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**FISHERIES IN THE SOUTH CHINA SEA AREA
FROM 1984 TO 1988 - FACTS AND FIGURES**

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CONTENTS

	Page
Introduction	1
Summary Notes	2
1. Fishery Production in the Region	2
2. Fishery Production by Country	4
3. Fishery Production by Sub-sector	6
4. Fishery Production by Sub-sector by Country	10
5. Number of Fishing Boats by Type	22
6. Number of Fishermen by Working Status	24
7. Major Twenty Marine Species Caught in the Region	28
8. Inland Fishery Production in Quantity and Value by Country	36
9. Aquaculture	40
9.1 Mariculture Production	40
9.2 Brackishwater Culture Production	44
9.3 Freshwater Culture Production	48
10. Disposition of Catch (Percentage)	52
11. Export and Import of Fishery Commodities	54
Appendix	58

LIST OF FIGURES

	Page
Fig. 1-1. Total fishery production in quantity in the Region.	3
Fig. 1-2. Total fishery production in value in the Region.	3
Fig. 2-1. Fishery production of eight countries in quantity.	5
Fig. 2-2. Fishery production of eight countries in value.	5
Fig. 3-1. Marine capture fishery production in quantity (A) and value (B) in the Region.	7
Fig. 3-2. Inland capture fishery production in quantity (A) and value (B) in the Region.	7
Fig. 3-3. Aquaculture production in quantity (A) and value (B) in the Region.	7
Fig. 3-4. Percentage of fishery production in quantity by sub-sector in the Region.	8
Fig. 3-5. Percentage of fishery production in value by sub-sector in the Region.	9
Fig. 4-1. 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.	11

	Page
Fig. 4-2. Fishery production in value by sub-sector by country. Data from eight countries. Abbreviations are the same as those in Fig. 4-1.	12
Fig. 4-3. Marine capture fishery production in quantity by country. Data from eight countries. Abbreviations are the same as those in Fig. 4-1.	13
Fig. 4-4. Marine capture fishery production in value by country. Data from eight countries. Abbreviations are the same as those in Fig. 4-1.	14
Fig. 4-5. Inland capture fishery production in quantity by country. Data from eight countries. Abbreviations are the same as those in Fig. 4-1.	15
Fig. 4-6. Inland capture fishery production in value by country. Data from eight countries. Abbreviations are the same as those in Fig. 4-1.	16
Fig. 4-7. Aquaculture production in quantity by country. Data from seven countries. Abbreviations are the same as those in Fig. 4-1.	17
Fig. 4-8. Aquaculture production in value by country. Data from seven countries. Abbreviations are the same as those in Fig. 4-1.	18
Fig. 4-9. Percentage of aquaculture production in quantity by breakdown sub-sector in the Region.	20

	Page
Fig. 4-10. Percentage of aquaculture production in value by breakdown sub-sector in the Region.	21
Fig. 5-1. Number of fishing boats by type. A. Brunei; B. Indonesia; C. Malaysia; D. Philippines; E. Singapore; F. Thailand.	23
Fig. 6-1. 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.	25
Fig. 6-2. Number of fishermen by working status (2). A. Malaysia; B. Philippines; C. Singapore; D. Thailand. Abbreviations are the same as those in Fig. 6-1.	27
Fig. 7-1. Trends of major species catch quantity from seven countries (1). Misc. fishes, Miscellaneous fishes.	28
Fig. 7-2. Trends of major species catch quantity from seven countries (2). Eastern l. tuna, Eastern little tuna; Indo-P. mackerel, Indo-Pacific mackerel; Misc. m. molluscs, Miscellaneous marine molluscs; Jacks, c., trevallies, Jacks - cavalla - trevallies; Frigate & b. tuna, Frigate and bullet tuna.	29
Fig. 7-3. Percentage of major species catch quantity from seven countries (1). Misc. fishes, Miscellaneous fishes.	30
Fig. 7-4. Percentage of major species catch quantity from seven countries (2). Eastern l. tuna, Eastern. little tuna.	30
Fig. 7-5. Percentage of major species catch quantity from seven countries (3). Indo-P. mackerel, Indo-Pacific mackerel.	31

Fig. 7-6.	Percentage of major species catch quantity from seven countries (4). Misc. m. molluscs, Miscellaneous marine molluscs; Jacks, c., trevallies, Jacks - cavalla - trevallies; Frigate & b. tuna, Frigate and bullet tuna.	31
Fig. 7-7.	Trends of major species catch in value from seven countries (1). Misc. fishes, Miscellaneous fishes.	32
Fig. 7-8.	Trends of major species catch in value from seven countries (2). Eastern l. tuna, Eastern little tuna; Indo-P. mackerel, Indo-Pacific mackerel, Frigate & b. tuna, Frigate and bullet tuna; Narrow-b. k. mackerel, Narrow-barred king mackerel.	33
Fig. 7-9.	Value percentages of major species caught from seven countries (1). Misc. fishes, Miscellaneous fishes.	34
Fig. 7-10.	Value percentages of major species caught from seven countries (2). Eastern l. tuna, Eastern little tuna.	34
Fig. 7-11.	Value percentages of major species caught from seven countries (3). Indo-P. mackerel, Indo-Pacific mackerel.	35
Fig. 7-12.	Value percentages of major species caught from seven countries (4). Frigate & b. tuna, Frigate and bullet tuna; Narrow-b. k. mackerel, Narrow-barred king mackerel.	35
Fig. 8-1.	Inland capture fishery production in quantity and value (1). A. Brunei; B. Taiwan; C. Indonesia.	37
Fig. 8-2	Inland capture fishery production in quantity and value (2). A. Malaysia; B. Philippines; C. Thailand.	39

	Page
Fig. 9-1. Percentage of major species groups of mariculture production in quantity from six countries. Blood c., Blood cockles; Sea m., Sea mussels; Other a., Other animals.	41
Fig. 9-2. Percentage of major species groups of mariculture production in value from six countries. Abbreviations are the same as those in Fig. 9-1.	43
Fig. 9-3. Percentage of major species groups of brackish-water culture production in quantity from six countries. Penaeid p., Penaeid prawns; Other f., Other fishes; Non-p.p., Non-penaeid prawns; Other c., Other crustaceans.	45
Fig. 9-4. Percentage of major species groups of brackish-water culture production in value from six countries. Abbreviations are the same as those in Fig. 9-3.	47
Fig. 9-5. Percentage of major species groups of freshwater culture production in quantity from six countries. Carp, b. & other c., Carps, barbels and other cyprinids; Tilapia & other c., Tilapia and other cichlids; Misc. f.f., Miscellaneous freshwater fishes; Other f.a., Other freshwater animals.	49
Fig. 9-6. Percentage of major species groups of freshwater culture production in value from six countries. Abbreviations are the same as those in Fig. 9-5. ..	51
Fig. 10-1. The ratio of disposition of catch from six countries. Ta. Taiwan; Hk. Hong Kong; In. Indonesia; Ma. Malaysia; Si. Singapore; Th. Thailand; Misc. products, Miscellaenous products.	53

	Page
Fig. 11-1. Export and import of fishery commodities in value (1). A. Brunei; B. Taiwan; C. Hong Kong; D. Indonesia.	55
Fig. 11-2. Export and import of fishery commodities in value (2). A. Malaysia; B. Philippines; C. Singapore; D. Thailand.	57

INTRODUCTION

Fishery Statistical Bulletins for the South China Sea Area have been published (1988 edition published in 1990) annually by SEAFDEC from 1976 up to 1988. The objective of the Bulletin is to provide standardized classifications and definitions of fishery statistics for data comparison and analysis. The Bulletin, also, provides 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 in the South China Sea Area, this paper was compiled as summary notes covering the five years from 1984 to 1988, and includes figures and brief notes.

The Bulletin covers the South China sea Area designated by FAO Fishing Area 71 and the territorial waters of the Andaman Sea belonging to Malaysia and Thailand.

Data was not always available for each section from individual countries and there is therefore a brief note in the brackets before the explanatory notes. Some other explanations are contained in the Appendix; greater detail can be found in the Bulletins.

SUMMARY NOTES

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 were obtained from all ten countries: Brunei, Taiwan, Hong Kong, Indonesia, Kampuchea, Malaysia, Philippines, Singapore, Thailand and Viet Nam.]

As shown in Fig. 1-1, the total fishery production in the Region in quantity during the period from 1984 to 1988 showed a rising trend. It increased from 8.8 million metric tons in 1984 to 10.5 million metric tons in 1988. In terms of value, the production in the Region also showed an initial rising trend from 5,574 million US\$ in 1984 to 6,106 million US\$ in 1986 but figures declined to 5,762 and 6,088 million US\$ in 1987 and 1988. The reason for this decline was the unavailability of value data from Indonesia in 1987 and 1988 as shown in Fig. 1-2.

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

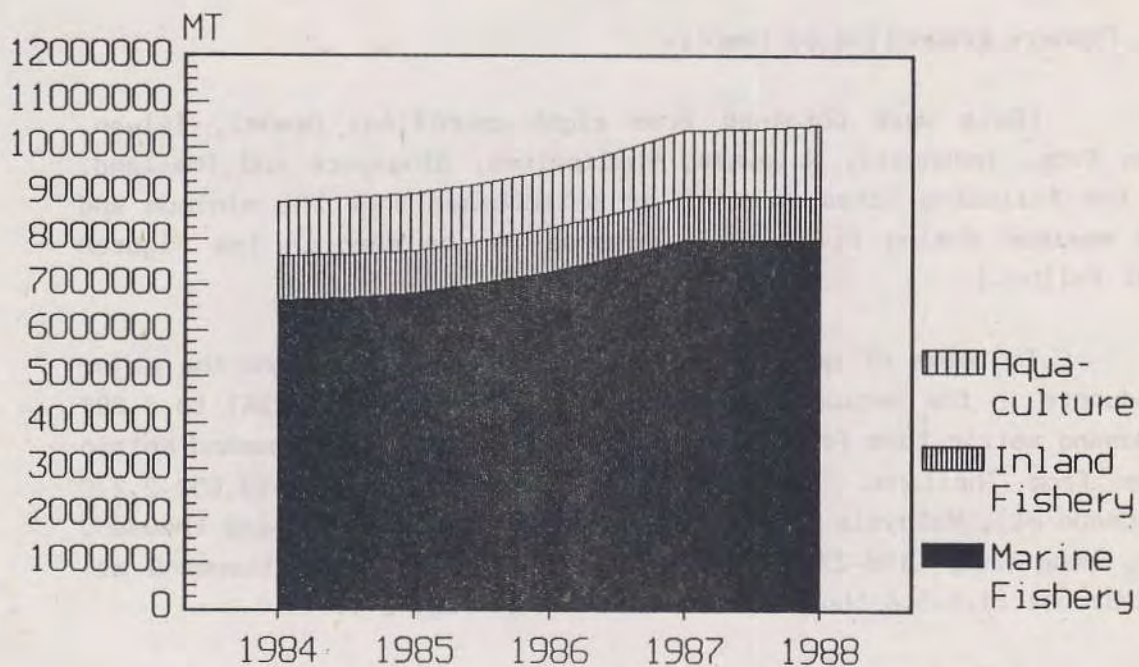


Fig. 1-1 Total fishery production in quantity in the Region.

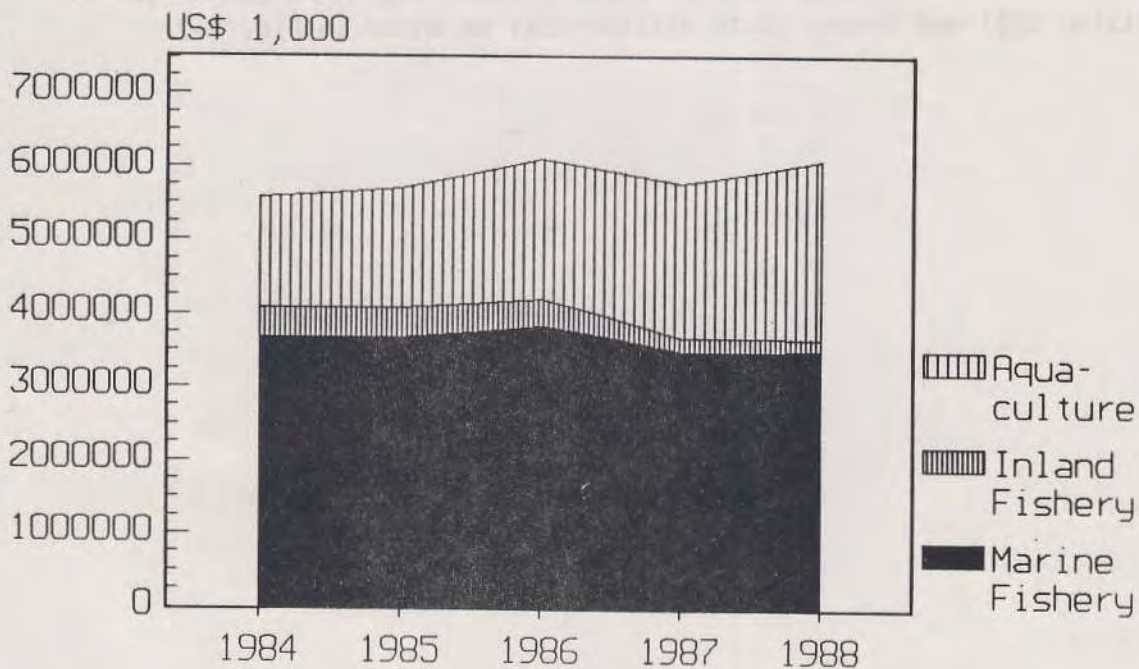


Fig. 1-2 Total fishery production in value in the Region.

2. Fishery Production by Country

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

In terms of quantity, Indonesia and Thailand were the major producers in the Region during this period with about 2,261 to 2,881 thousand metric tons from Indonesia and 2,135 to 2,779 thousand metric tons from Thailand. Following were the Philippines (2,052-2,270 thousand mt), Malaysia (619-909 thousand mt), Taiwan (596-668 thousand mt), Hong Kong (198-238 thousand mt), Singapore (15-25 thousand mt) and Brunei (1.6-5.6 thousand mt) as shown in Fig. 2-1.

In terms of value, the Philippines predominated making about 1,644 to 1,996 million US\$ followed by Indonesia (1,102-1,303 million US\$) (value data in 1987 and 1988 were not available); Taiwan (1,109-1,995 million US\$); Thailand (727-1,257 million US\$); Malaysia (554-580 million US\$); Hong Kong (232-301 million US\$); Singapore (20-47 million US\$) and Brunei (5-18 million US\$) as shown in Fig. 2-2.



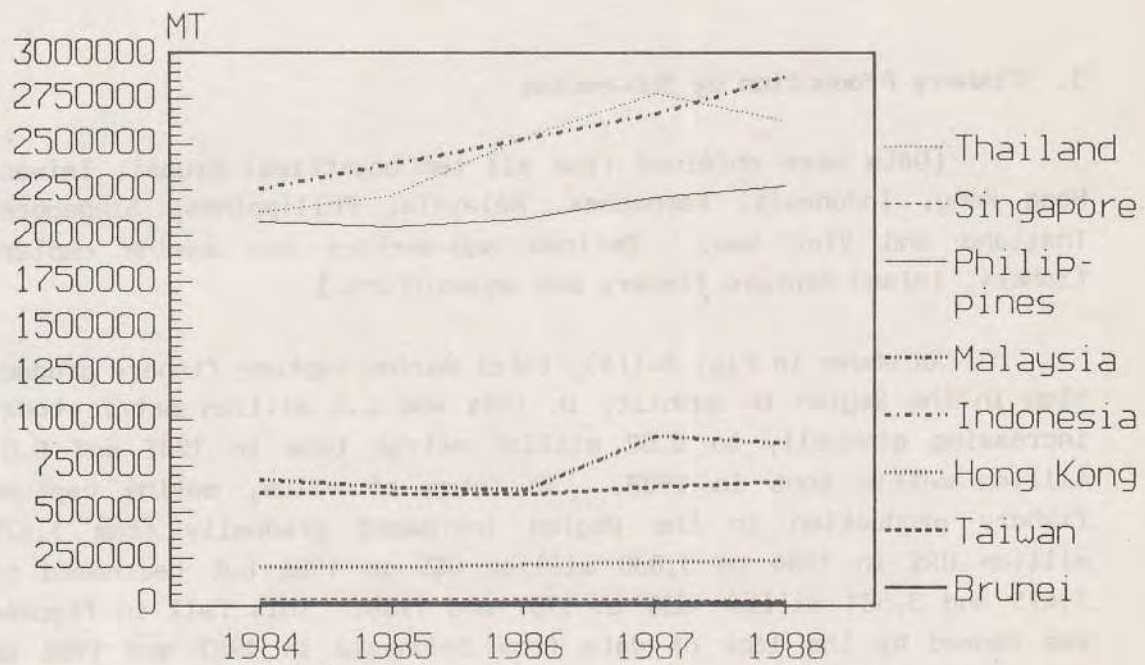


Fig. 2-1 Fishery production of eight countries in quantity.

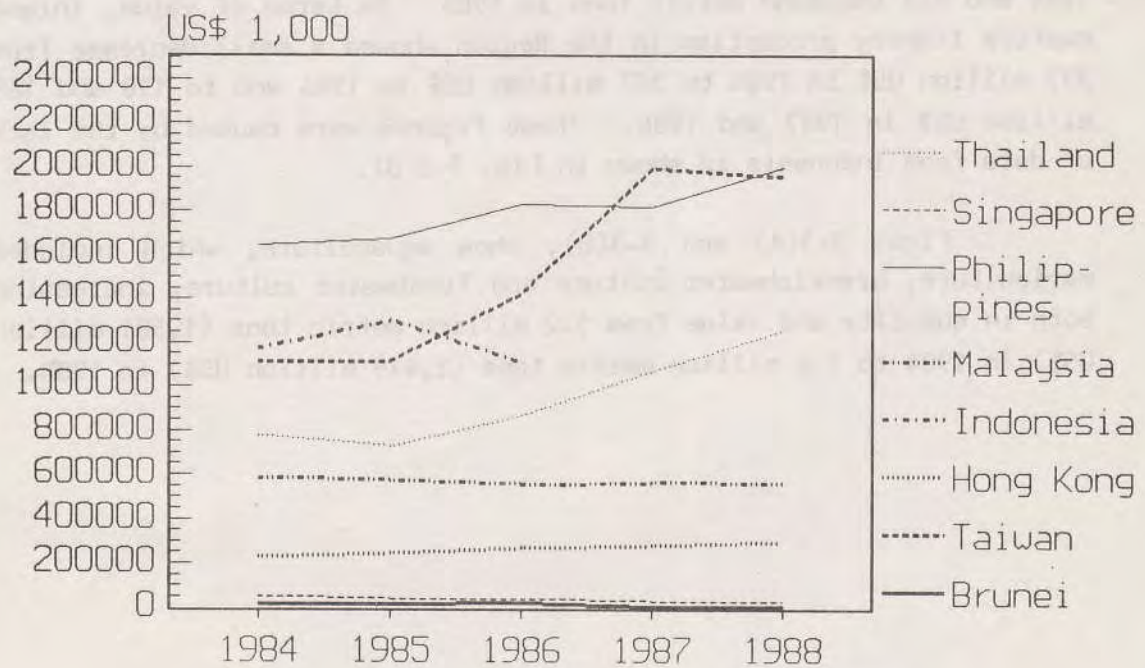


Fig. 2-2 Fishery production of eight countries in value.

3. Fishery Production by Sub-sector

[Data were 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. 3-1(A), total marine capture fishery production in the Region in quantity in 1984 was 6.6 million metric tons, increasing gradually to 8.02 million metric tons in 1987 and 8.01 million metric tons in 1988. In terms of value, marine capture fishery production in the Region increased gradually from 3,675 million US\$ in 1984 to 3,830 million US\$ in 1986 but decreased to 3,495 and 3,501 million US\$ in 1987 and 1988. This fall in figures was caused by the lack of data from Indonesia in 1987 and 1988 as shown in Fig. 3-1(B).

Fig. 3-2(A) shows regional inland capture fishery production in quantity. This fluctuated, between 967 thousand metric tons in 1984 and 913 thousand metric tons in 1988. In terms of value, inland capture fishery production in the Region showed a small decrease from 397 million US\$ in 1984 to 367 million US\$ in 1986 and to 178 and 168 million US\$ in 1987 and 1988. These figures were caused by the lack of data from Indonesia as shown in Fig. 3-2(B).

Figs. 3-3(A) and 3-3(B), show aquaculture, which includes mariculture, brackishwater culture and freshwater culture, increasing both in quantity and value from 1.2 million metric tons (1,501 million US\$) in 1984 to 1.6 million metric tons (2,419 million US\$) in 1988.

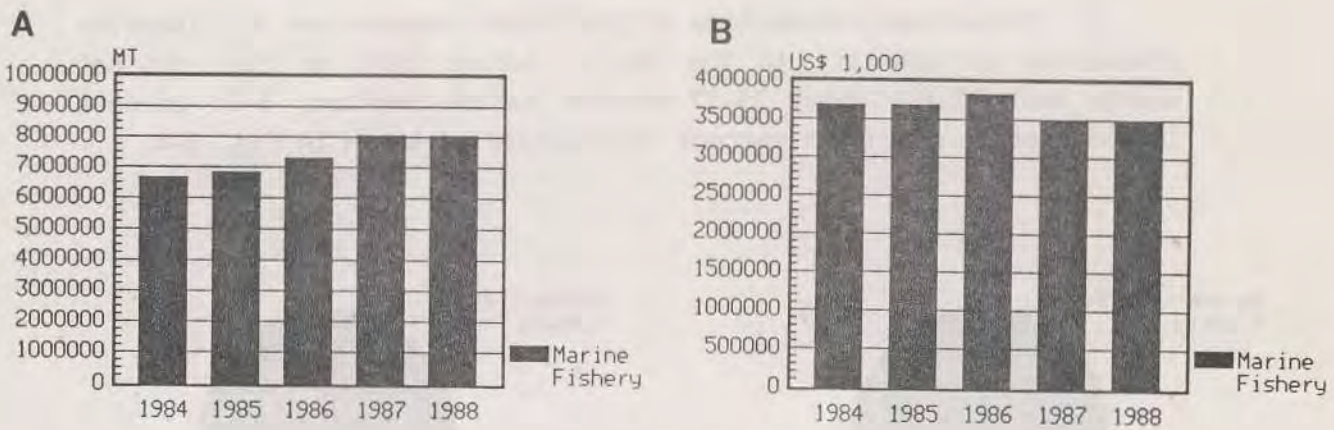


Fig. 3-1 Marine capture fishery production in quantity (A) and value (B) in the Region.

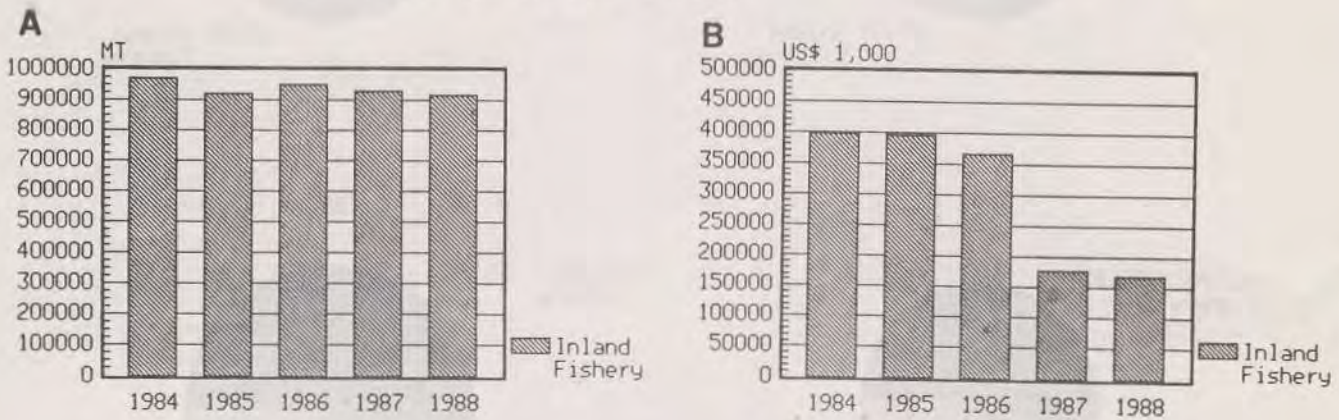


Fig. 3-2 Inland capture fishery production in quantity (A) and value (B) in the Region.

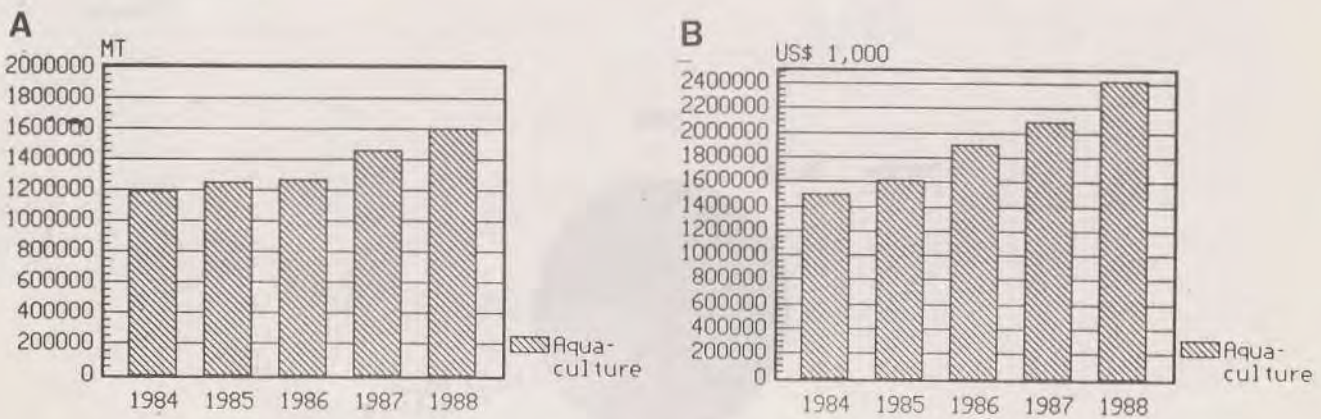


Fig. 3-3 Aquaculture production in quantity (A) and value (B) in the Region.

Percentage composition of the three sub-sectors of fisheries production in quantity in the Region during 1984 to 1988 did not change much, i.e., about 75-77 percent marine capture, 8-11 percent inland capture and 13-15 percent aquaculture as shown in Fig. 3-4.

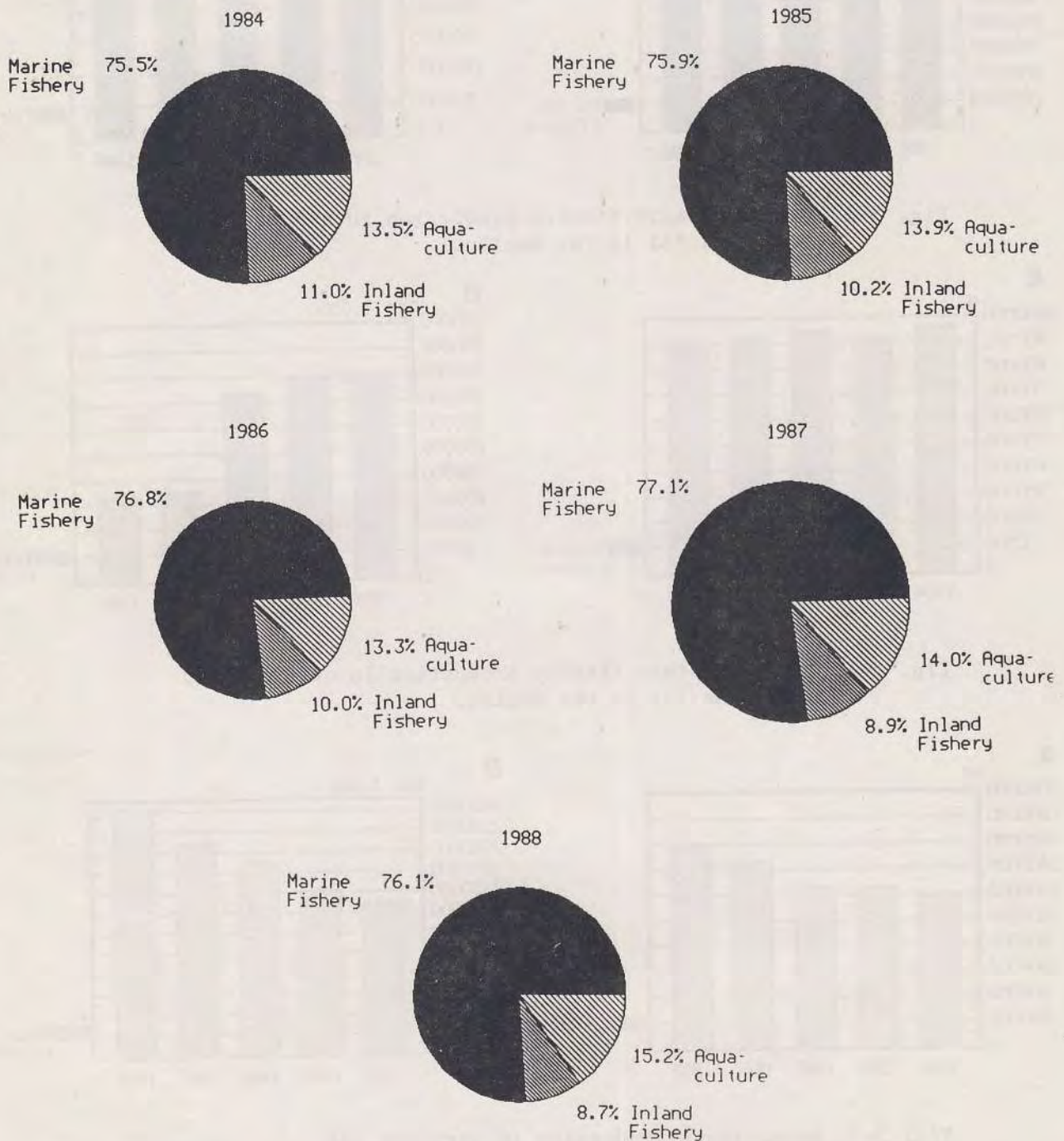


Fig. 3-4 Percentage of fishery production in quantity by sub-sector in the Region.

In terms of value, figures did not change much, although there was a decrease in marine capture, from 65.9 percent in 1984 to 57.5 percent in 1988, and inland capture, from 7.1 percent in 1984 to 2.8 percent in 1988. The reason for this decrease was the unavailability of value data from Indonesia in 1987 and 1988. Aquaculture, however, showed an increasing trend, from 26.9 percent in 1984 to 39.7 percent in 1988 as shown in Fig. 3-5.

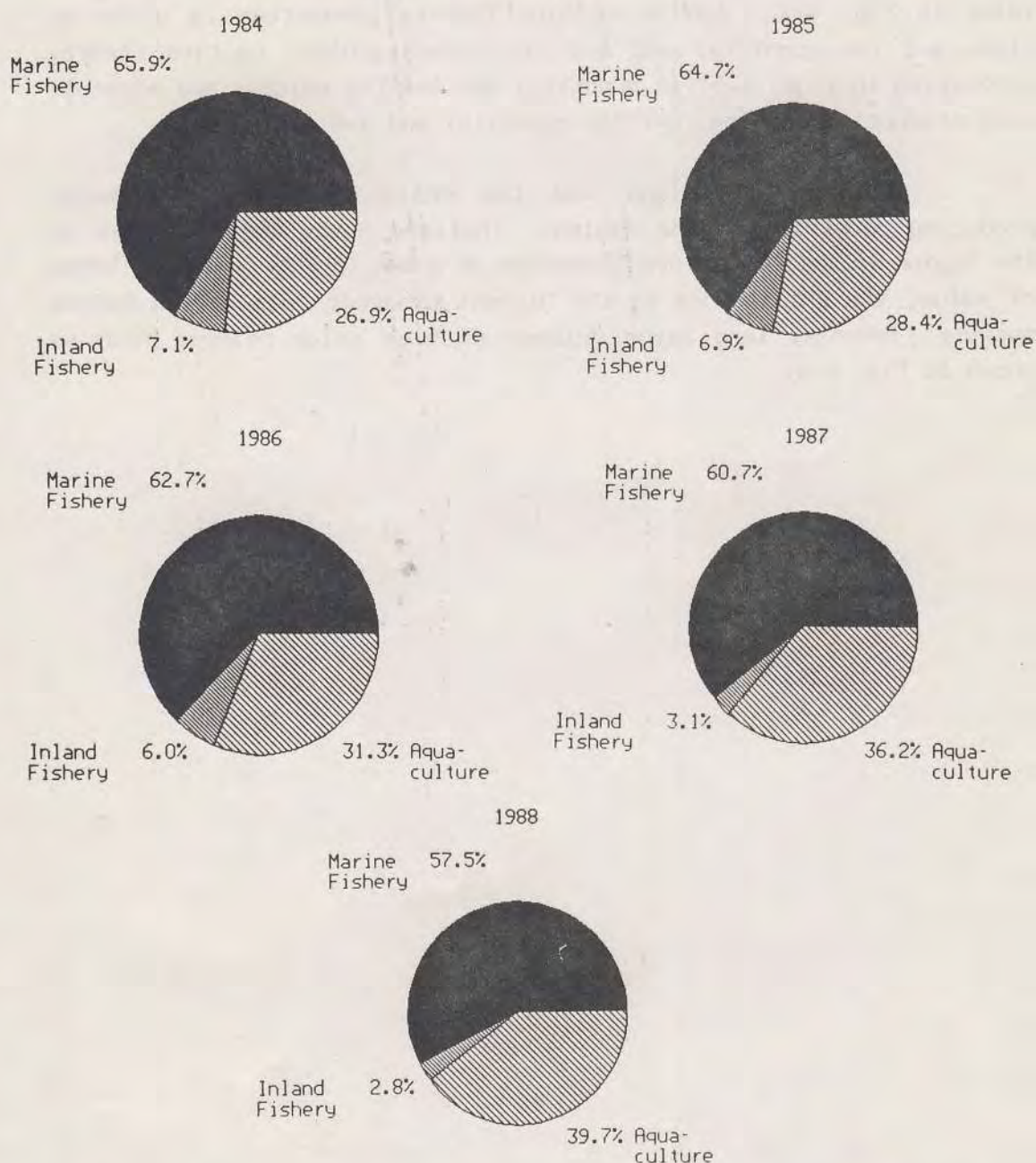


Fig. 3-5 Percentage of fishery production in value by sub-sector in the Region.

4. Fishery Production by Sub-sector by Country

[Data were obtained from eight countries; Brunei, Taiwan, Hong Kong, Indonesia, Malaysia, Philippines, Singapore and Thailand.]

Fishery production in quantity is shown in Fig. 4-1 and in value in Fig. 4-2. Marine capture fishery production is shown in Figs. 4-3 (in quantity) and 4-4 (in value); inland capture fishery production in Figs. 4-5 (in quantity) and 4-6 (in value); and aquaculture production in Figs. 4-7 (in quantity) and 4-8 (in value).

Indonesia, Thailand and the Philippines are the major producing countries in the Region. Thailand heads the countries in the Region in marine capture fisheries as shown in Fig. 4-3. In terms of value, the Philippines is the highest producer because its marine capture fisheries land large volumes of high value pelagic fish as shown in Fig. 4-4.

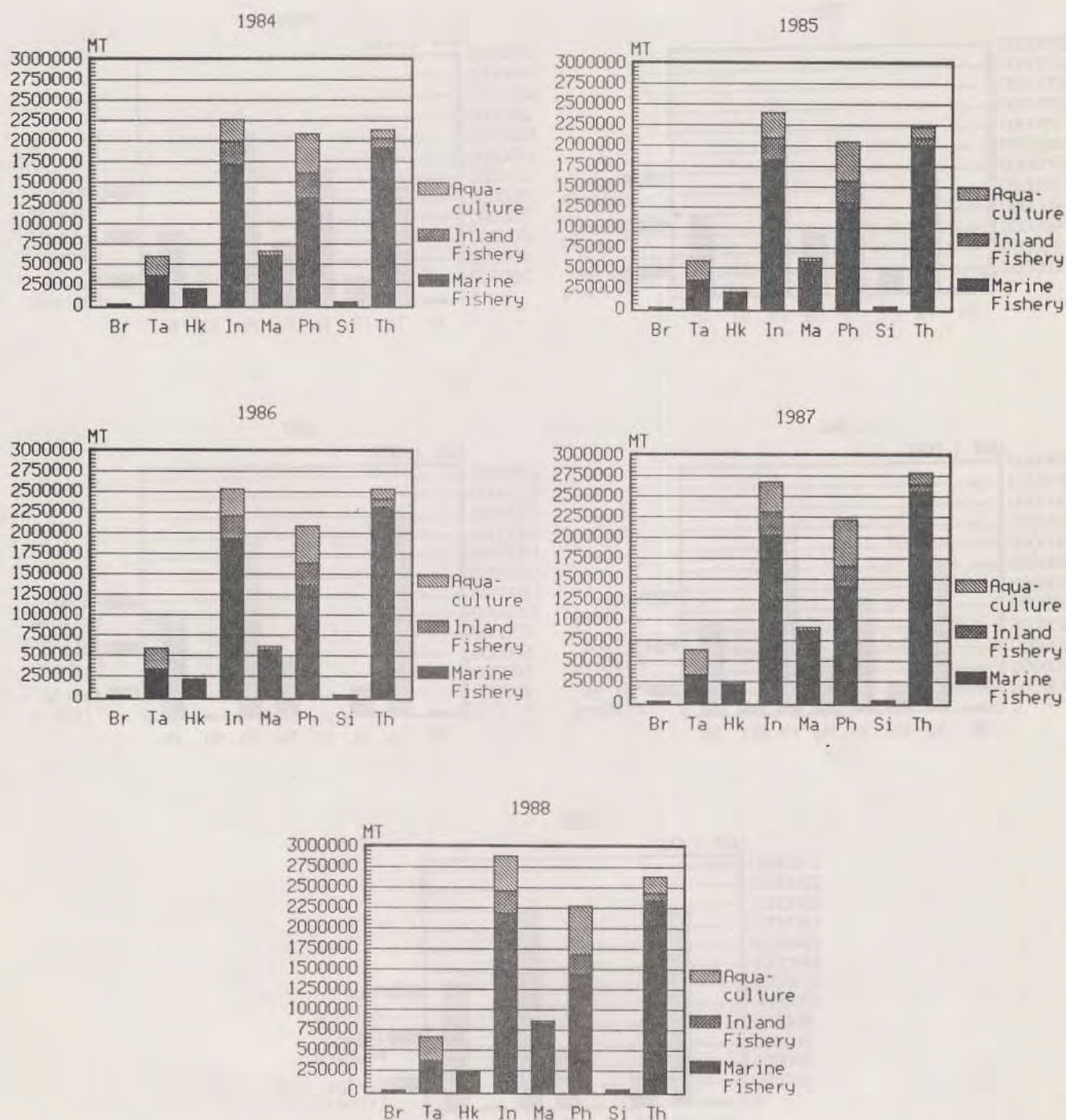


Fig. 4-1 Fishery production in quantity by sub-sector by country. Data from eight countries.
Br. Brunei; Ta. Taiwan; Hk. Hong Kong;
In. Indonesia; Ma. Malaysia; Ph. Philippines;
Si. Singapore; Th. Thailand.

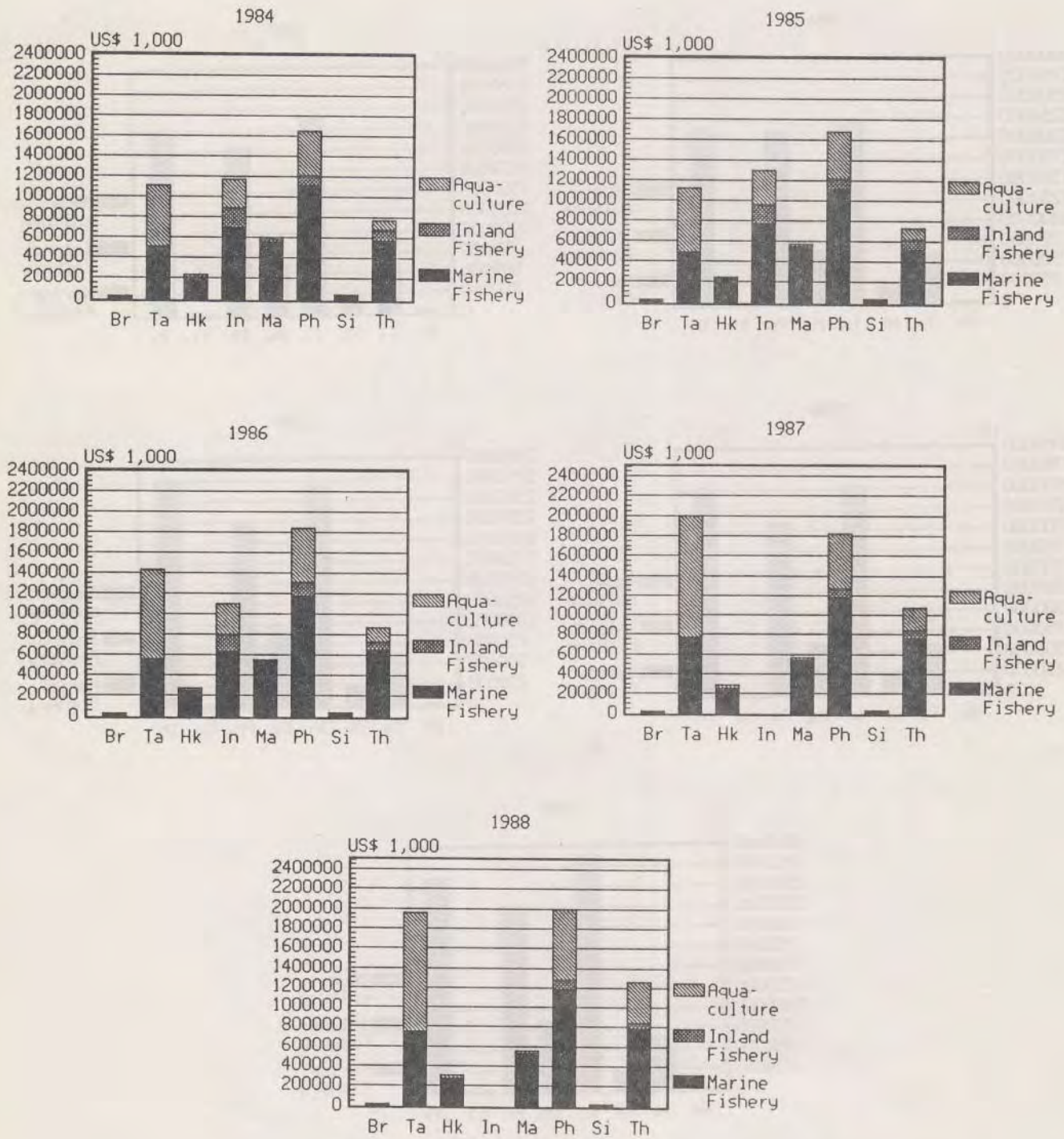


Fig. 4-2 Fishery production in value by sub-sector by country. Data from eight countries. Abbreviations are the same as those in Fig. 4-1.

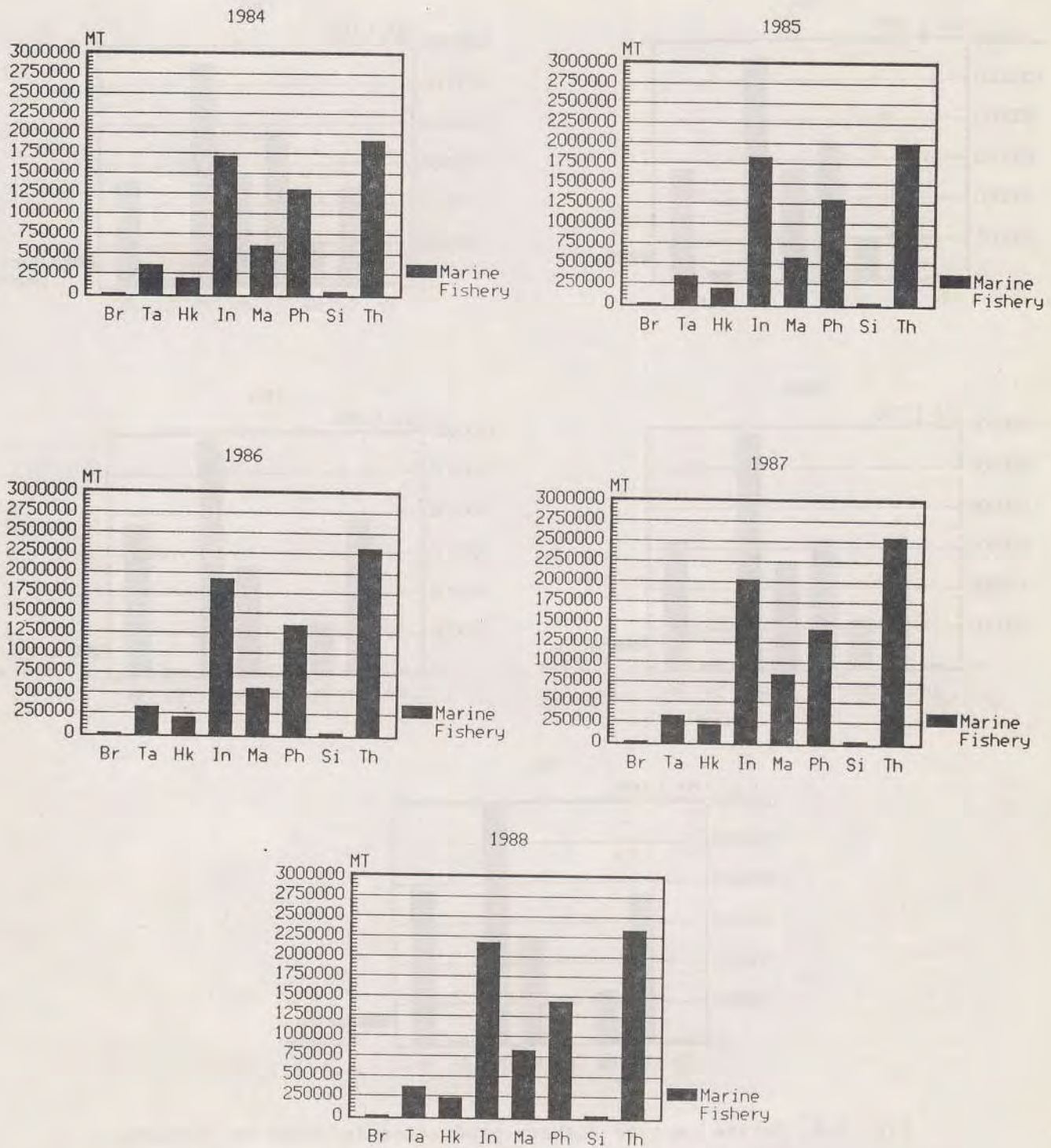


Fig. 4-3 Marine capture fishery production in quantity by country. Data from eight countries. Abbreviations are the same as those in Fig. 4-1.

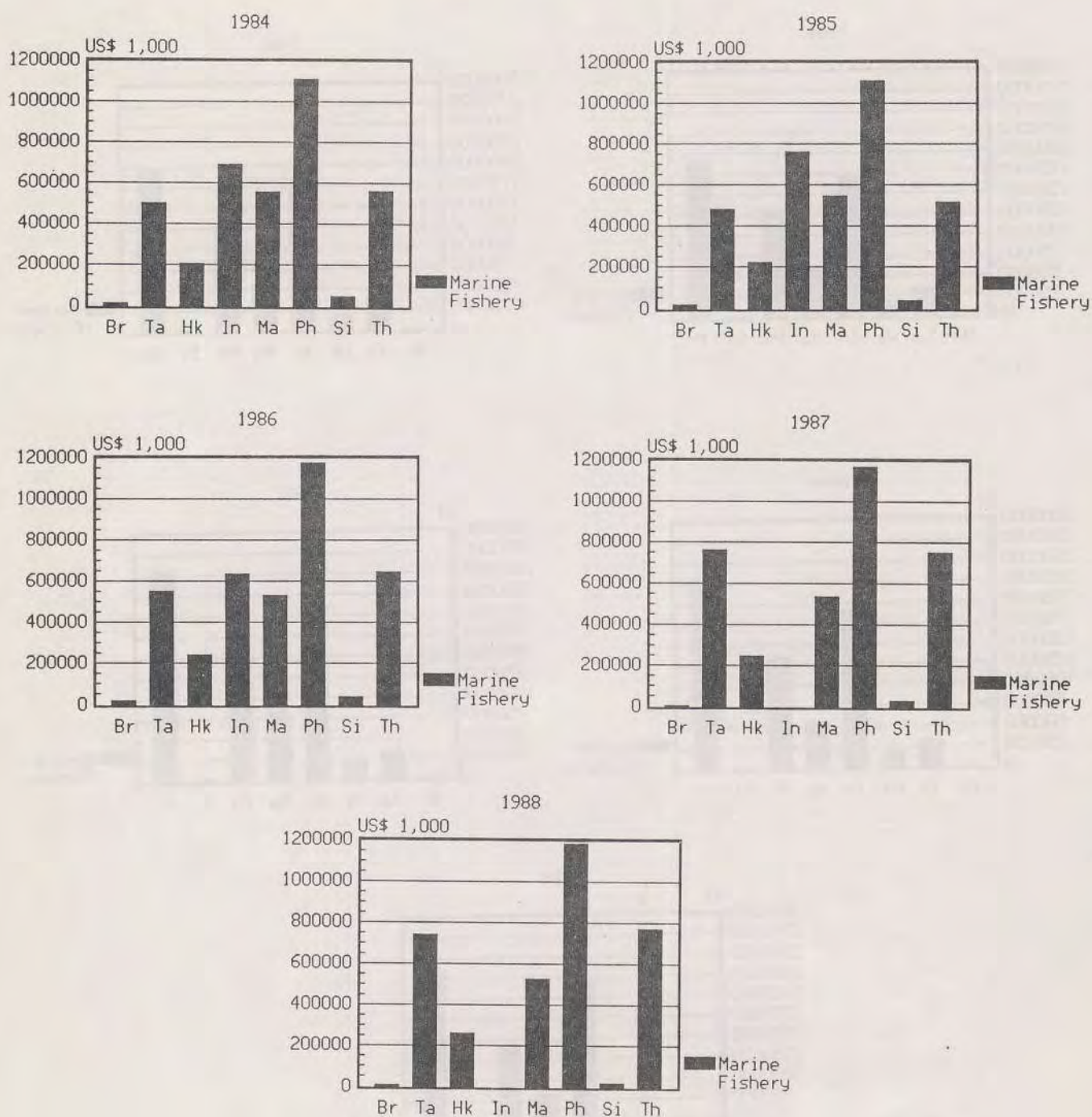


Fig. 4-4 Marine capture fishery production in value by country. Data from eight countries. Abbreviations are the same as those in Fig. 4-1.

Indonesia is the biggest inland capture fisheries producer in the Region, both in terms of quantity and value, except for 1987 and 1988 when value data were not available as shown in Fig. 4-5 and Fig. 4-6.

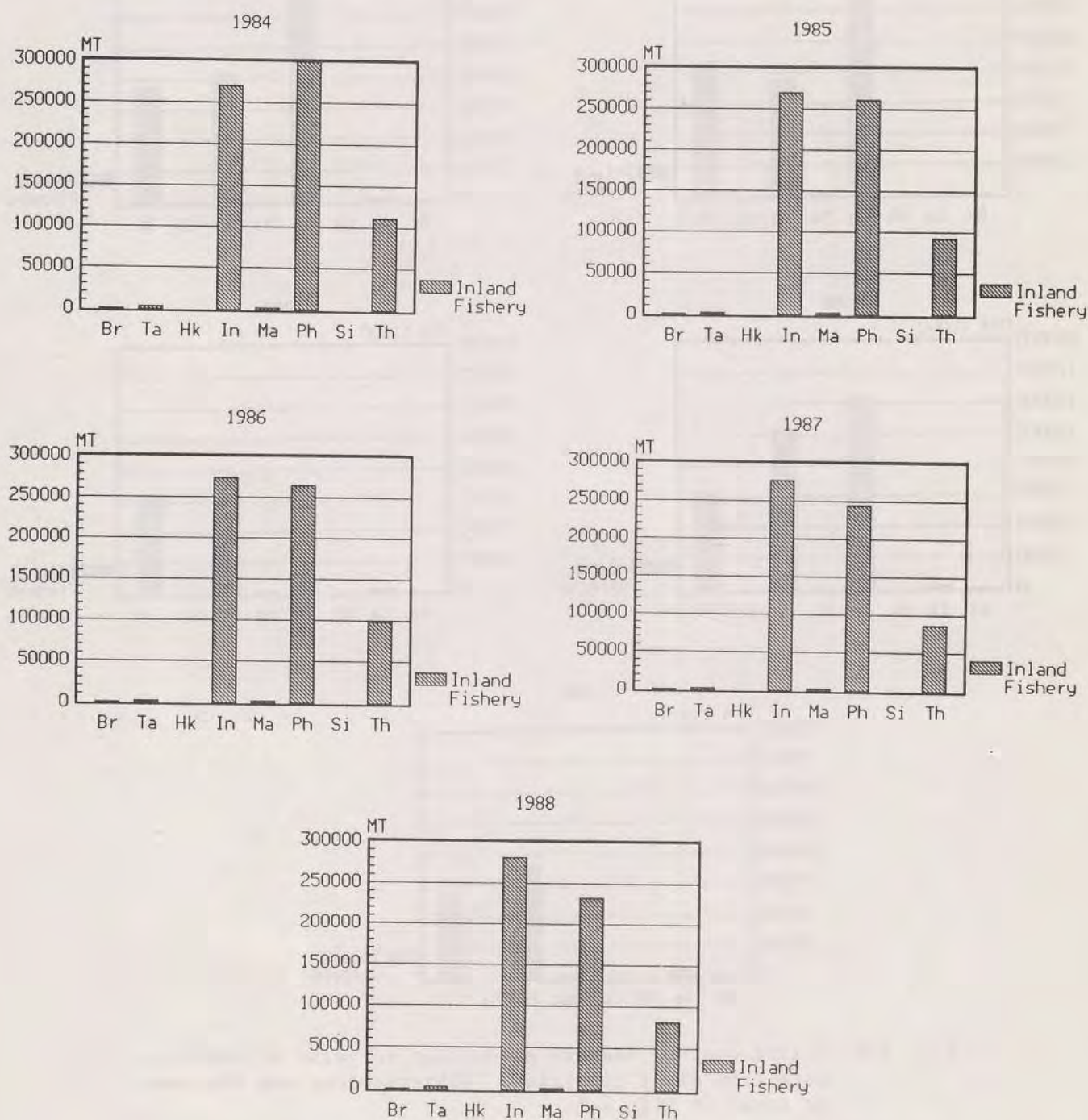


Fig. 4-5 Inland capture fishery production in quantity by country. Data from eight countries. Abbreviations are the same as those in Fig. 4-1.

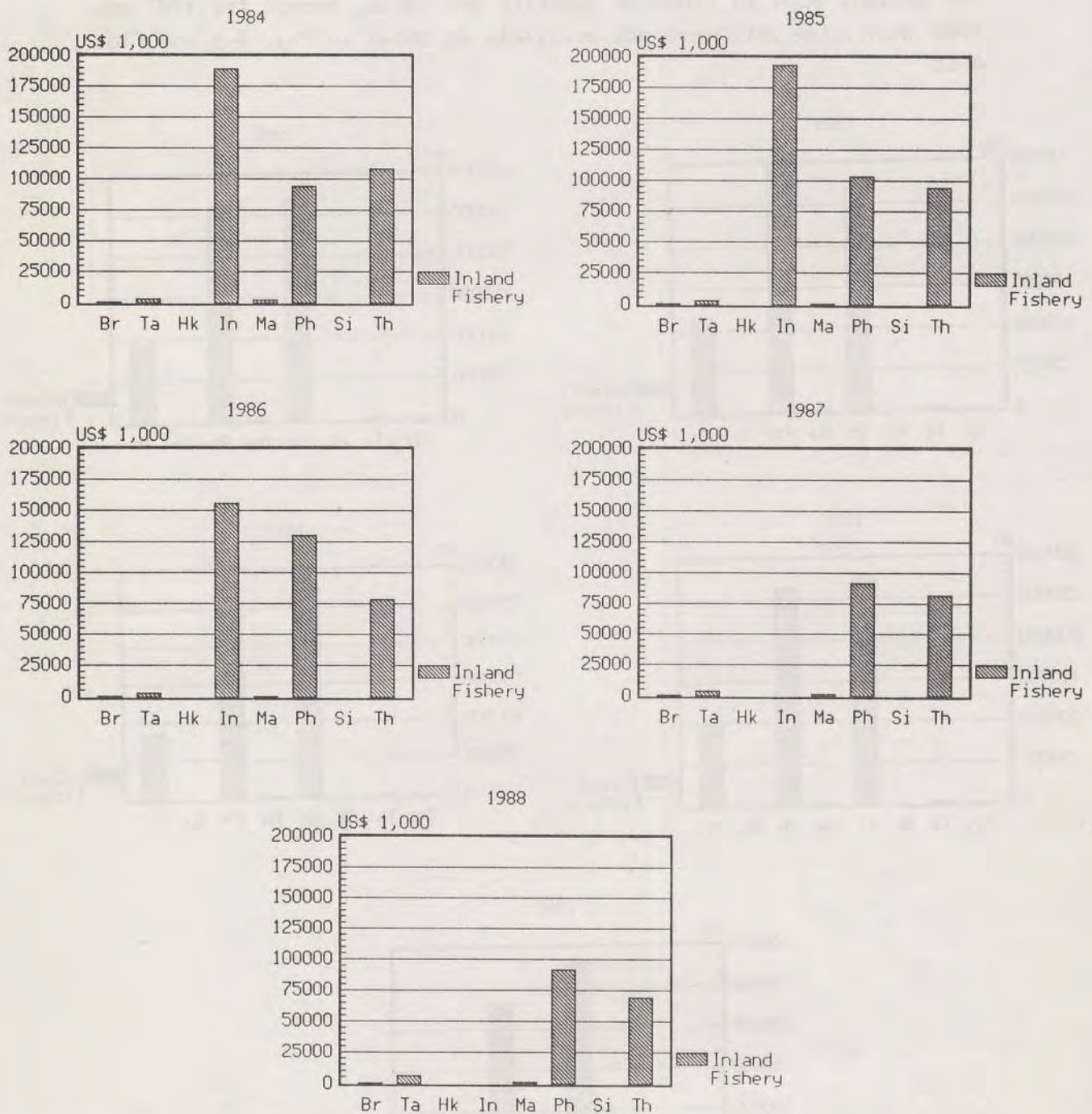


Fig. 4-6 Inland capture fishery production in value by country. Data from eight countries. Abbreviations are the same as those in Fig. 4-1.

With regard to aquaculture, the Philippines and Indonesia lead in terms of quantity but Taiwan has the highest value rating as shown in Fig. 4-7 and Fig. 4-8.

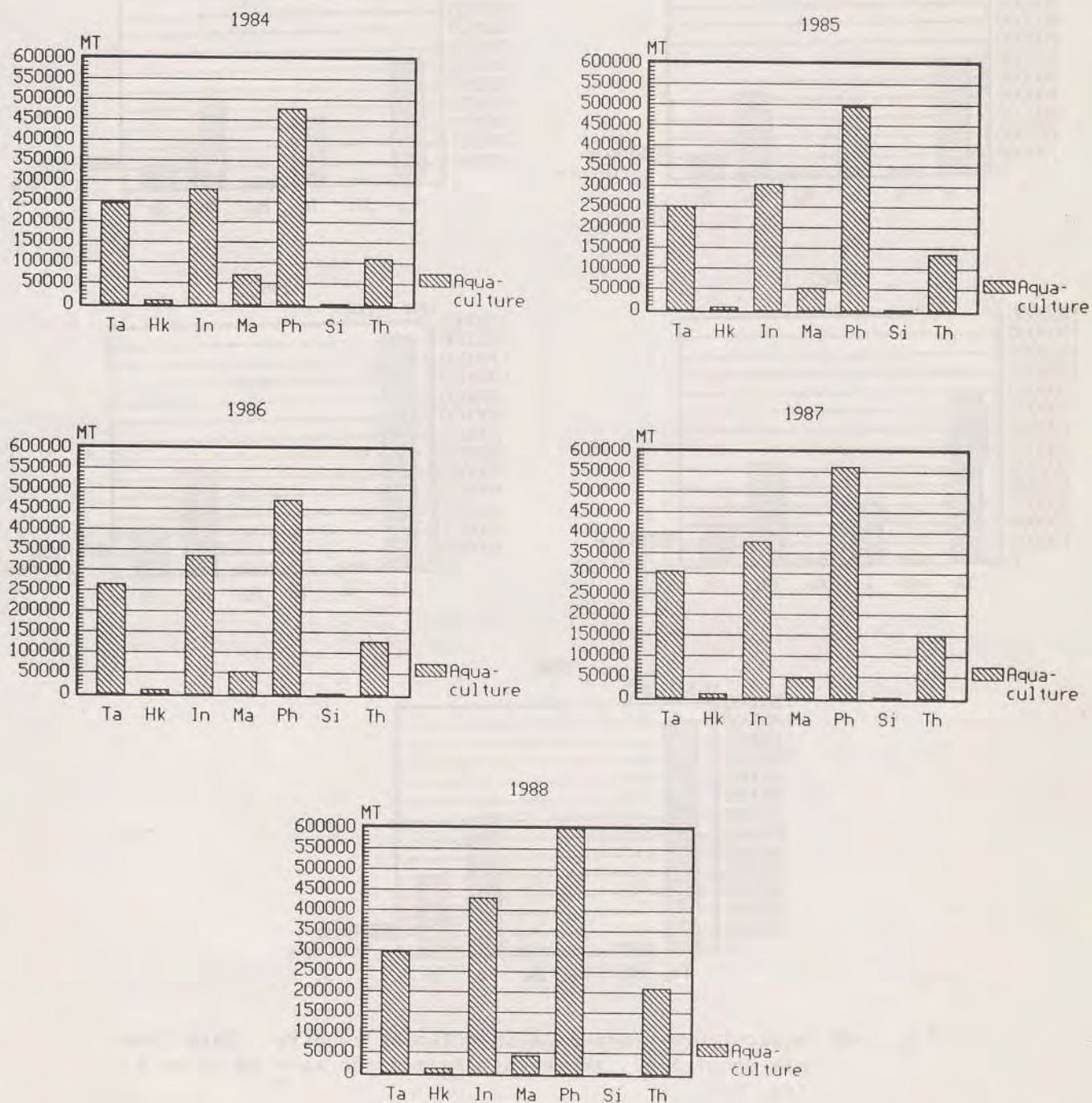


Fig. 4-7 Aquaculture production in quantity by country. Data from seven countries. Abbreviations are the same as those in Fig. 4-1.

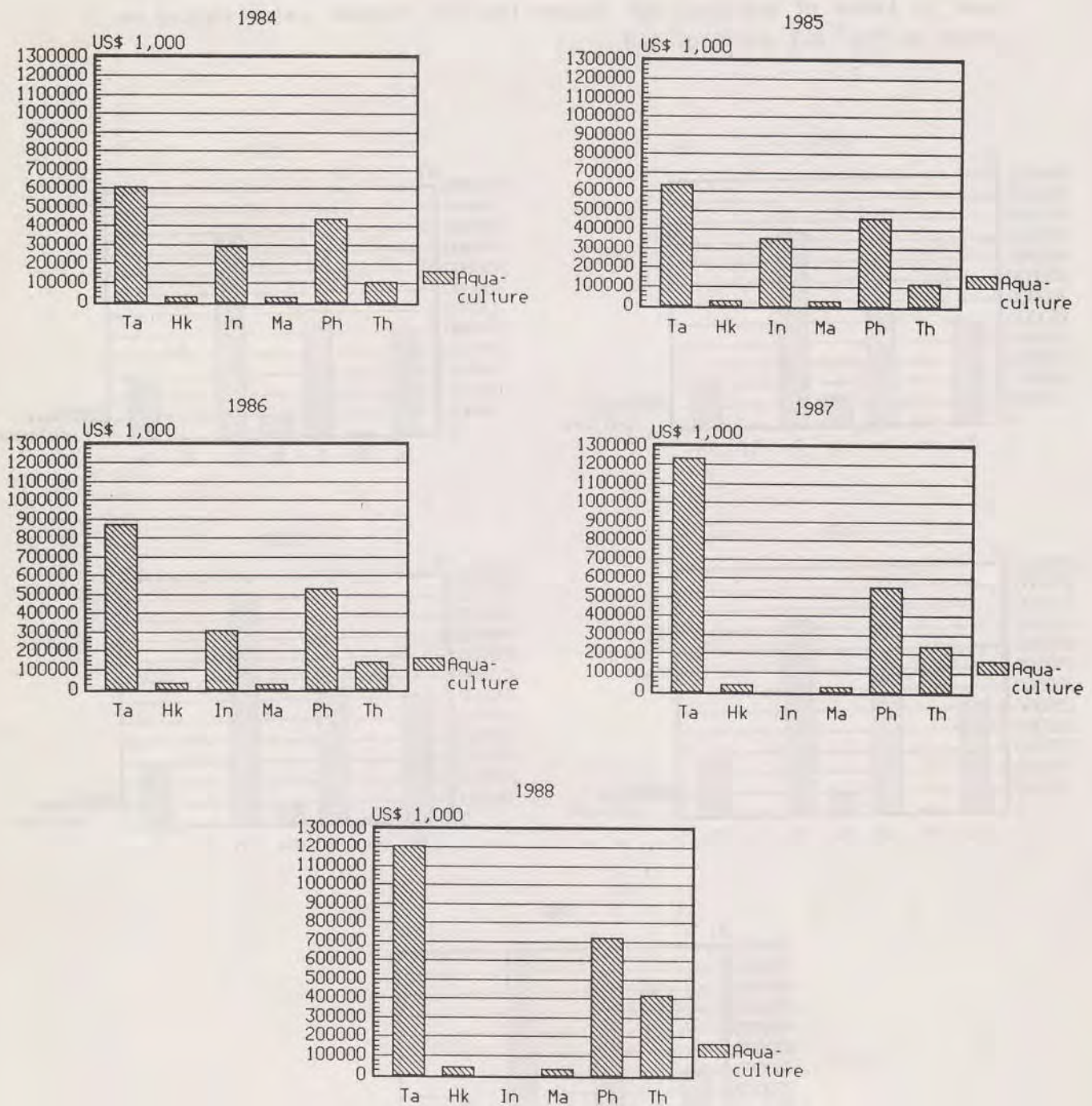


Fig. 4-8 Aquaculture production in value by country. Data from six countries. Abbreviations are the same as those in Fig. 4-1.

Composition of aquaculture in quantity from 1984-1988, showed little change. Mariculture constituted 23-27 percent, brackishwater culture 35-40 percent, and freshwater culture 35-37 percent as shown in Fig. 4-9.

In terms of value, brackishwater culture was the highest being between 44-58 percent during 1984-1988, followed by freshwater culture at 35-44 percent. Mariculture was a minor constituent at around 6-11 percent as shown in Fig. 4-10.

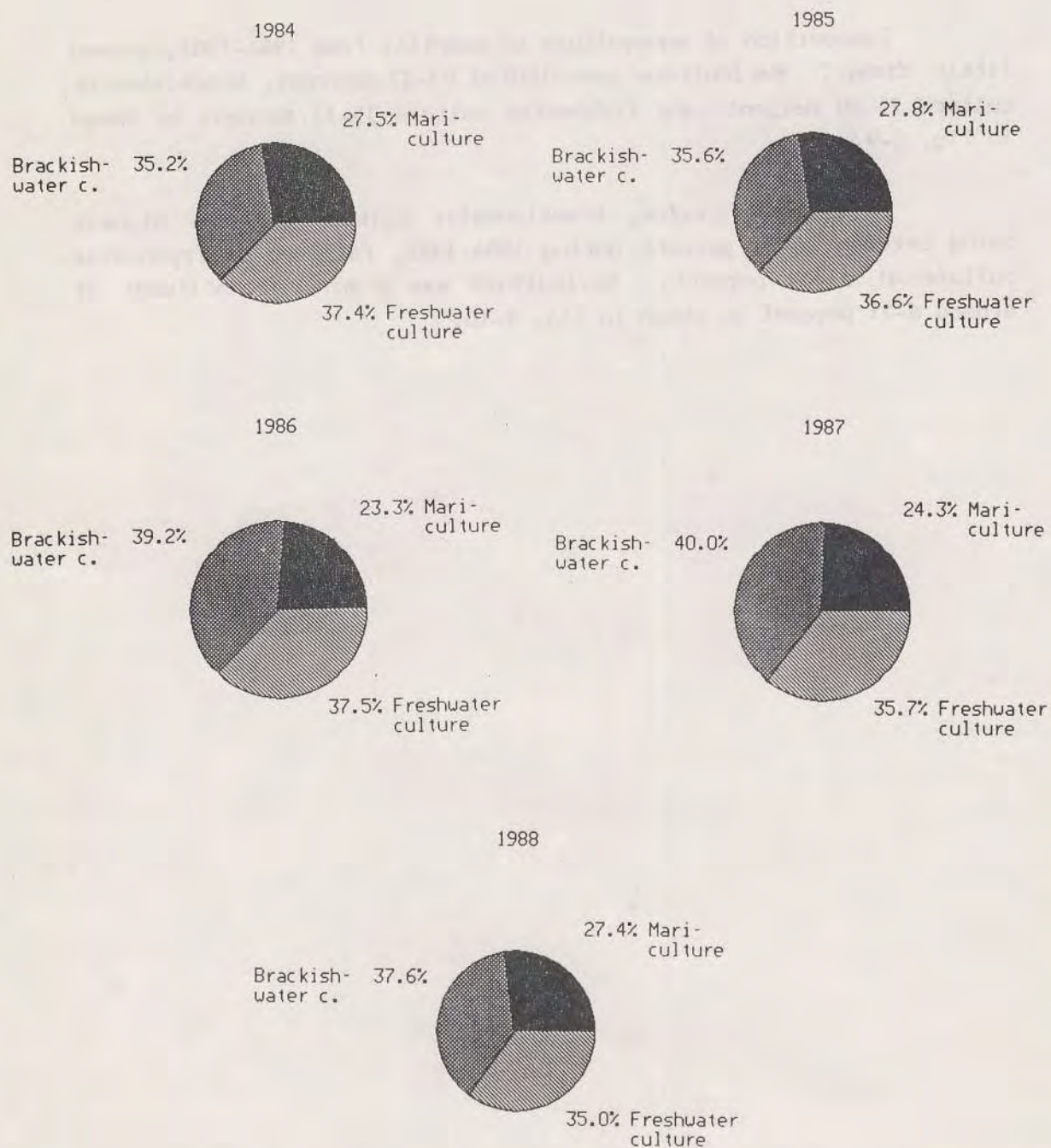


Fig. 4-9 Percentage of aquaculture production in quantity by breakdown sub-sector in the Region.

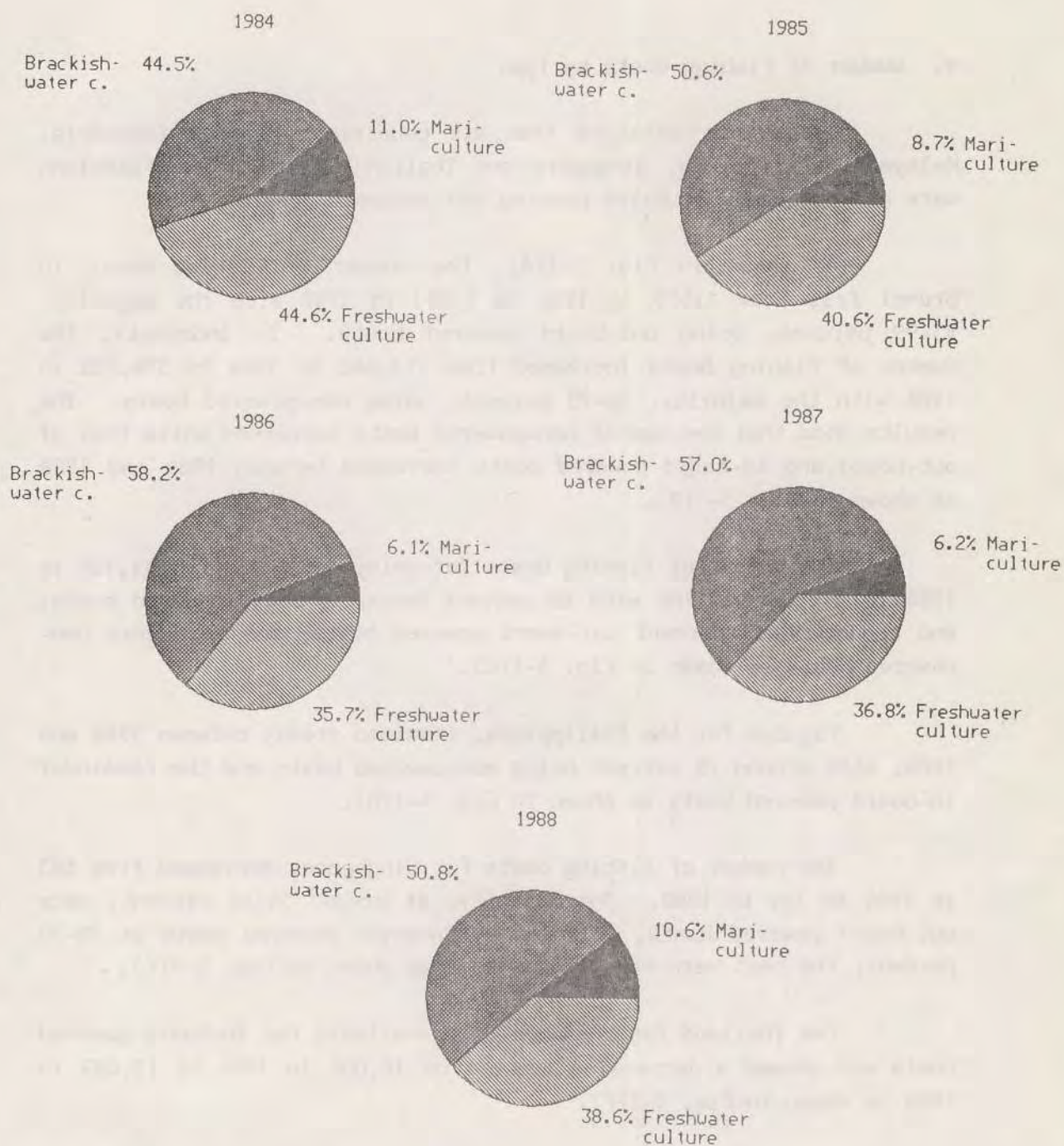


Fig. 4-10 Percentage of aquaculture production in value by breakdown sub-sector in the Region.

5. Number of Fishing Boats by Type

[Data were obtained from six countries: Brunei, Indonesia, Malaysia, Philippines, Singapore and Thailand. Boat classifications were non-powered, out-board powered and in-board powered.]

As shown in Fig. 5-1(A), the number of fishing boats in Brunei fell from 1,595 in 1984 to 1,280 in 1988 with the majority, 93-99 percent, being out-board powered boats. In Indonesia, the number of fishing boats increased from 313,640 in 1984 to 334,202 in 1988 with the majority, 66-70 percent, being non-powered boats. The results show that the use of non-powered boats decreased while that of out-board and in-board powered boats increased between 1984 and 1988 as shown in Fig. 5-1(B).

The number of fishing boats for Malaysia, fell from 41,109 in 1984 to 37,966 in 1988 with 60 percent being in-board powered boats, and around 30-35 percent out-board powered boats; the rest were non-powered boats as shown in Fig. 5-1(C).

Figures for the Philippines, remained steady between 1984 and 1988, with around 70 percent being non-powered boats and the remainder in-board powered boats as shown in Fig. 5-1(D).

The number of fishing boats for Singapore, decreased from 483 in 1984 to 384 in 1988. The majority, at around 54-61 percent, were out-board powered boats, followed by in-board powered boats at 35-38 percent; the rest were non-powered boat as shown in Fig. 5-1(E).

For Thailand figures were only available for in-board powered boats and showed a decreasing trend from 16,006 in 1984 to 15,489 in 1988 as shown in Fig. 5-1(F).

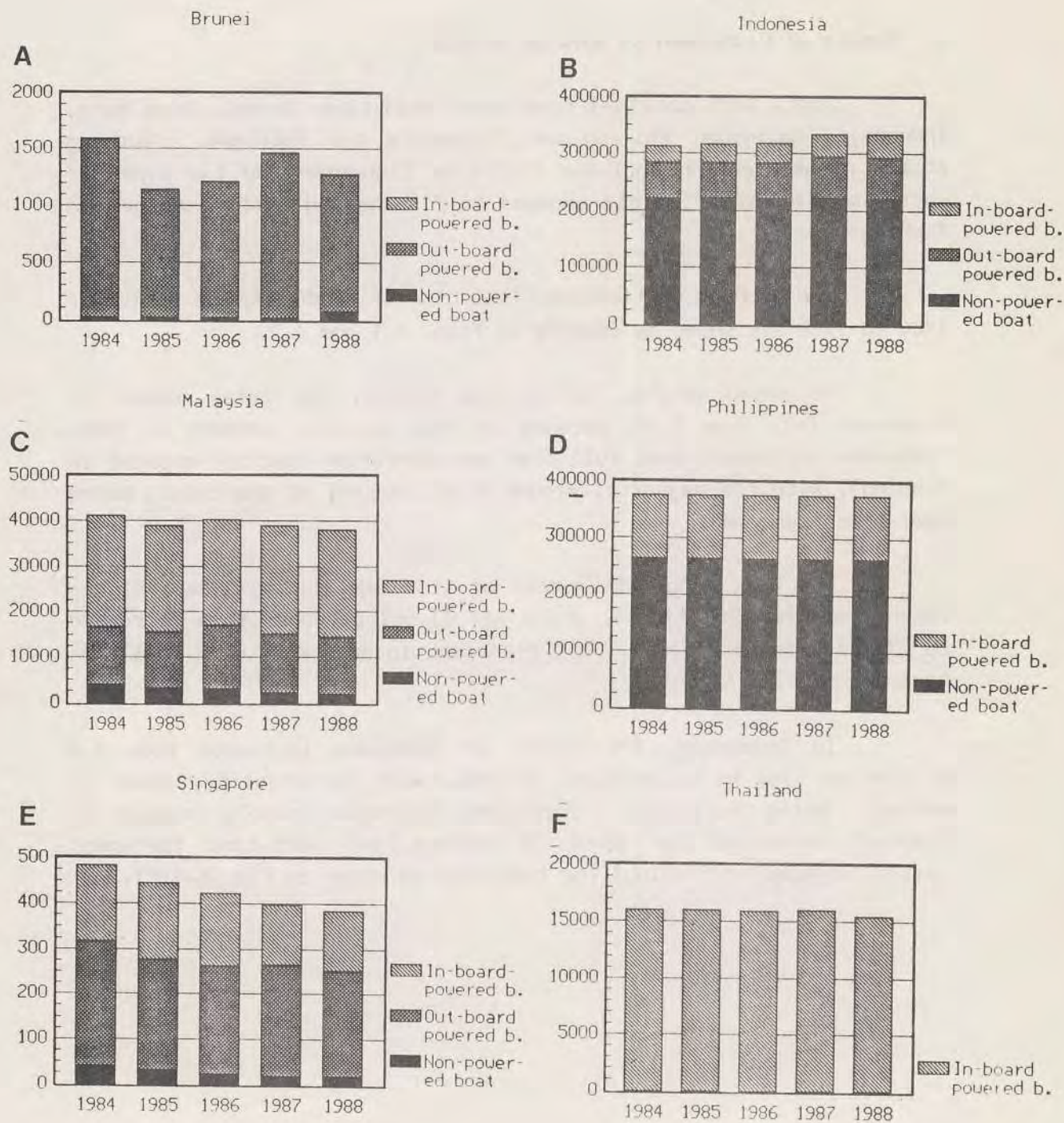


Fig. 5-1 Number of fishing boats by type. A. Brunei; B. Indonesia; C. Malaysia; D. Philippines; E. Singapore; F. Thailand.

6. Number of Fishermen by Working Status

[Data were obtained from seven countries: Brunei, Hong Kong, Indonesia, Malaysia, Philippines, Singapore and Thailand. Working status classification includes 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 1984 to 1988 are shown by country in Figs. 6-1 and 6-2.

As shown in Fig. 6-1(A) for Brunei, the total number of fishermen fell from 2,692 persons in 1984 to 2,265 persons in 1988. Fishermen in Brunei were full-time and part-time (partly engaged in fishing), with the majority, around 70-80 percent of the total, being part-time fishermen.

For Hong Kong, the number of fishermen during 1984-1987 was taken from the 1985 figure, which was 23,662 persons; this decreased to 23,383 persons in 1988. All fishermen in Hong Kong were full-time as shown in Fig. 6-1(B).

In Indonesia, the number of fishermen increased from 1.3 million in 1984 to 1.4 million in 1988, with the majority, about 50 percent, being full-time. Part-time fishermen (mainly engaged in fishing) accounted for about 37 percent and part-time fishermen (partly engaged in fishing) the remainder as shown in Fig. 6-1(C).

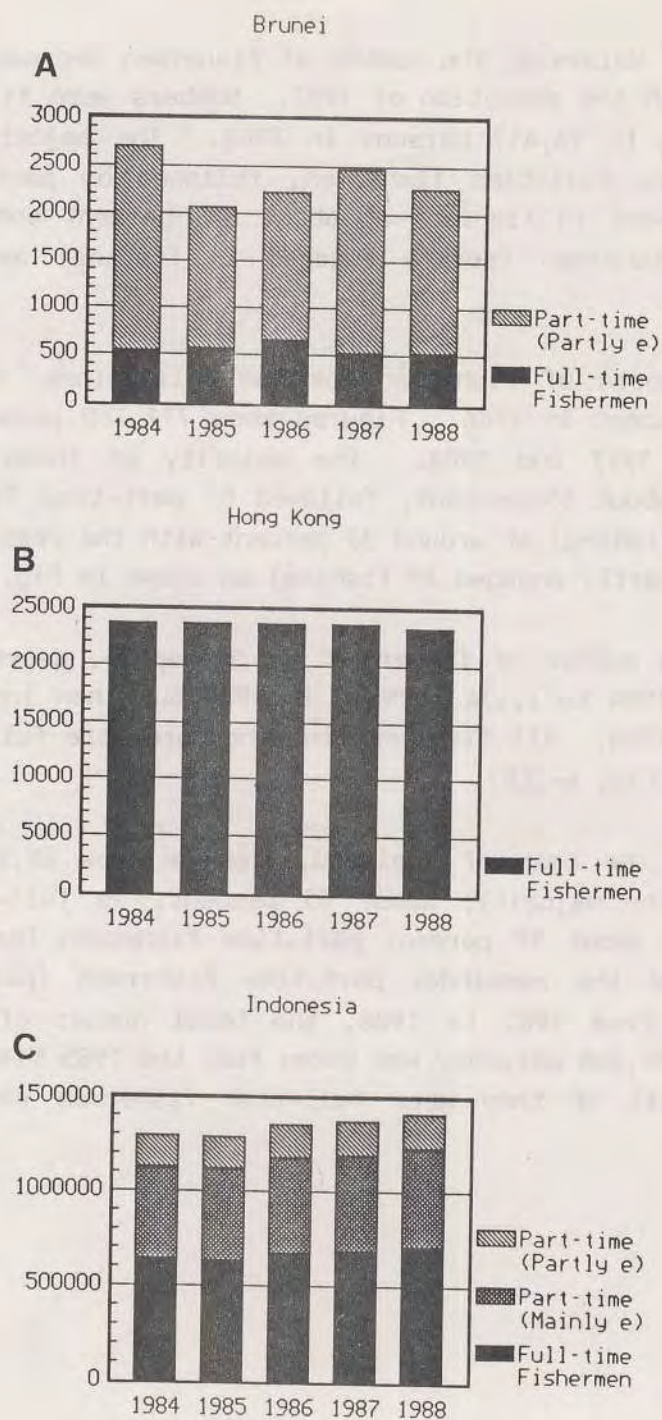


Fig. 6-1 Number of fishermen by working status (1). A. Brunei; B. Hong Kong; C. Indonesia. Partly e. Partly engaged in fishing; Mainly e. Mainly engaged in fishing.

For Malaysia, the number of fishermen decreased between 1984 and 1988 with the exception of 1987. Numbers were 111,252 persons in 1984 falling to 96,417 persons in 1988. The majority, about 89-92 percent, were full-time fishermen, followed by part-time fishermen (mainly engaged in fishing) at about 6-8 percent and the remainder, part-time fishermen (partly engaged in fishing) as shown in Fig. 6-2(A).

Numbers of fishermen for the Philippines, increased during 1984-1988 except in 1986. Figures show 772,780 persons in 1984 and 784,877 in 1987 and 1988. The majority of these were full-time fishermen, about 55 percent, followed by part-time fishermen (mainly engaged in fishing) at around 37 percent with the rest being part-time fishermen (partly engaged in fishing) as shown in Fig. 6-2(B).

The number of fishermen for Singapore, decreased from 1,446 persons in 1984 to 1,154 persons in 1987 but then increased to 1,208 persons in 1988. All fishermen in Singapore were full-time fishermen as shown in Fig. 6-2(C).

In the case of Thailand, numbers show 89,777 fishermen in 1984 with the majority, about 73 percent, as 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 1985 to 1988, 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. 6-2(D).

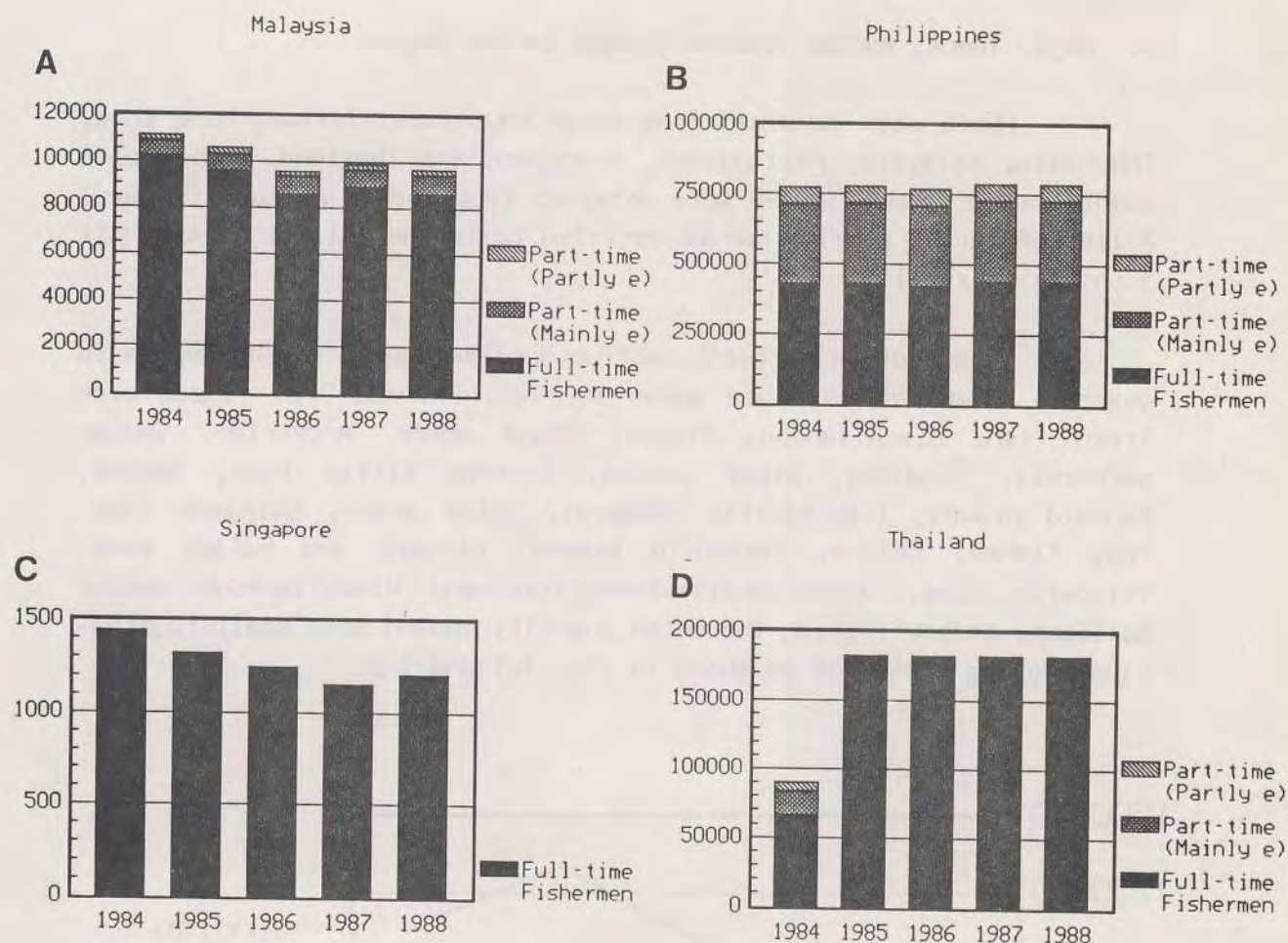


Fig. 6-2 Number of fishermen by working status (2). A. Malaysia; B. Philippines; C. Singapore; D. Thailand. Abbreviations are the same as those in Fig. 6-1.

7. Major Twenty Marine Species Caught in the Region

[Data were obtained from seven countries: Taiwan, Hong Kong, Indonesia, Malaysia, Philippines, Singapore and Thailand. The catch quantity and value figures were obtained from marine capture fishery. A list of marine species can be referred to in the Bulletin's Appendix 2 (p. xv to xvii).]

Trends of major twenty marine species caught in the Region in quantity from 1984-1988 are shown in Figs. 7-1 and 7-2. These were Trash fish, Miscellaneous fishes, Round scads, Anchovies, Indian mackerels, Sardines, Other prawns, Eastern little tuna, Squids, Penaeid prawns, Indo-Pacific mackerel, Selar scads, Skipjack tuna, Pony fishes, Sharks, Threadfin breems, Frigate and bullet tuna, Yellowfin tuna, Jacks-cavalla-trevallies and Miscellaneous marine molluscs, respectively. The catch quantity showed some small fluctuations during 1984-1988 as shown in Fig. 7-1 and 7-2.

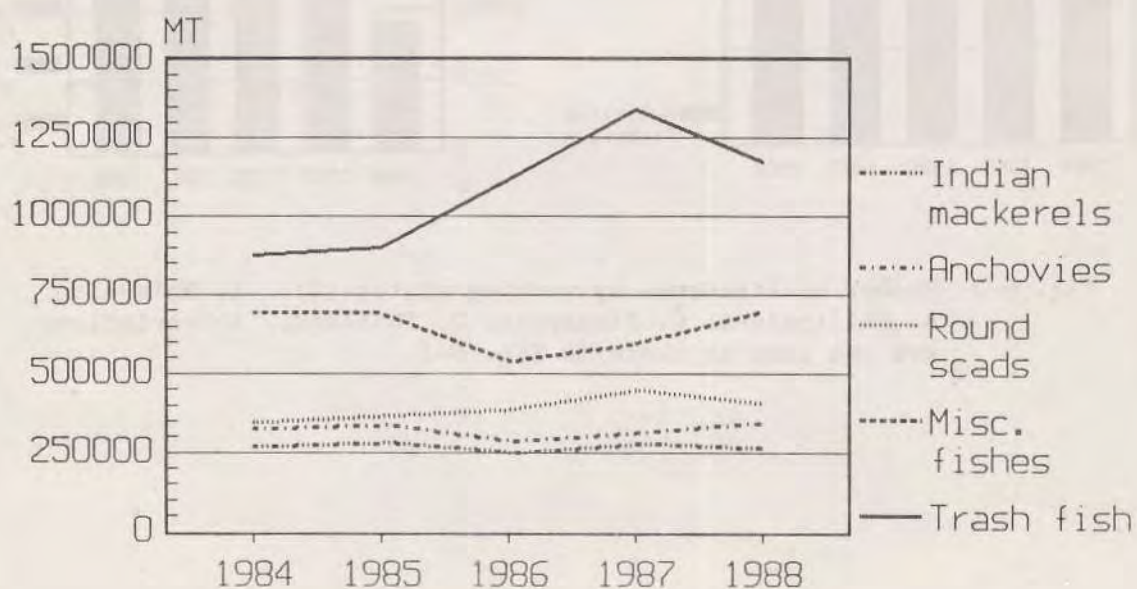


Fig. 7-1 Trends of major species catch quantity from seven countries (1). Misc. fishes, Miscellaneous fishes.

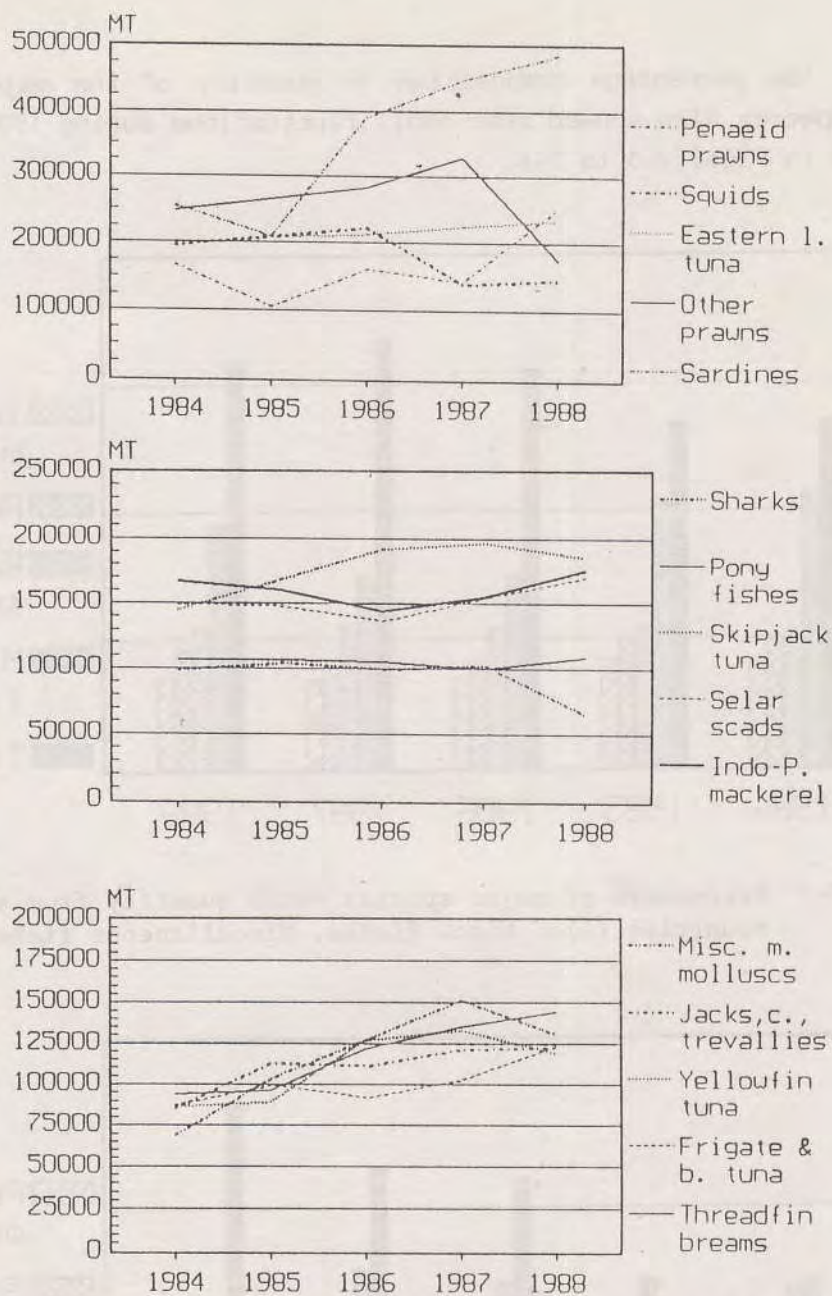


Fig. 7-2 Trends of major species catch quantity from seven countries (2). Eastern l. tuna, Eastern little tuna; Indo-P. mackerel, Indo-Pacific mackerel; Misc. m. molluscs, Miscellaneous marine molluscs; Jacks, c., trevallies, Jacks - cavalla - trevallies; Frigate & b. tuna, Frigate and bullet tuna.

The percentage composition in quantity of the major twenty marine species also showed some small fluctuations during 1984 to 1988 as shown in Figs. 7-3 to 7-6.

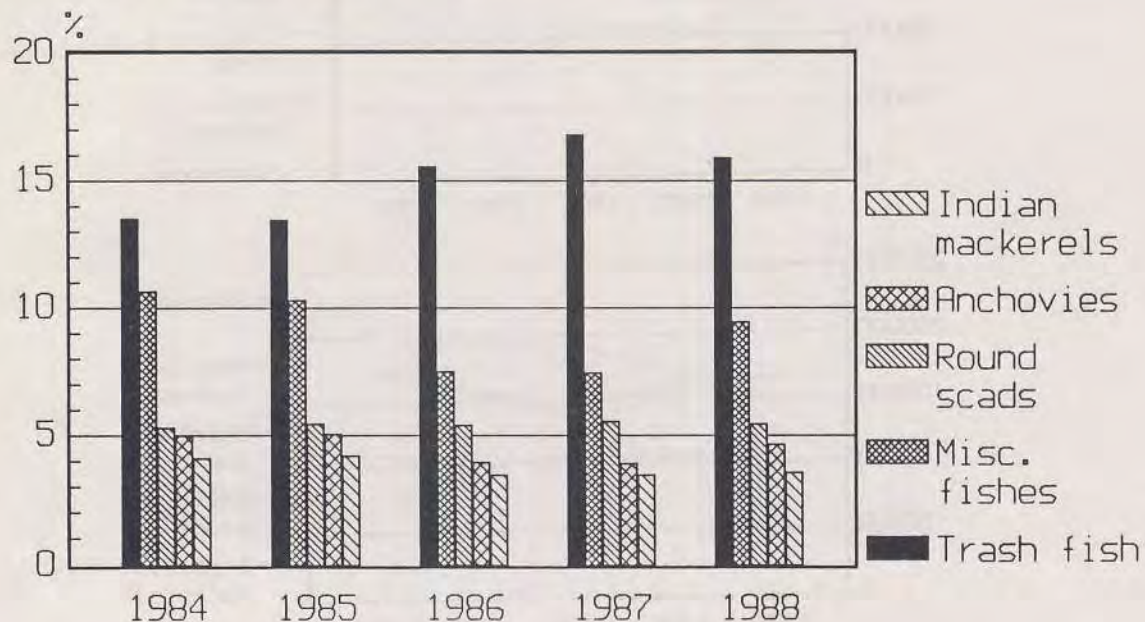


Fig. 7-3 Percentage of major species catch quantity from seven countries (1). Misc. fishes, Miscellaneous fishes.

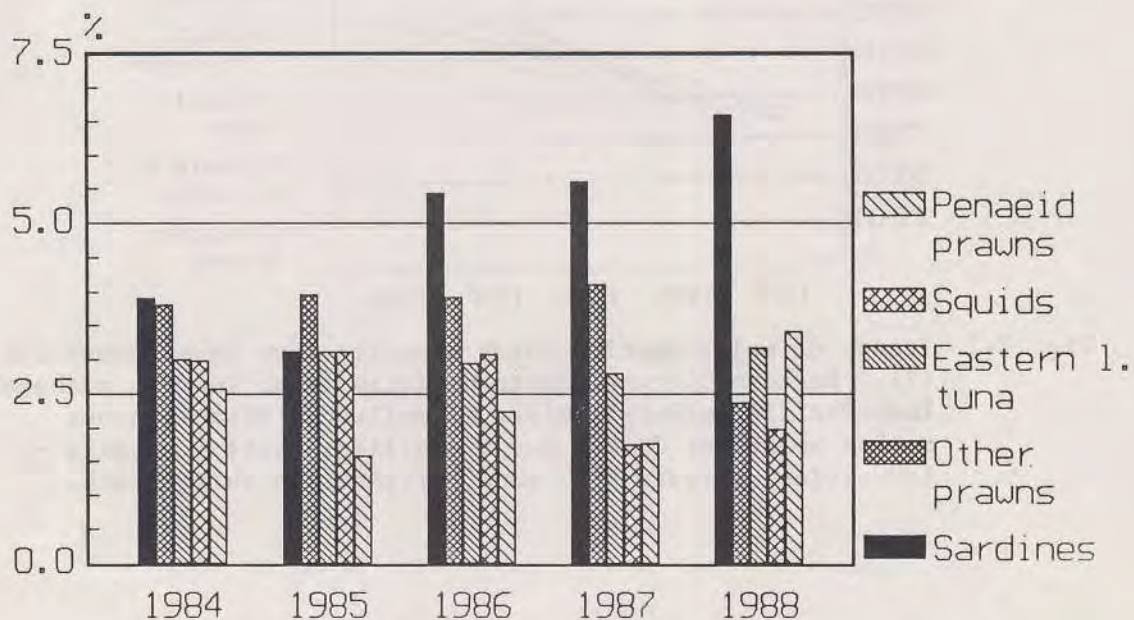


Fig. 7-4 Percentage of major species catch quantity from seven countries (2). Eastern l. tuna, Eastern little tuna.

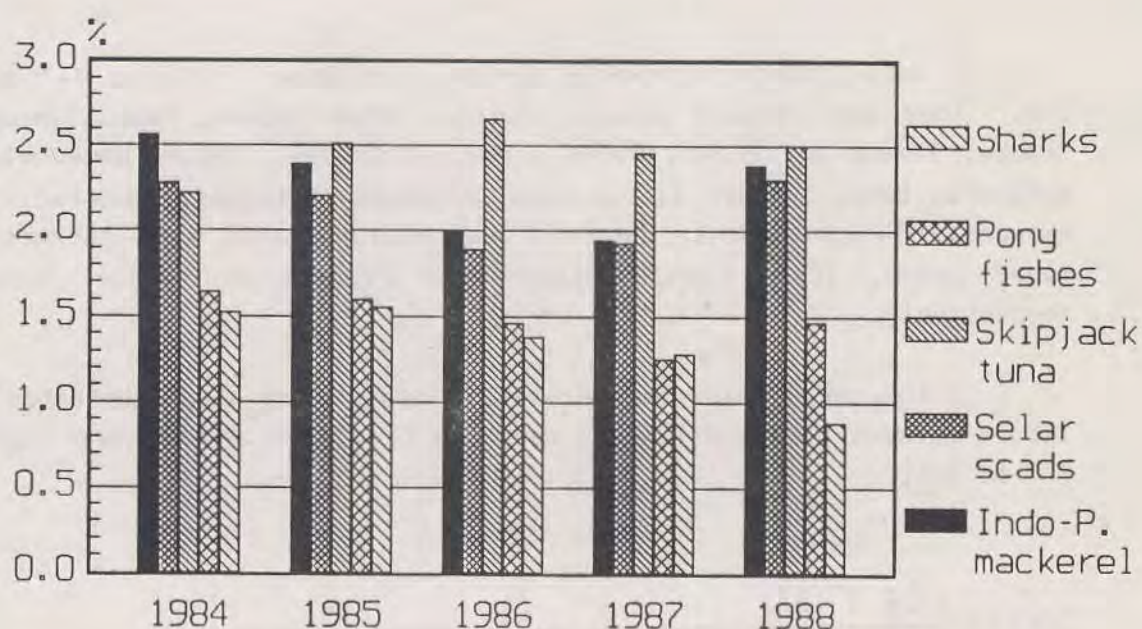


Fig. 7-5 Percentage of major species catch quantity from seven countries (3). Indo-P. mackerel, Indo-Pacific mackerel.

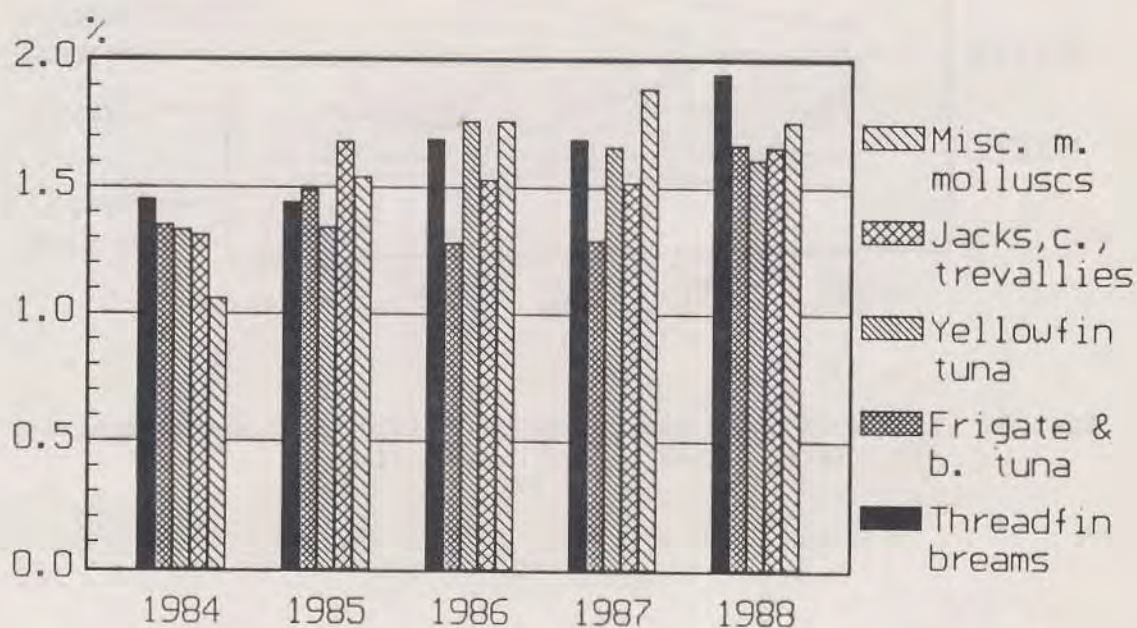


Fig. 7-6 Percentage of major species catch quantity from seven countries (4). Misc. m. molluscs, Miscellaneous marine molluscs; Jacks, c., trevallies, Jacks - cavalla - trevallies; Frigate & b. tuna, Frigate and bullet tuna.

Value trends of twenty species are shown in Figs. 7-7 and 7-8. They were Penaeid prawns, Squids, Other prawns, Miscellaneous fishes, Threadfin breems, Round scads, Anchovies, Indian mackerels, Yellowfin tuna, Eastern little tuna, Albacore, Sardines, Indo-Pacific mackerel, Skipjack tuna, Cuttlefishes, Narrow-barred king mackerel, Tiger prawn, Trash fish, Groupers and Frigate and bullet tuna, respectively.

The catch value and percentage composition also fluctuated a little between 1984 and 1988 as shown in Figs. 7-7 and 7-8 and Figs. 7-9 to 7-12.

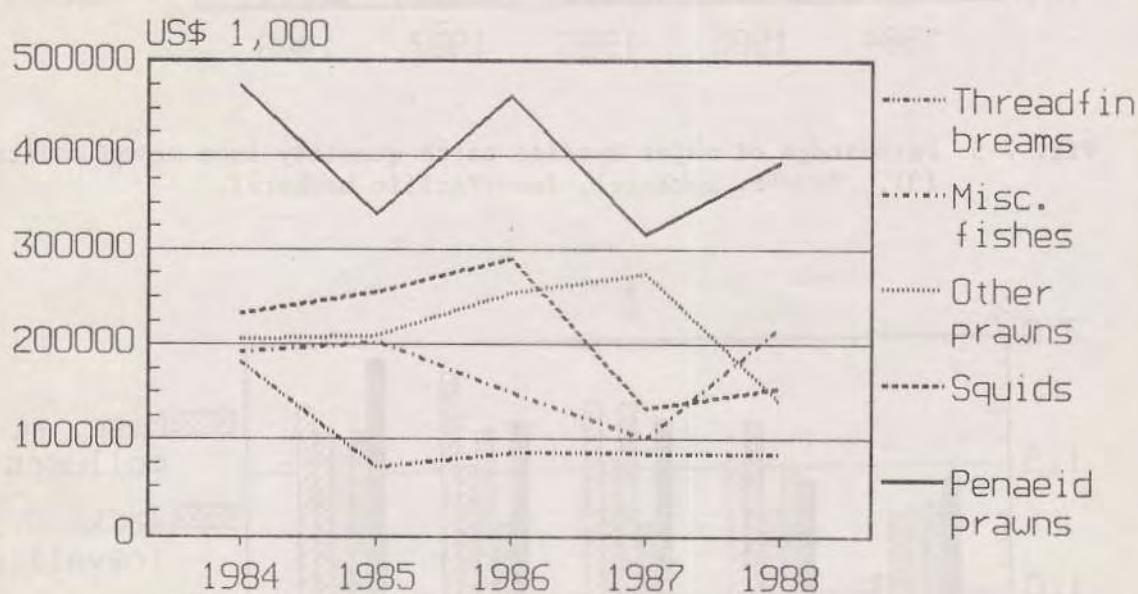


Fig. 7-7 Trends of major species catch in value from seven countries (1). Misc. fishes, Miscellaneous fishes.

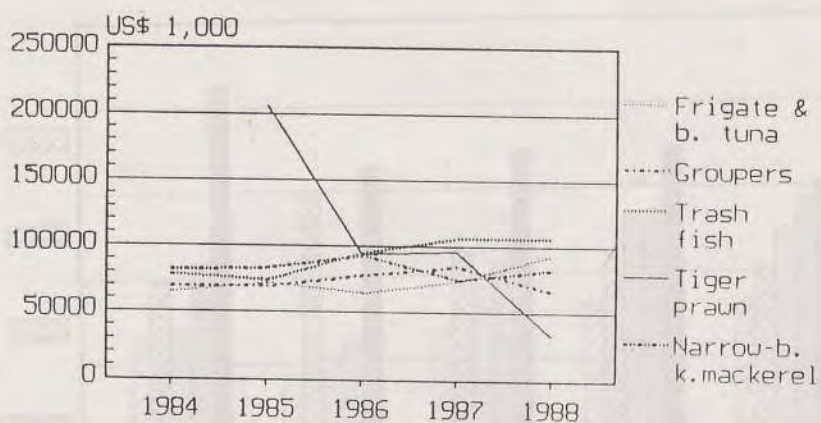
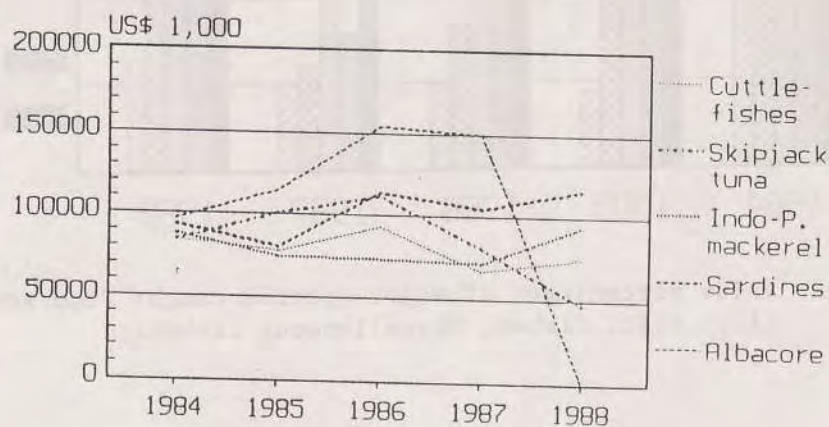
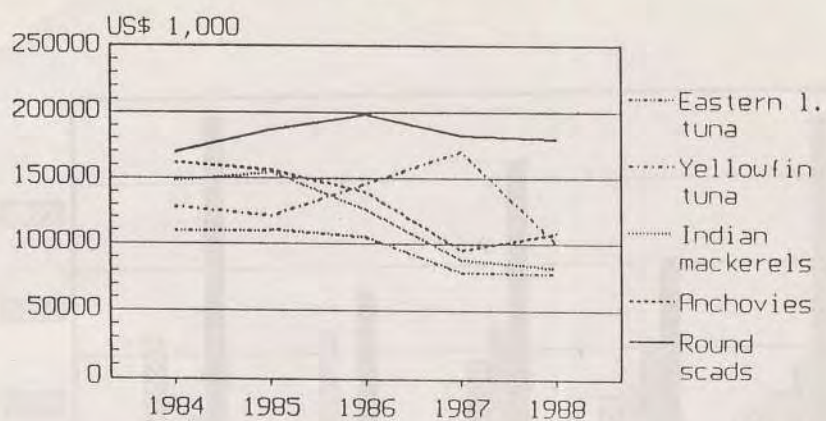


Fig. 7-8 Trends of major species catch in value from seven countries (2). Eastern l. tuna, Eastern little tuna; Indo-P. mackerel, Indo-Pacific mackerel; Frigate & b. tuna, Frigate and bullet tuna; Narrow-b. k. mackerel, Narrow-barred king mackerel.

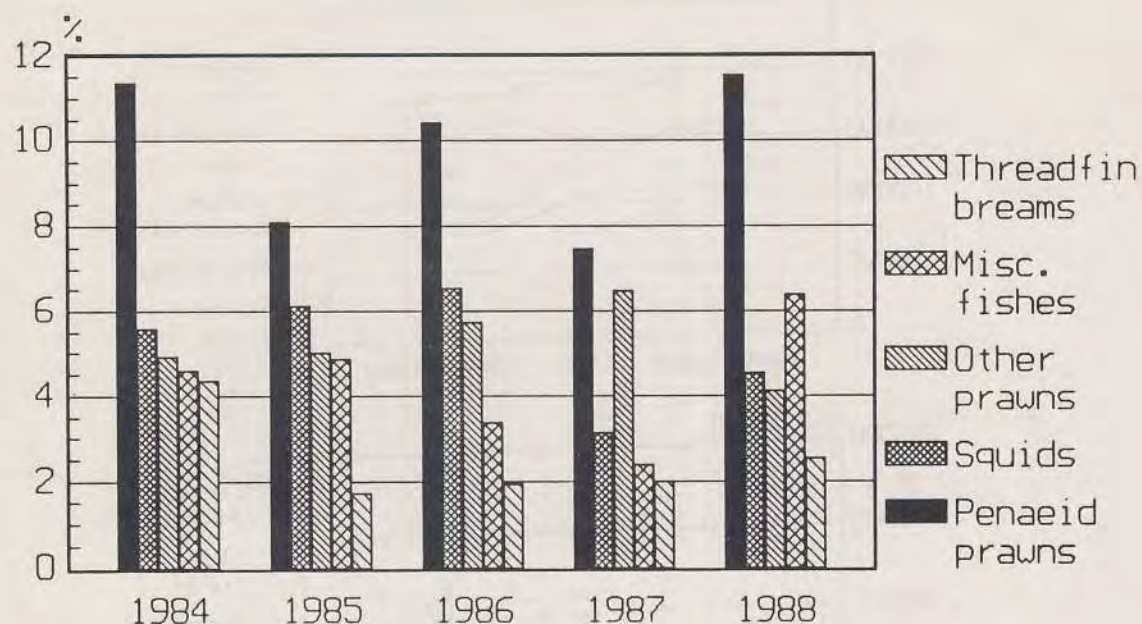


Fig. 7-9 Value percentages of major species caught from seven countries (1). Misc. fishes, Miscellaneous fishes.

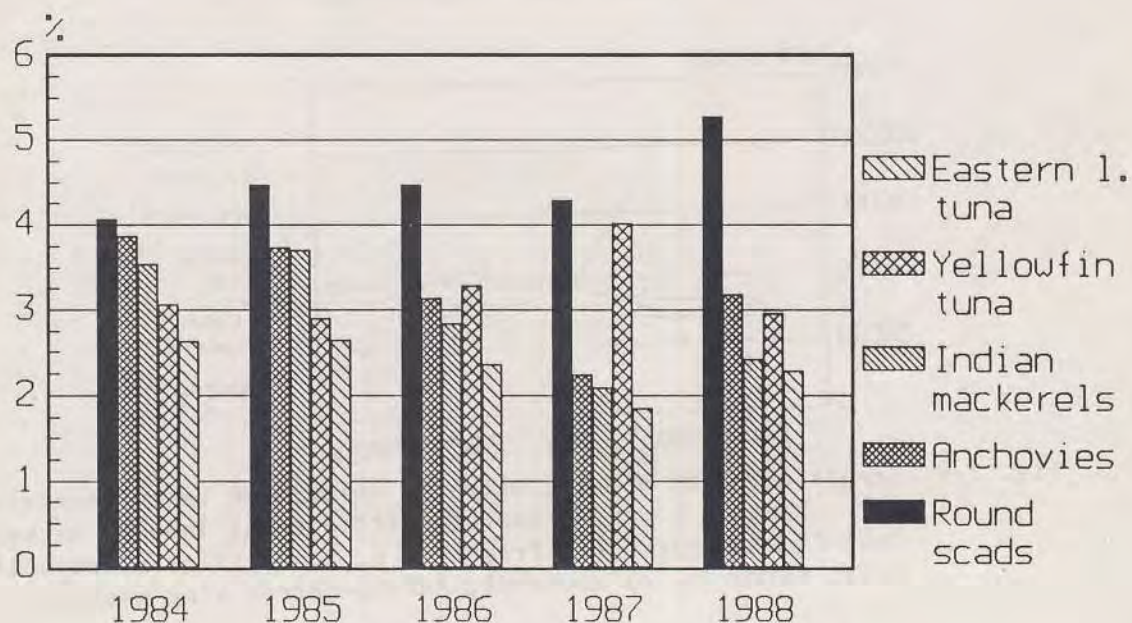


Fig. 7-10 Value percentages of major species caught from seven countries (2). Eastern l. tuna, Eastern little tuna.

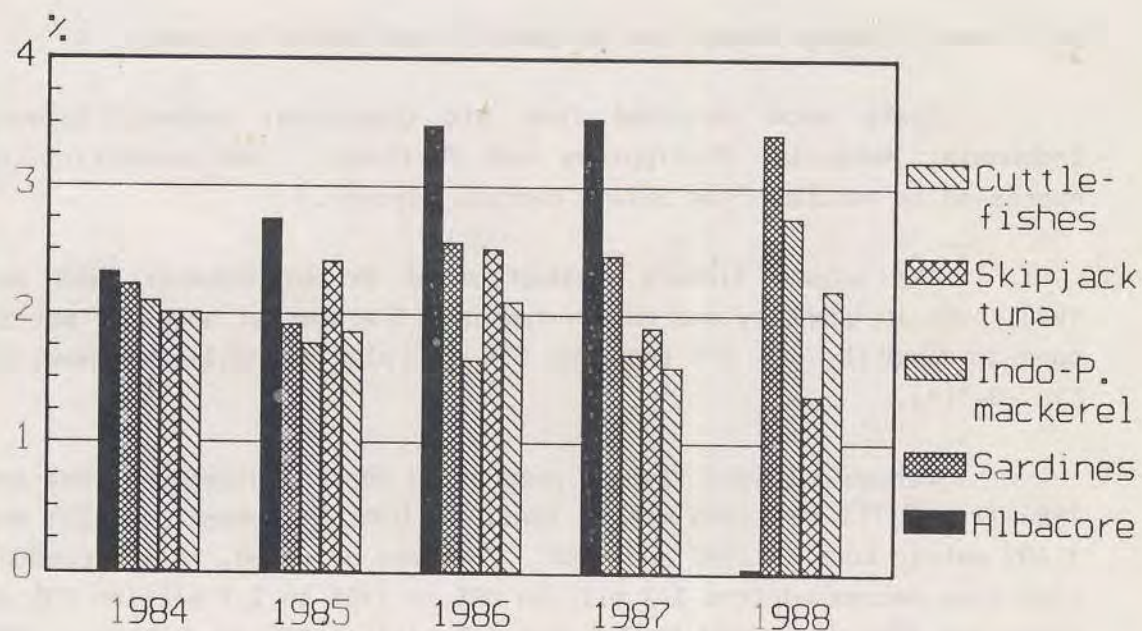


Fig. 7-11 Value percentages of major species caught from seven countries (3). Indo-P. mackerel, Indo-Pacific mackerel.

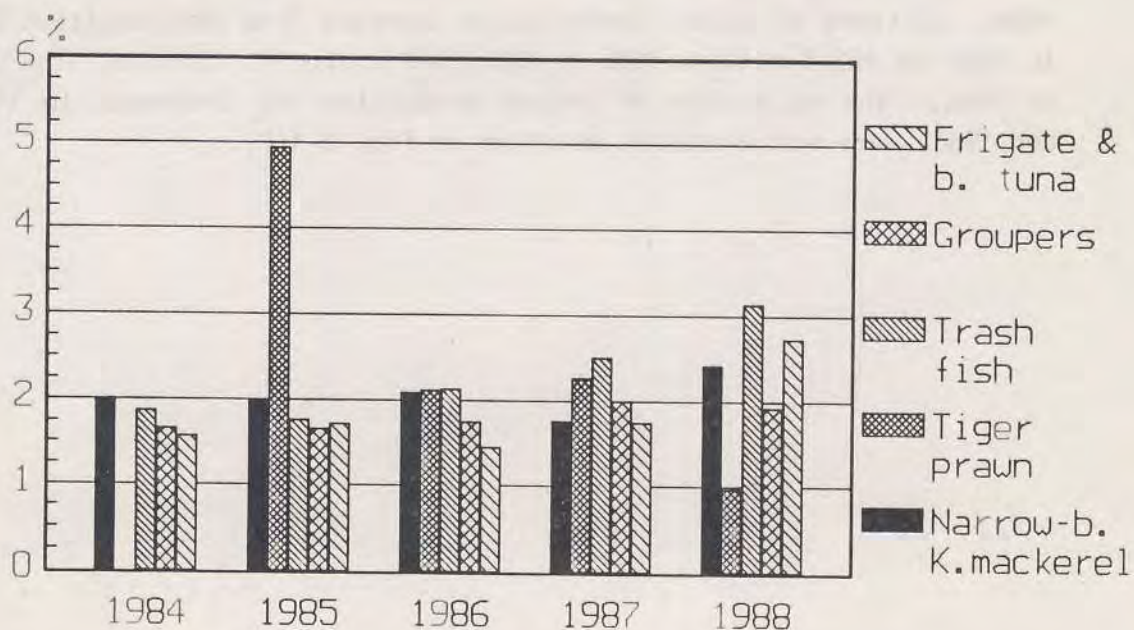


Fig. 7-12 Value percentages of major species caught from seven countries (4). Frigate & b. tuna, Frigate and bullet tuna; Narrow-b. k. mackerel, Narrow-barred king mackerel.

8. Inland Fishery Production in Quantity and Value by Country

[Data were obtained from six countries: Brunei, Taiwan, Indonesia, Malaysia, Philippines and Thailand. The production is expressed in catches from inland capture fishery.]

The inland fishery production of Brunei between 1984 and 1988, both in quantity and value, remained the same at about 83 metric tons in quantity and 115 thousand US\$ in value annually as shown in Fig. 8-1(A).

Taiwan's inland fishery production decreased between 1984 and 1986 from 2,711 to 2,183 metric tons; it then increased to 2,255 and 3,409 metric tons in 1987 and 1988. In terms of value, inland production also decreased from 3.2 million US\$ in 1984 to 2.7 million US\$ in 1986, and then increased to 3.5 and 6.3 million US\$ in 1987 and 1988 as shown in Fig. 8-1(B).

Indonesia's inland fishery production showed an increasing trend from 269,321 metric tons in 1984 to 281,264 metric tons in 1988. In terms of value, there was an increase from 189.2 million US\$ in 1984 to 192.8 million US\$ in 1985, but a drop to 155.4 million US\$ in 1986. The value data of inland production for Indonesia in 1987 and 1988, were not available as shown in Fig. 8-1(C).



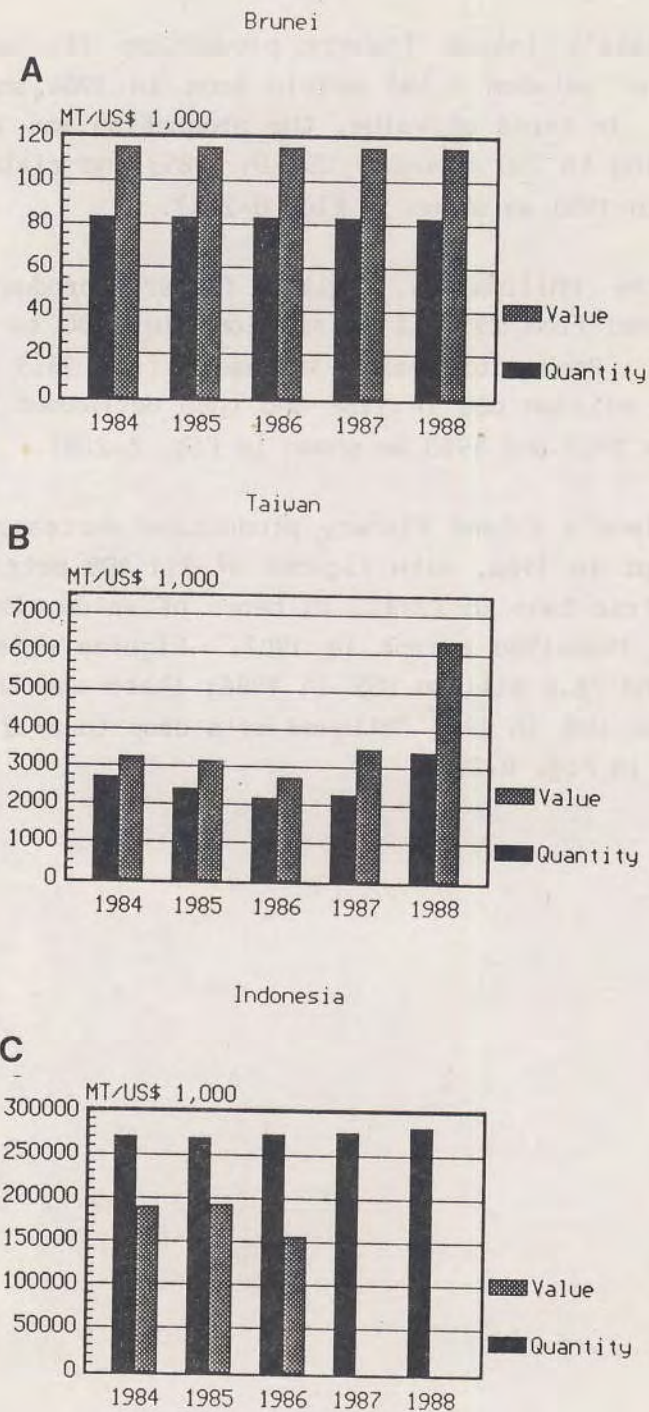


Fig. 8-1 Inland capture fishery production in quantity and value (1). A. Brunei; B. Taiwan; C. Indonesia.

Malaysia's inland fishery production fluctuated slightly, with figures of between 1,581 metric tons in 1984 and 1,750 metric tons in 1988. In terms of value, the production was 2.2 million US\$ in 1984 dropping to 750 thousand US\$ in 1985, and rising again to 880 thousand US\$ in 1988 as shown in Fig. 8-2(A).

In the Philippines, inland fishery production showed a decreasing trend from 299,242 metric tons in 1984 to 231,829 metric tons in 1988. Production value increased from 94.5 million US\$ in 1984 to 129.6 million US\$ in 1986 and then decreased to 91.9 and 92 million US\$ in 1987 and 1988 as shown in Fig. 8-2(B).

Thailand's inland fishery production decreased between 1984 and 1988 except in 1986, with figures of 111,408 metric tons in 1984 and 81,500 metric tons in 1988. In terms of value, there was also a decrease from 1984-1988 except in 1987. Figures were 108.5 million US\$ in 1984 and 78.6 million US\$ in 1986; there was then an increase to 81.9 million US\$ in 1987 followed by a drop to 69.2 million US\$ in 1988 as shown in Fig. 8-2(C).



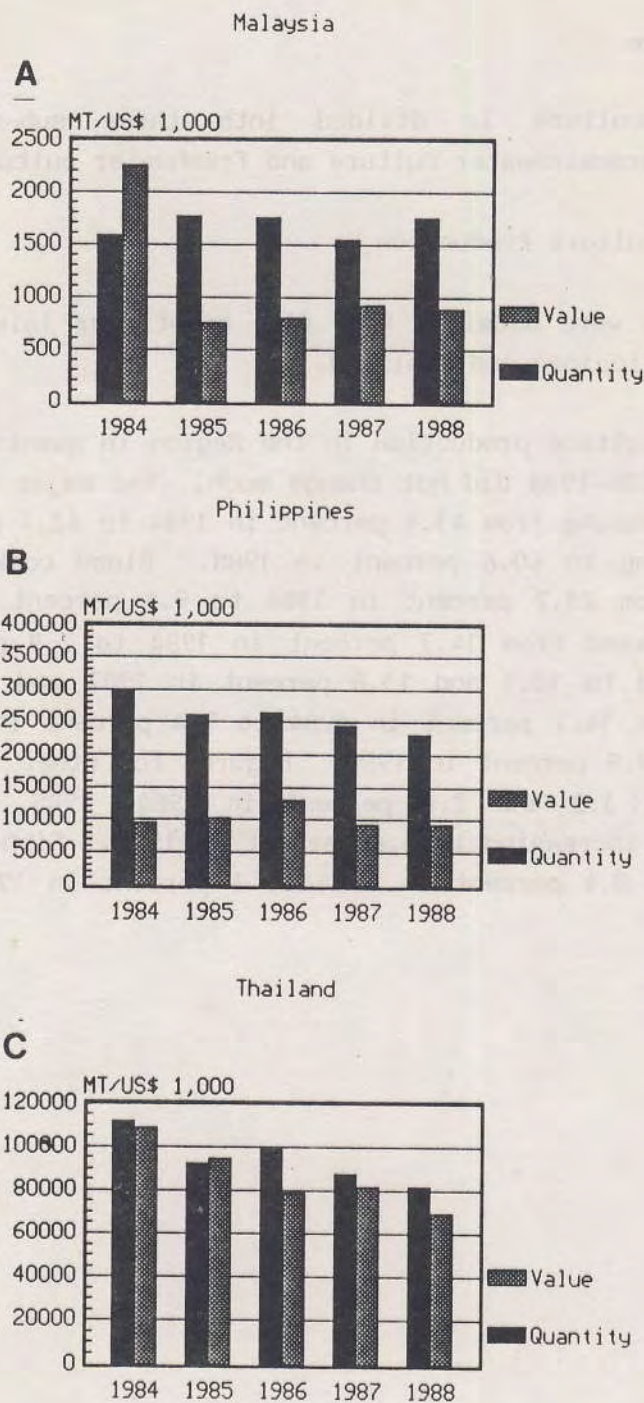


Fig. 8-2 Inland capture fishery production in quantity and value (2). A. Malaysia; B. Philippines; C. Thailand.

9. Aquaculture

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

9.1 Mariculture Production

[Data were obtained from five countries: Taiwan, Hong Kong, Malaysia, Philippines and Thailand.]

Mariculture production in the Region in quantity by composition during 1984-1988 did not change much. The major constituent was Seaweed, increasing from 43.4 percent in 1984 to 62.7 percent in 1987 then decreasing to 60.6 percent in 1988. Blood cockles were next, decreasing from 23.2 percent in 1984 to 9.1 percent in 1988. Sea mussels decreased from 14.7 percent in 1984 to 7.9 percent in 1986 then increased to 10.1 and 13.8 percent in 1987 and 1988. Oysters decreased from 14.7 percent in 1984 to 9.4 percent in 1987 and then increased to 9.9 percent in 1988. Figures for Other animals, varied at 3.6, 3.1, 3.2 and 2.6 percent in 1984, 1985, 1986 and 1987 respectively, increasing to 5.6 percent in 1988. Fish showed a small increase from 0.4 percent in 1984 to 1 percent in 1988 as shown in Fig. 9-1.



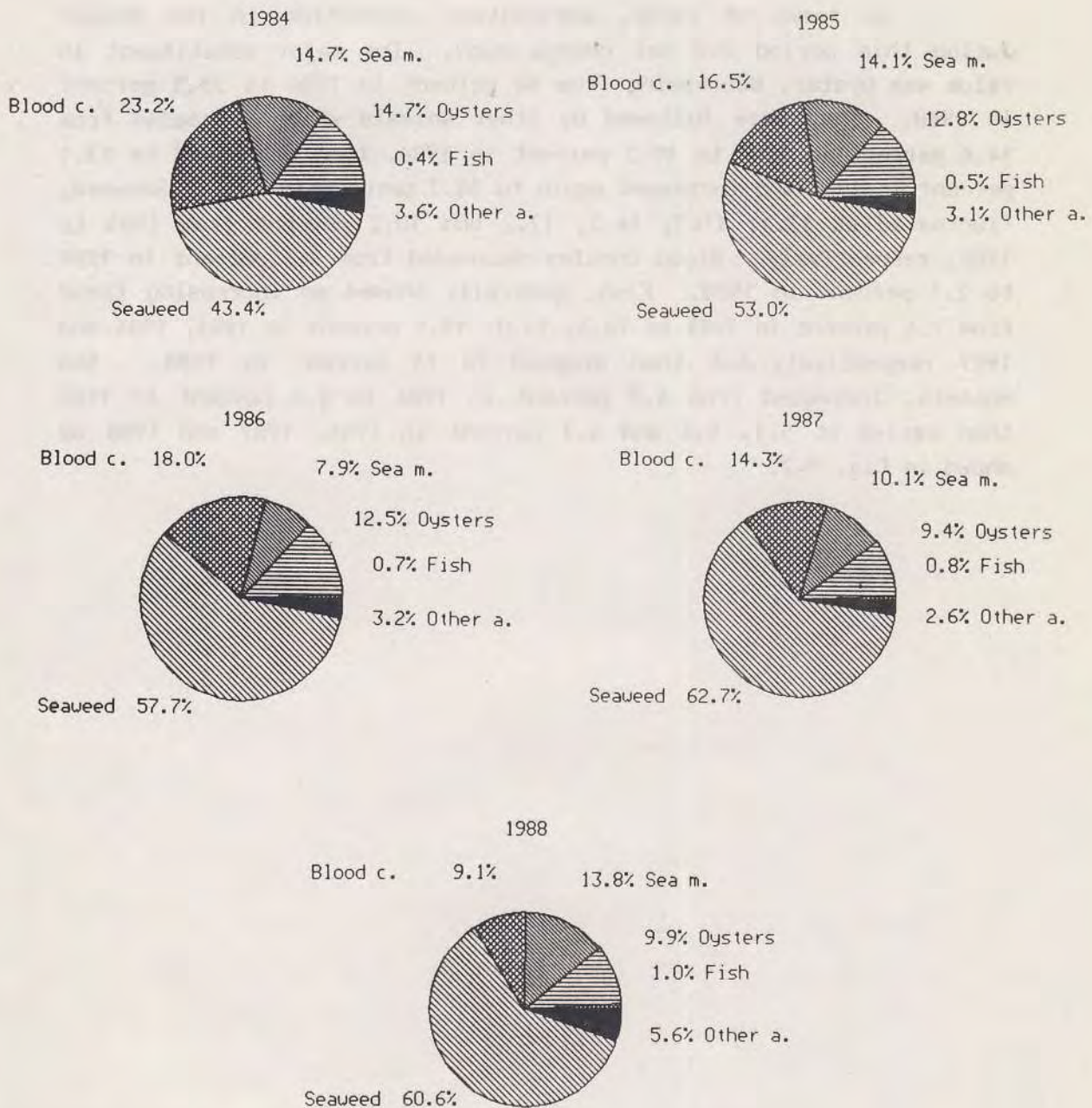


Fig. 9-1 Percentage of major species groups of mariculture production in quantity from six countries. Blood c., Blood cockles; Sea m., Sea mussels; Other a., Other animals.

In terms of value, mariculture production in the Region during this period did not change much. The major constituent in value was Oyster, decreasing from 48 percent in 1984 to 35.8 percent in 1988. They were followed by Other animals which increased from 14.6 percent in 1984 to 19.2 percent in 1986, then decreased to 13.1 percent in 1987 and increased again to 34.7 percent in 1988. Seaweed, fluctuated at 13.1, 11.7, 14.5, 17.2 and 10.2 percent from 1984 to 1988, respectively. Blood cockles decreased from 9.7 percent in 1984 to 2.1 percent in 1988. Fish, generally showed an increasing trend from 7.6 percent in 1984 to 10.3, 15.0, 19.5 percent in 1985, 1986 and 1987 respectively but then dropped to 13 percent in 1988. Sea mussels, increased from 6.9 percent in 1984 to 8.6 percent in 1985 then varied at 5.1, 5.4 and 4.1 percent in 1986, 1987 and 1988 as shown in Fig. 9-2.



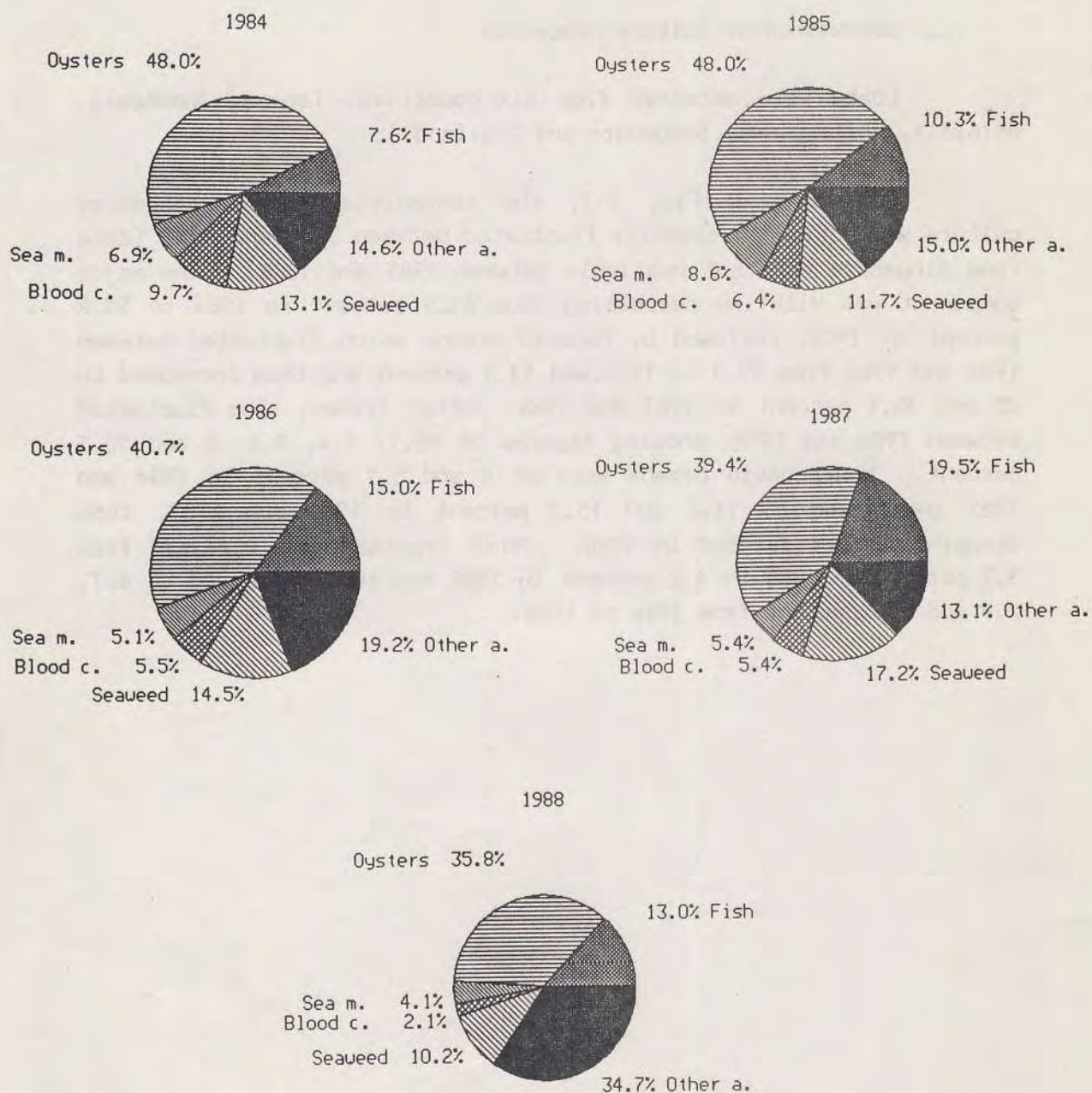


Fig. 9-2 Percentage of major species groups of mariculture production in value from six countries. Abbreviations are the same as those in Fig. 9-1.

9.2 Brackishwater Culture Production

[Data were obtained from six countries: Taiwan, Indonesia, Malaysia, Philippines, Singapore and Thailand.]

As shown in Fig. 9-3, the composition of brackishwater culture production in quantity fluctuated between 1984 and 1988 (data from Singapore were not available between 1985 and 1988). The major component was Milkfish decreasing from 62.9 percent in 1984 to 52.8 percent in 1988, followed by Penaeid prawns which fluctuated between 1984 and 1986 from 17.3 to 17.6 and 17.1 percent and then increased to 20 and 30.1 percent in 1987 and 1988. Other fishes, also fluctuated between 1984 and 1988, showing figures of 10.1, 9.4, 9.6, 9 and 10.3 percent. Non-penaeid prawns were at 6 and 5.1 percent in 1984 and 1985 increasing to 11.2 and 15.7 percent in 1986 and 1987, then dropping to 6.3 percent in 1988. Other crustaceans, increased from 3.7 percent in 1984 to 6.2 percent in 1985 and then decreased to 4.7, 2.9 and 0.6 percent from 1986 to 1988.

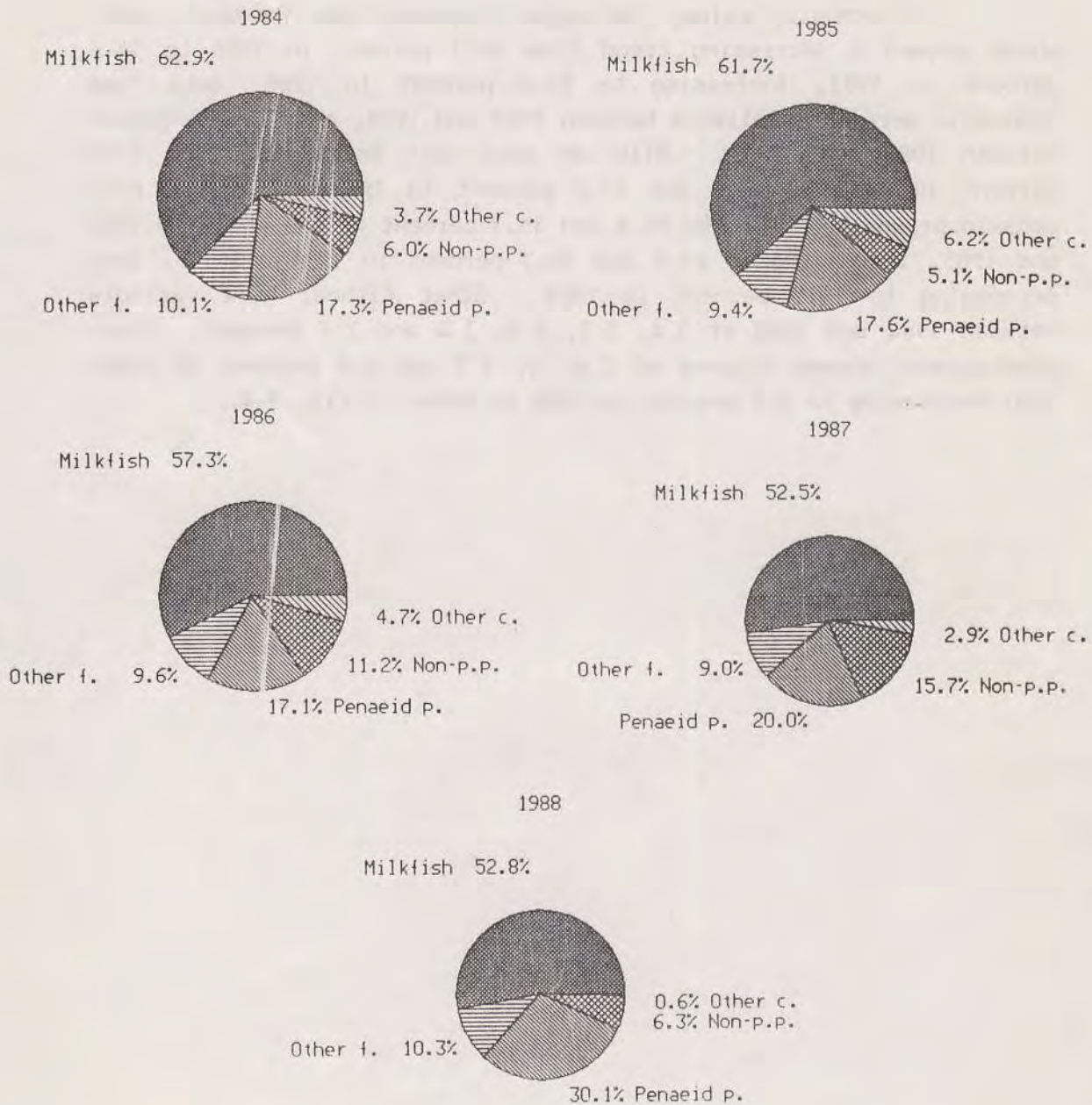


Fig. 9-3 Percentage of major species groups of brackishwater culture production in quantity from six countries. Penaeid p., Penaeid prawns; Other f., Other fishes; Non-p.p., Non-penaeid prawns; Other c., Other crustaceans.

In terms of value, the major component was Penaeid prawns which showed a decreasing trend from 40.3 percent in 1984 to 34.6 percent in 1987, increasing to 58.6 percent in 1988 (data from Indonesia were not available between 1987 and 1988, and from Singapore between 1984 and 1988). Milkfish were next decreasing from 37.5 percent in 1984 to 20.9 and 21.5 percent in 1987 and 1988. Non-penaeid prawns, constituted 16.4 and 15.7 percent of the whole in 1984 and 1985, increasing to 29.4 and 36.1 percent in 1986 and 1987 then decreasing to 16.5 percent in 1988. Other fishes, were variable between 1984 and 1988 at 3.4, 3.7, 3.8, 3.4 and 2.7 percent. Other crustaceans, showed figures of 2.4, 6, 4.7 and 4.9 percent in 1984-1987 decreasing to 0.8 percent in 1988 as shown in Fig. 9-4.

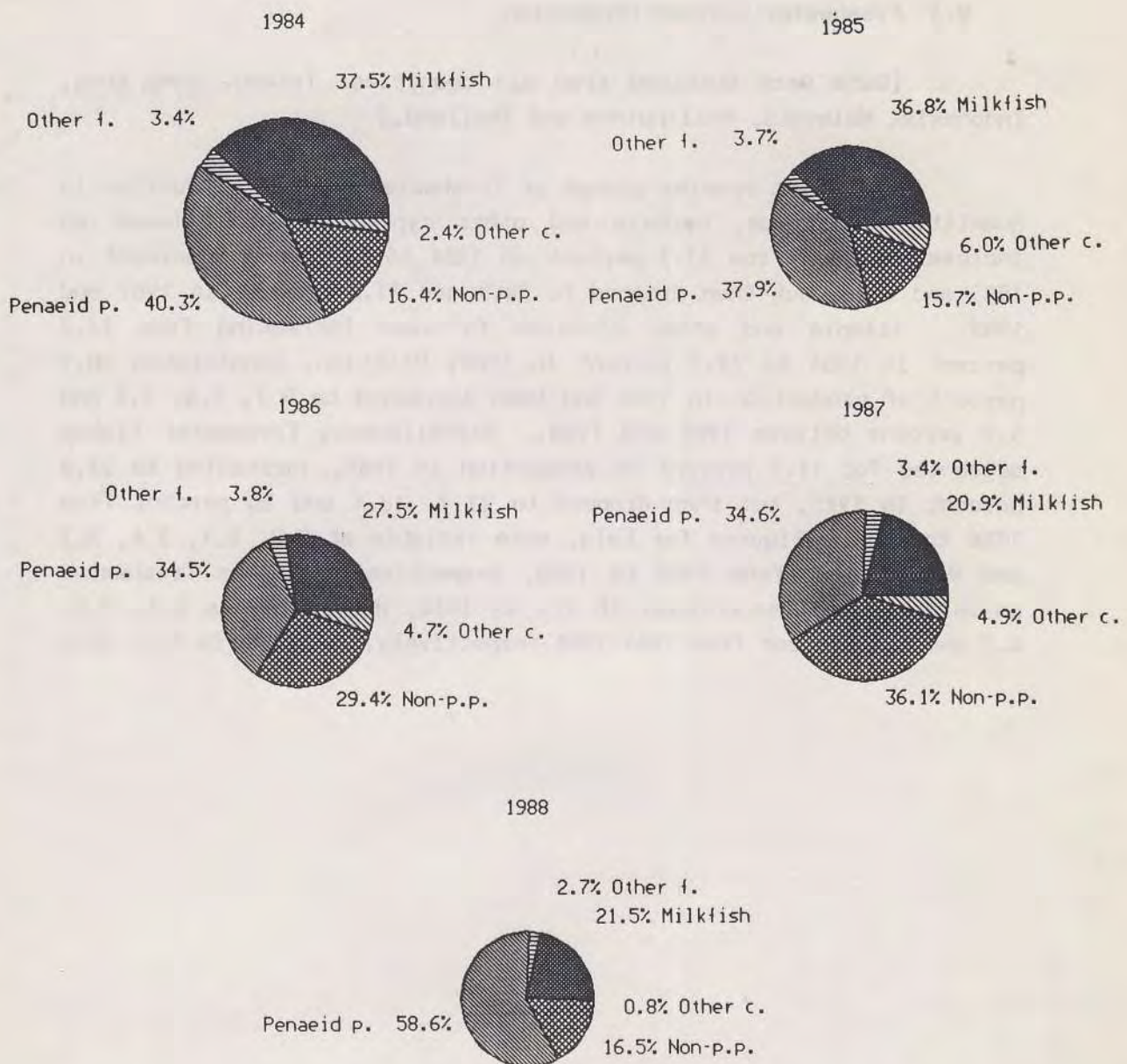


Fig. 9-4 Percentage of major species groups of brackishwater culture production in value from six countries. Abbreviations are the same as those in Fig. 9-3.

9.3 Freshwater Culture Production

[Data were obtained from six countries: Taiwan, Hong Kong, Indonesia, Malaysia, Philippines and Thailand.]

The major species groups of freshwater culture production in quantity were Carps, barbels and other cyprinids which showed an increasing trend from 27.3 percent in 1984 to 32 and 35.5 percent in 1985 and 1986, but then dropped to 34.9 and 31.8 percent in 1987 and 1988. Tilapia and other cichlids followed increasing from 23.2 percent in 1984 to 29.7 percent in 1988; Milkfish, constituted 20.1 percent of production in 1984 and then decreased to 9.7, 5.6, 5.2 and 5.2 percent between 1985 and 1988. Miscellaneous freshwater fishes accounted for 11.5 percent of production in 1984, increasing to 22.8 percent in 1985, but then dropped to 21.1, 18.4 and 20 percent from 1986 to 1988. Figures for Eels, were variable at 8.2, 8.1, 7.6, 8.2 and 9.2 percent from 1984 to 1988, respectively. Other freshwater animals, showed percentages of 9.7 in 1984, decreasing to 2.3, 3.4, 4.2 and 4.1 percent from 1985-1988 respectively, as shown in Fig. 9-5.

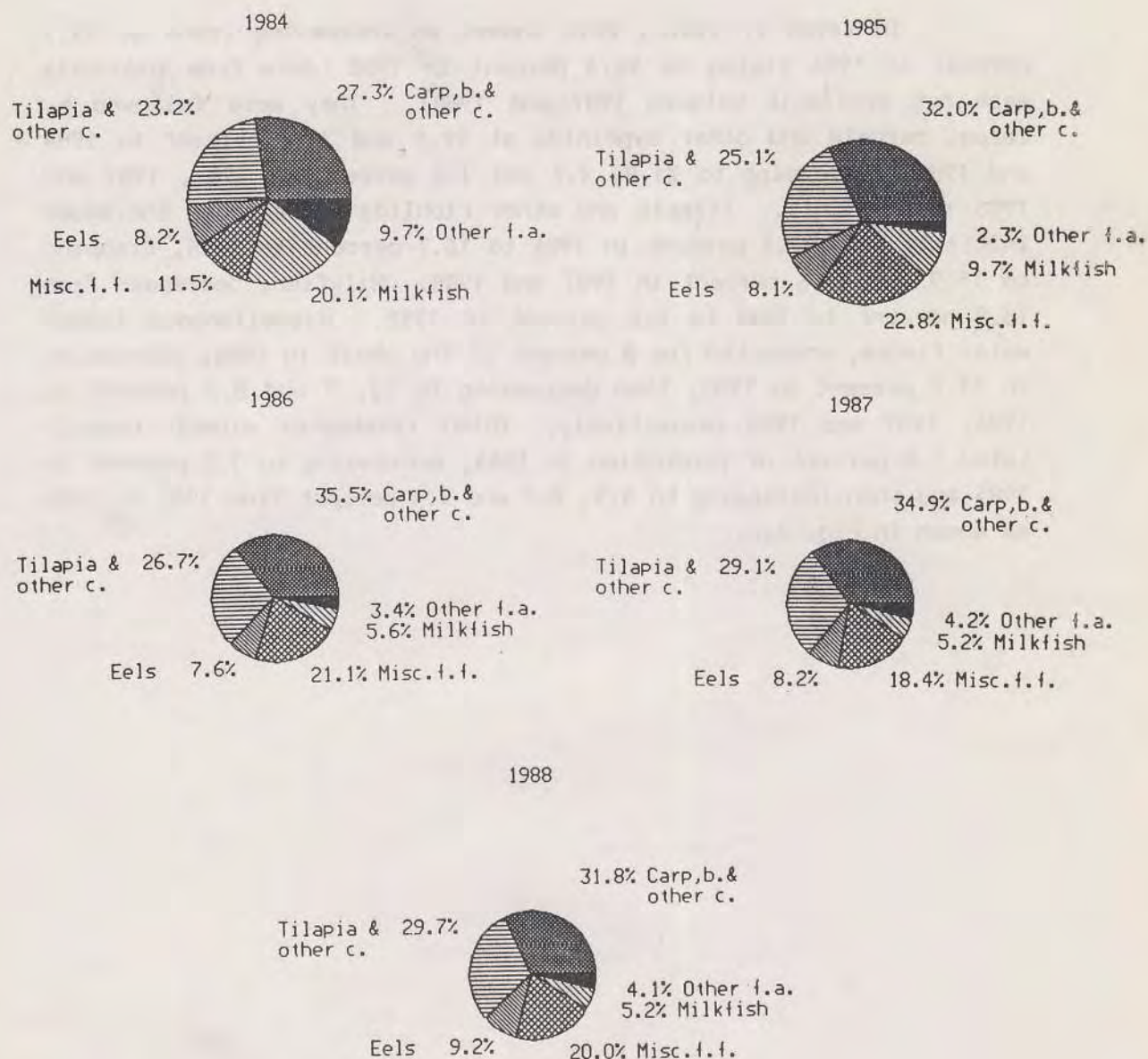


Fig. 9-5 Percentage of major species groups of freshwater culture production in quantity from six countries. Carp, b. & other c., Carps, barbels and other cyprinids; Tilapia & other c., Tilapia and other cichlids; Misc. f.f., Miscellaneous freshwater fishes; Other f.a., Other freshwater animals.

In terms of value, Eels showed an increasing trend at 35.3 percent in 1984 rising to 56.3 percent in 1988 (data from Indonesia were not available between 1987 and 1988). They were followed by Carps, barbels and other cyprinids at 22.8 and 24.3 percent in 1984 and 1985, decreasing to 21.8, 8.7 and 7.8 percent in 1986, 1987 and 1988 respectively. Tilapia and other cichlids percentages increased initially from 12.2 percent in 1984 to 16.7 percent in 1986, dropping to 15.9 and 13.6 percent in 1987 and 1988. Milkfish, decreased from 13.9 percent in 1984 to 4.6 percent in 1988. Miscellaneous freshwater fishes, accounted for 8 percent of the whole in 1984, increasing to 13.9 percent in 1985, then decreasing to 12, 9 and 8.2 percent in 1986, 1987 and 1988 respectively. Other freshwater animals constituted 7.8 percent of production in 1984, decreasing to 3.2 percent in 1985 and then increasing to 4.9, 8.7 and 9.4 percent from 1986 to 1988 as shown in Fig. 9-6.

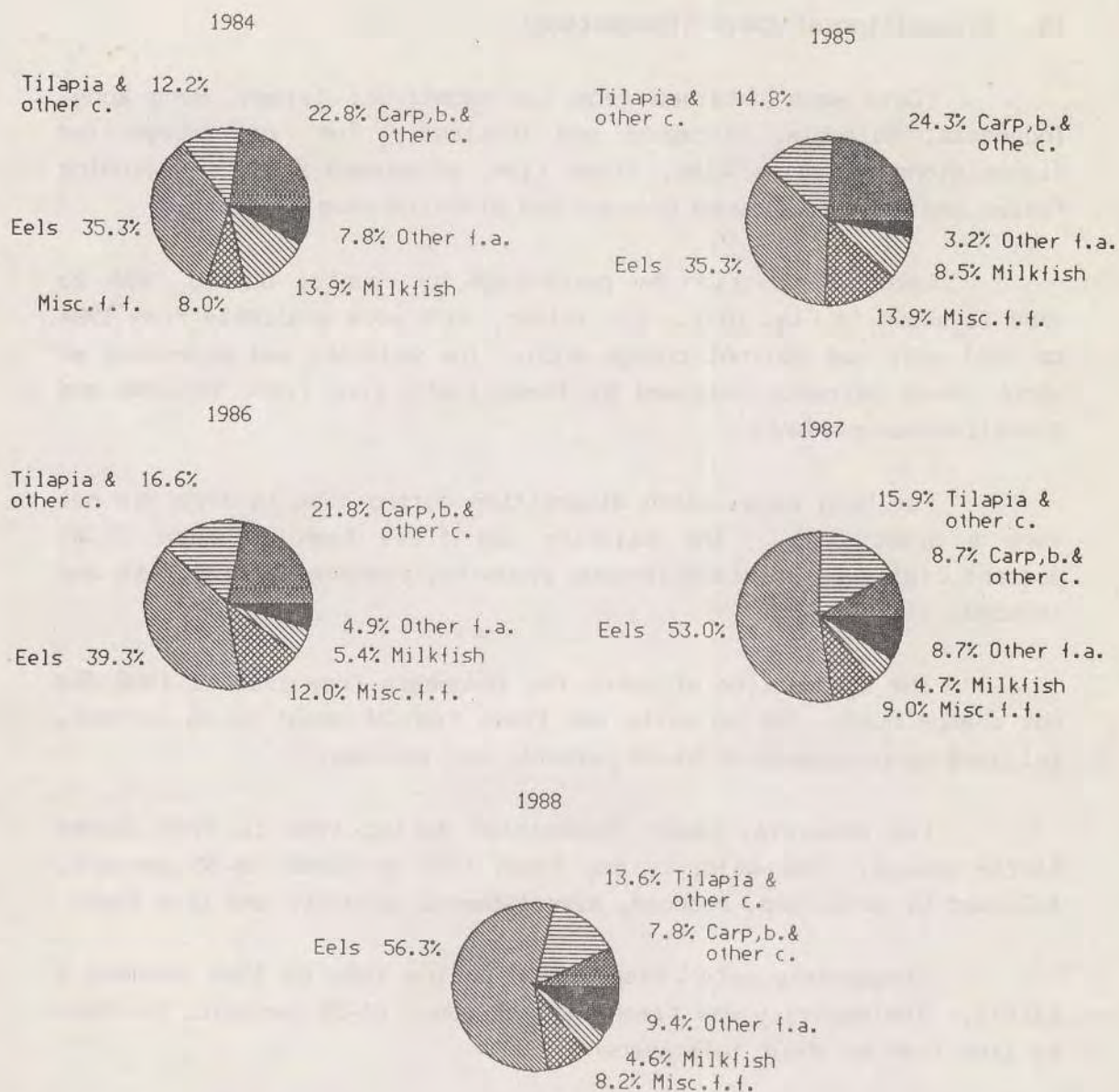


Fig. 9-6 Percentage of major species groups of freshwater culture production in value from six countries. Abbreviations are the same as those in Fig. 9-5.

10. Disposition of Catch (Percentage)

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

Catch disposition by percentage by country during 1984 to 1988 is shown in Fig. 10-1. For Taiwan, data were available from 1984 to 1987 only and did not change much. The majority was processed at about 38-48 percent, followed by fresh fish, live fish, reduced and miscellaneous products.

For Hong Kong, catch disposition during 1984 to 1988 did not vary a great deal. The majority was fresh fish at about 77-85 percent, followed by miscellaneous products, processed, live fish and reduced.

The disposition of catch for Indonesia from 1984 to 1988 did not change much. The majority was fresh fish at about 50-56 percent, followed by processed at 43-49 percent, and reduced.

For Malaysia, catch disposition during 1984 to 1988 showed little change. The majority was fresh fish at about 58-65 percent, followed by processed, reduced, miscellaneous products and live fish.

Singapore's catch disposition during 1984 to 1988 changed a little. The majority was fresh fish at about 85-98 percent, followed by live fish at about 1-15 percent.

For Thailand, figures between 1984 and 1988 did not change much. The majority was reduced at 38-42 percent, followed by processed at 33-37 percent, and the remainder was fresh fish.

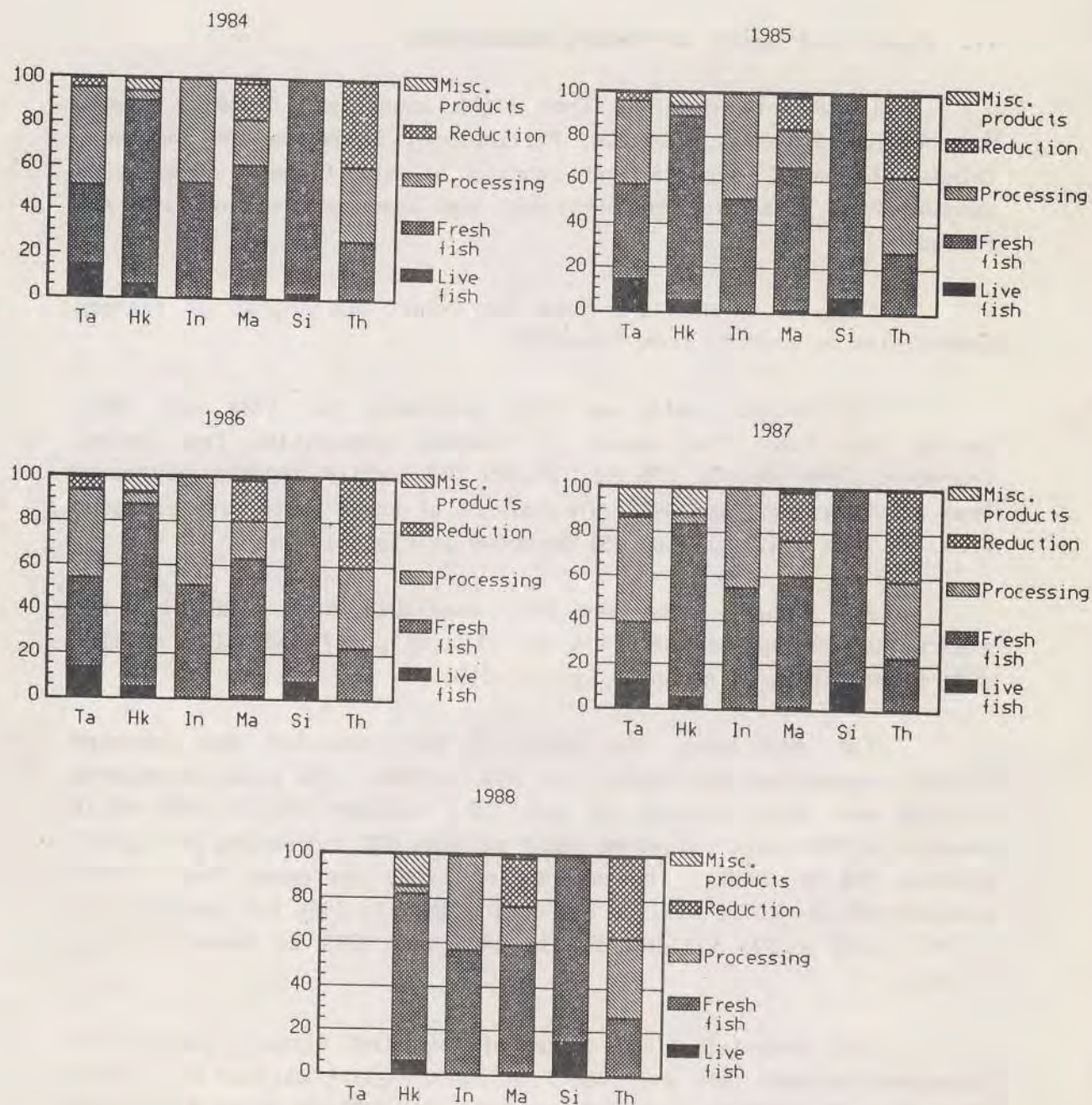


Fig. 10-1 The ratio of disposition of catch from six countries.
Ta. Taiwan; Hk. Hong Kong; In. Indonesia; Ma. Malaysia;
Si. Singapore; Th. Thailand; Misc. products, Miscellaneous
products.

11. Export and Import of Fishery Commodities

[Data were obtained from eight countries; Brunei, Taiwan, Hong Kong, Indonesia, Malaysia, 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. 11-1 and 11-2 show the export and import of fishery commodities by country from 1984-1988.

For Brunei, data was only available for 1984 and 1985. During this time, the export of fishery commodities from Brunei increased from 144,000 US\$ to 169,000 US\$, while imports decreased from 7.1 to 4.9 million US\$. The balance of trade therefore decreased from - 6.9 to - 4.8 million US\$ as shown in Fig. 11-1(A).

For Taiwan, data was only available from 1988 with the export, import and balance of trade at 1,485, 467 and 1,019 million US\$, respectively as shown in Fig. 11-1(B).

For Hong Kong, the value of both exported and imported fishery commodities increased from 1984 to 1988. The value of exports in 1984 was 288.1 million US\$ and 730.3 million US\$ in 1988 while imports in 1984 were valued at 480.1 million US\$ increasing to 1,033.3 million US\$ in 1988. The balance of trade decreased from -191.9 million US\$ to -167.2 million US\$ during 1984 to 1986 but increased to - 297.6 and - 303 million US\$ in 1987 and 1988 as shown in Fig. 11-1(C).

For Indonesia, the value of exported fishery commodities increased between 1984 and 1988 from 248 to 653.5 million US\$, while the value of imports varied between 1984 and 1987 at 28.8, 23.9, 28.2 and 28.4 million US\$ (data in 1988 was not available). The balance of trade for Indonesia also increased from 219.3 million US\$ in 1984 to 447.2 million US\$ in 1987 as shown in Fig. 11-1(D).

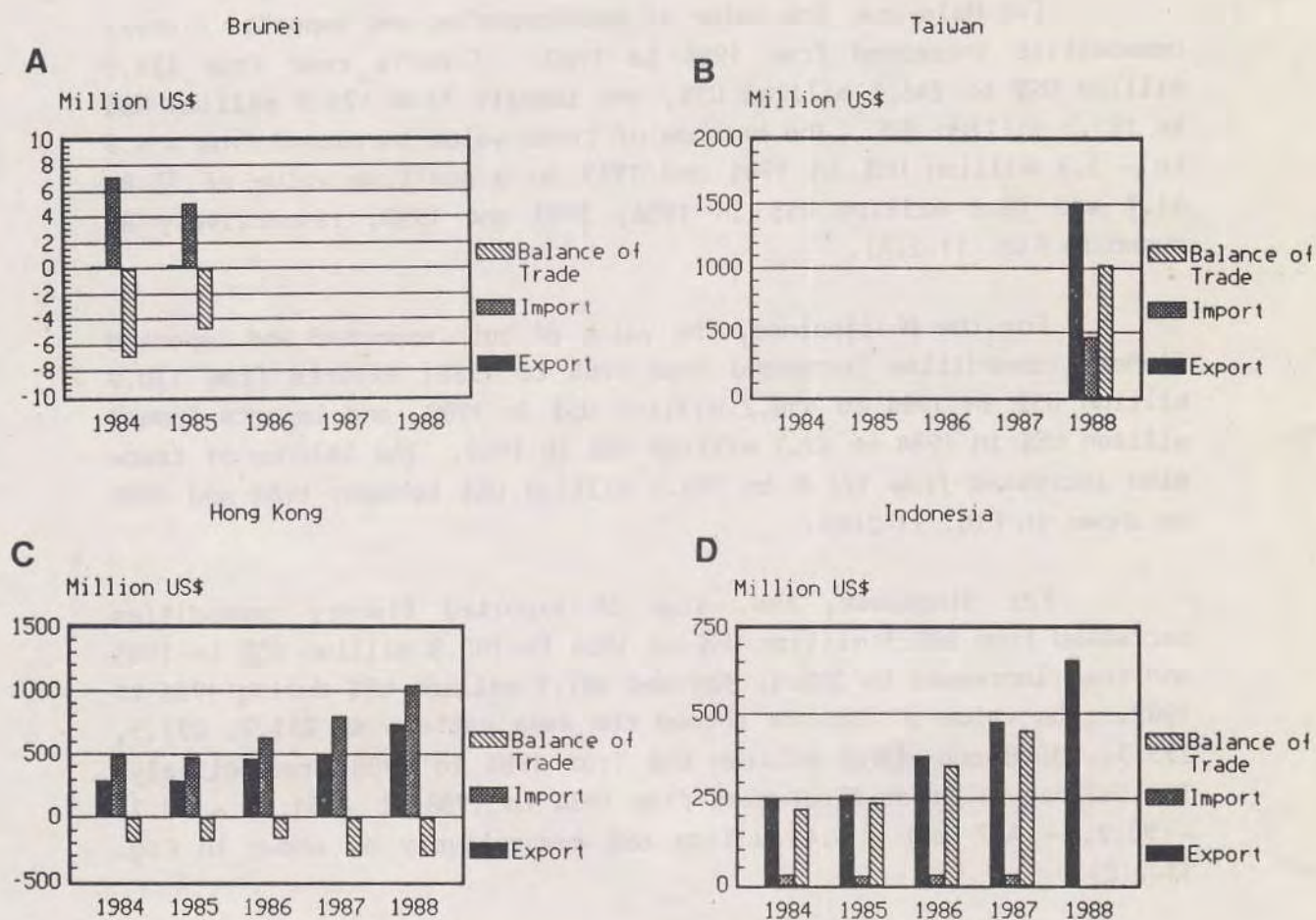


Fig. 11-1 Export and import of fishery commodities in value (1).
A. Brunei; B. Taiwan; C. Hong Kong; D. Indonesia.

For Malaysia, the value of both exported and imported fishery commodities increased from 1984 to 1988. Exports rose from 125.3 million US\$ to 246.1 million US\$, and imports from 129.9 million US\$ to 167.5 million US\$. The balance of trade value increased from - 4.5 to - 5.9 million US\$ in 1984 and 1985 to a positive value of 10.8, 41.7 and 78.6 million US\$ in 1986, 1987 and 1988, respectively as shown in Fig. 11-2(A).

For the Philippines, the value of both exported and imported fishery commodities increased from 1984 to 1988; exports from 130.9 million US\$ in 1984 to 458.2 million US\$ in 1988, and imports from 3 million US\$ in 1984 to 62.7 million US\$ in 1988. The balance of trade also increased from 127.9 to 395.5 million US\$ between 1984 and 1988 as shown in Fig. 11-2(B).

For Singapore, the value of exported fishery commodities decreased from 200.3 million US\$ in 1984 to 180.8 million US\$ in 1985 and then increased to 202.1, 326 and 402.7 million US\$ during 1986 to 1988. The value of imports showed the same pattern at 251.7, 231.5, 295.3, 330.8 and 408.2 million US\$ from 1984 to 1988, respectively. The balance of trade fluctuated from 1984 to 1988 at - 51.4, - 50.7, - 93.2, - 4.7 and - 5.4 million US\$ respectively as shown in Fig. 11-2(C).

For Thailand, the value of both exported and imported fishery commodities increased between 1984 and 1988. Exported fishery commodities increased from 636.6 million US\$ to 1,723 million US\$, while imports increased from 89.5 million US\$ to 570.5 million US\$. The balance of trade in 1984 was 547.1 million US\$ decreasing to 539.1 million US\$ in 1985, then increasing to 734.7, 994.1 and 1,152.6 million US\$ in 1986, 1987 and 1988, respectively as shown in Fig. 11-2(D).

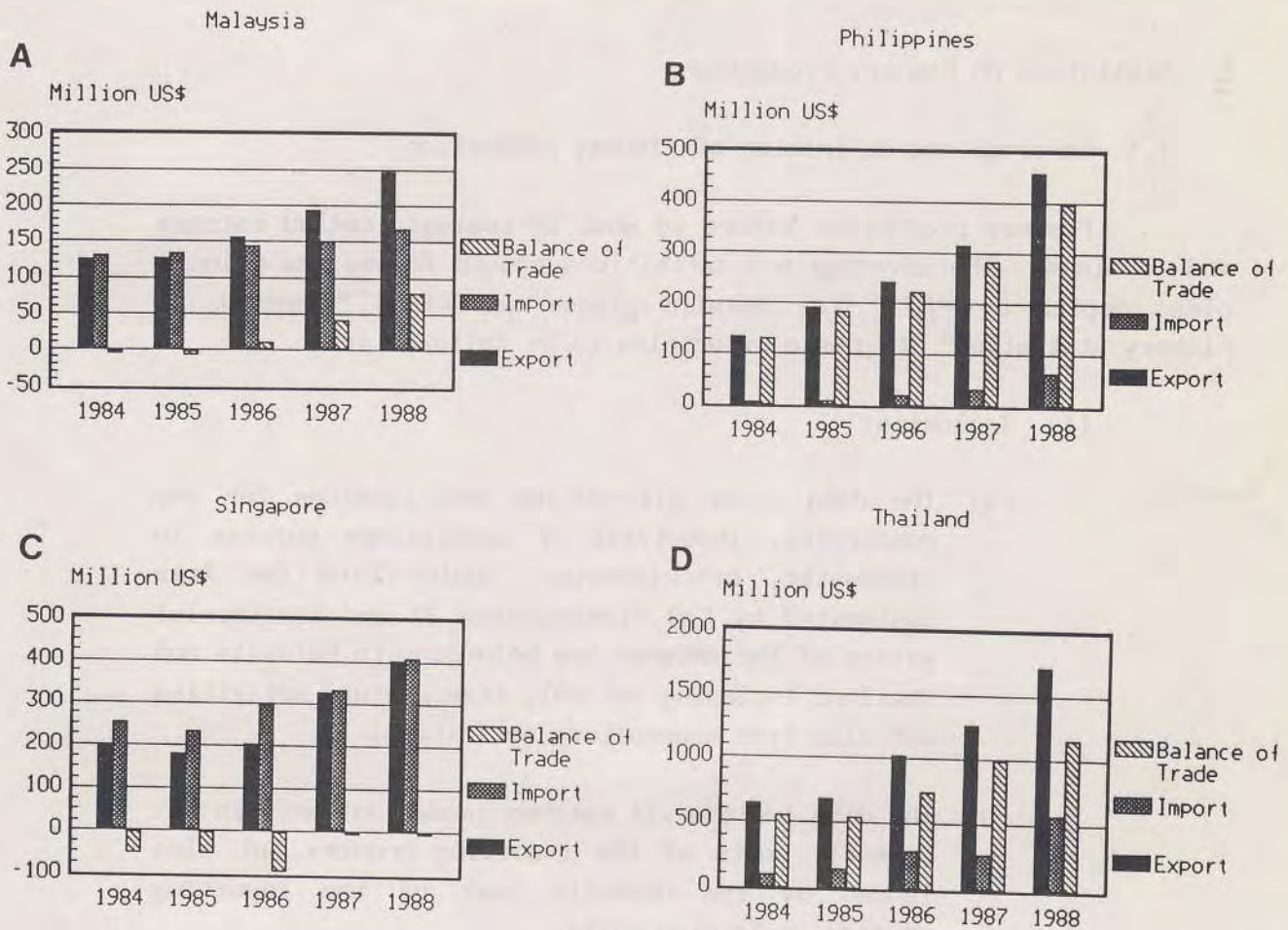


Fig. 11-2 Export and import of fishery commodities in value (2).
A. Malaysia; B. Philippines; C. Singapore; D. Thailand.

APPENDIX

1. Statistics on Fishery Production

1.1 Coverage and definition of fishery production

Fishery production refers to what is commonly called catches and landings. The coverage and definitions should follow the principles adopted by FAO. For details please see FAO's "Yearbook of Fishery Statistics" The basic principles to be followed are:

(1) Inclusion:

- (a) The data cover all catches and landings for any commercial, industrial or subsistence purpose in freshwater, brackishwater, South China Sea Area designated by FAO Fishing Area 71 and territorial waters of the Andaman Sea belonging to Malaysia and Thailand including not only from capture activities but also from aquaculture activities.
- (b) The data include all catches landed not only in the domestic ports of the reporting country but also landed by the domestic boat of the reporting country in foreign ports.

(2) Exclusion:

- (a) The data exclude catches taken by small-scale fishermen for home consumption and sport fishing.

1.2 Quantity and value

(1) Fishery production in quantity

Fishery production in quantity represents the live weight equivalent of the landing, i.e., "the round, fresh" "round, whole" or "ex-water" weight equivalent of the quantities recorded at the time of landing.

(2) Fishery production in value

Fishery production in value represents the producer value equivalent of landing. It is generally estimated by multiplying quantity of catches and landings by producer price (wholesale price at landing centers) by species.

1.3 Definitions of fishery subsectors

(1) Fishery subsectors

in the Bulletin fisheries are divided into three subsectors, i.e., marine fishery, inland fishery and aquaculture, in cases where the terms "fishery" is used it includes both capture (fishing) and culture. However, when the terms marine fishery or inland fishery are used, they refer to capture (fishing) only.

Brackishwater fishery is included in marine fishery.

(2) Capture (or fishing)

Capture means an economic activity to catch or collect aquatic organisms which grow naturally in public waters and which do not belong to the property of any person. The collection of shells of molluscs is also included herein.

(3) Culture

Culture means an economic activity to rear the young of aquatic organisms such as fry, fingerling, oyster seeds, etc., to commercial size. In principle, culture occupies a certain water area for its operation and is carried out with certain artificially built facilities such as ponds, fences, rafts, cages, pens, etc. The production of fry and fingerling in hatcheries, and the collection of various shell seeds in natural waters with artificially built facilities are also included herein.

Unlike capture, aquatic organisms under culture operations belong to the property of a specific person or a group of specific persons who manage them until they grow to commercial size. Therefore, stocking of fry and fingerling into public waters to increase the abundance of natural fisheries resources is not regarded as culture, since such natural resources do not belong to any specific person after stocking.

2. Statistics on Fishing Boat

2.1 Coverage of fishing boat

(1) Inclusion:

The statistics should cover annual data on the fishing fleet engaged in commercial and subsistence operations for fishing in marine and brackishwater areas.

All boat used in fishing, whether registered with the government or not, should be included. A raft which is used in fishing should also be included.

The statistics should also cover fish factory ships, mother ships of fishing expeditions and auxiliary vessels such as fish carriers and fish transport boat. However, a carrier which is used exclusively as a fish carrier is excluded.

(2) The statistics should exclude fishing boat engaged in aquaculture in freshwater, brackishwater and marine areas. Fishing boat engaged in fishing in freshwater areas should also be excluded.

Boat used exclusively for sport fishing, state operated fishery patrol boat, fishery protection boat, and similar types of boat should be excluded.

2.2 Classification of fishing boat

Fishing boat are classified into three broad categories, i.e., non-powered boat, out-board powered boat and in-board powered boat.

3. Statistics on Fishermen

3.1 Coverage of fishermen

(1) Inclusion:

The statistics should cover all commercial and subsistence fishermen operating in marine and brackishwater areas for catching and landing all aquatic animals and plants.

The statistics should also cover fishermen employed on fish factory ships, mother ships of fishing expeditions and on auxiliary vessels such as fish carriers and fish transport boat.

(2) Exclusion:

The statistics should exclude fishermen engaged in aquaculture in freshwater, brackishwater and marine areas. Fishermen engaged in freshwater areas should also be excluded.

The statistics should exclude sport fishermen, the crews employed on state-operated fishery patrol boat, fishery protection boat, and similar types of boat.

3.2 Classification and definitions

The statistics on numbers of fishermen by working status should be based on the following three main categories:

- (1) Fully engaged in fishing
- (2) Mainly engaged in fishing
- (3) Partly engaged in fishing

These categories are defined as follows:

- (1) Fully engaged in fishing: Fishermen who spend all of their working time fishing;
- (2) Mainly engaged in fishing : Fishermen who spend a major part of their working time fishing;
- (3) Partly engaged in fishing : Fishermen who spend a minor part of their working time fishing.

4. Statistics on Catch of Marine Fishery

4.1 Coverage of catch of marine fishery

The coverage of catch of marine fishery is the same as mentioned previously in paragraph 1-1 (p. 58).

4.2 Classification and definition

(1) Catch by species

The catch statistics should be broken down by species. The standard statistical list of marine species is given in the Bulletin's Appendix 2 (p. xv).

5. Statistics on Inland Fishery

5.1 Coverage of inland fishery

The statistics should cover the annual data of commercial and subsistence operations for catching and landing all aquatic animals and plants in freshwater areas.

Aquaculture operation in freshwater areas is excluded from this category because it is treated as an independent sector of freshwater culture.

5.2 Classification and definition

(1) Water body

The statistics on inland fishery production should be presented for the following four types of water body:

- | | |
|---------------|------------|
| (a) Reservoir | (c) River |
| (b) Lake | (d) Others |

(2) Freshwater species

The statistics on inland fishery production should be broken down by species. The list of freshwater species is given in the Bulletin's Appendix 3 (p. xviii).

6. Statistics on Aquaculture

6.1 Classification and definitions

(1) Aquaculture

See definition of this sub-sectors given in paragraph 1-3(3) (p. 59, 60).

(2) Type of culture

The statistics should be based on the type of culture categorized by the method of culture. The national statistical classification should be used in filling in this questionnaire since the regional classification has not yet been established. However, the type of culture may be summarized as follows:

Mariculture:

Oyster culture with raft,
Oyster culture with rack,
Oyster culture with longline,
Oyster culture with stone,
Fish culture in pond surrounded by dike,
Fish culture in pond surrounded by net, etc.,
Seaweeds culture.

Brackishwater culture and freshwater culture:

Name of major species and type of culture (pond culture,
pen culture, cage culture, paddy field culture, etc.)

(3) Yield by species

The yield (production) from aquaculture should be broken
down by species.

7. Statistics on Disposition of Catch

7.1 Coverage

The statistics should cover the disposition of the quantities
of annual catches or landings of all aquatic animals made by
both commercial and subsistence fishermen operating in
freshwater, brackishwater and marine areas. The disposition
of quantities produced through aquaculture should also be
included.

7.2 Classification and definitions

The statistics should be based on three fishery subsectors,
i.e., marine fishery, inland fishery and aquaculture,
according to the broad categories (see the Bulletin, p. xi).

7.3 Quantities

All quantities should be expressed on a live-weight basis.

8. Statistics on Exports and imports of Fishery Commodities

8.1 Coverage

The statistics cover the quantities and values of annual exports and imports of all fishery commodities ranging from live fish to preserved and processed commodities.

In accordance with the internationally recommended practice, export statistics include fish caught by domestic fishing boat whether or not processed on board, landed in foreign ports; import statistics include fish caught by foreign fishing boat whether or not processed on board, landed in domestic ports.