IMPACT OF THE INTRODUCTION OF COMMERCIAL PURSE-SEINE OPERATIONS ON THE TRADITIONAL FISHERIES OF THE KARNATAKA COAST IN INDIA

by

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Abstract

It was during 1977 that large-scale operation of purse-seines started in India mostly along the Karnataka coast. No doubt this has substantially increased the marine fish landings, especially mackerel and sardines. But it has affected the traditional Rampani fishing which also exploits the same fishery resources. The paper makes an impact analysis of this development.

The study revealed that the landings from purse-seines steadily increased while those from Rampani nets have sharply declined during 1976 and 1979. The number of operations of Rampani nets and the catch per operation have also very much declined over the period, thereby displacing a number of active fishermen from their traditional way of livelihood.

Developmental agencies are aware of the problem and are giving preferential treatment to the affected Rampani operators in sanctioning loans to purchase purse-seiners on a cooperative basis. Intensive effort must be made to persuade more fishermen to take to purse-seine operations and associated ancillary activities, and also to induce some to take up mariculture work. Financial assistance and technical know-how will have to be provided to promote the speedy rehabilitation of the affected fishermen.

CONTENTS

1. INTRODUCTION

Since ancient times the fisherfolk along the coastline of India have been exploiting the marine fishery resources in the inshore waters using indigenous crafts and gears. With the advancement of research and technology the traditional methods of fish capture are being fast replaced by modern methods employing mechanised boats and gears.

In India mechanisation started around 1950, but it is only after 1960 that the process accelerated. One of the developments in this direction is the deployment of purse-seiners for fishing. While some pioneering work was done about two decades back under the Indo-Norwegian Project, it was only in 1977 that a large number of purse-seiners were introduced for commercial fishing. This was particularly so in the Karnataka coast where some 120 purse-seiners were put into operation. The number is steadily increasing and is expected to reach 250 by the end of 1979.

Large-scale operations of purse-seiners have certainly increased the fish landings, especially of mackerel and sardines. A natural question here is whether this has any adverse effect on the activities of artisanal fishermen along the coast. The present study attempts to examine the impact of purse-seine operations on traditional fishing, particularly Rampani, along the Karnataka coast.

2. BACKGROUND INFORMATION

Karnataka State lies on the West Coast of India with a coastline of 270 km. (C.M.F.R.I. 1978). There are about 145 marine fishing villages distributed in the two coastal districts of South Kanara and North Kanara. The fishing season begins about September and extends to May. The important fisheries in the area are mackerel, oil sardine, penaeid prawns, catfish, sciaenids and seer fish. The fish landings have been steadily increasing from about 0.76 lakh tonnes in 1969 to 1.53 lakh tonnes in 1978. (C.M.F.R.I. 1979). The sharp rise in 1978 was due to the increase in the number of purse-seine operations which alone could catch about 0.86 lakh tonnes of fish.

In traditional fishing in Karnataka, the types of crafts commonly used are Rampani boats, dug-out canoes, canoe-type boats and outrigger boats. The gears generally employed are Rampani, small shore-seine, boat seine, gill net, drift net, cast net and hook and line. The most pupular gear is the Rampani. It is a shore-seine of exceptionally large size and is generally used for catching mackerel and sardines. The operation of the Rampani net has been described by Samuel (1968) and C.M.F.R.I. (1970). In a typical case, it consists of about 200 pieces laced together, with each piece measuring about 10 metres long. The head rope is buoyed with wooden or plastic floats and the foot rope is weighted with stones or metal balls at regular intervals. The net requires about 80 persons for the operation. When a shoal of fish coming close to the shore is sighted, one end of the net is held at the shore and the Rampani boat is steered in a semi-circular path releasing the net and finally completing the set with the other end of the net to the

shore, enclosing the shoal. The net is slowly dragged, bringing the catch ashore. In some cases, a portion of the catch will be kept alive in the net and sold in stages, depending upon the market demand.

The mechanised crafts used on the Karnataka coast are the trawler and the purse-seiner, the latter being introduced only in 1977. The purse-seine, as is well known, is an encircling net. A long net attached to the mechanised vessel is quickly set to form a wall of webbing around a school of fish. (Sainsburg 1975). The bottom is pursed so that an artificial pond of webbing holds the catch. The pond is gradually made smaller and finally drawn aboard. About 26 persons are employed on a purse-seiner. The catch is often transported to the shore aboard carrier-boats.

3. ESTIMATES OF MARINE FISH LANDINGS BY TYPES OF GEAR AND EFFORT EXPENDED

Fish landings

The gear estimates by types of gear of marine fish landings in Karnataka State in respect to oil sardine, mackerel, seer fish, sciaenids, cat fish, penaeid prawns and other fishes for South Kanara and North Kanara districts for the years 1976 to 1979 (1st half) are shown in Tables I and II. From the tables it is seen that the bulk of the catch of the Karnataka State comes from South Kanara district. In 1978 about 81 percent of the total catch in Karnataka State was accounted for by South Kanara district and this is mainly due to the large scale operations of purse-seine nets in the area. In fact over 90 percent of the purse-seiners are operating in the South Kanara area. Thus the stress in the paper is also on the operations in South Kanara.

From Table I, it is noticed that in South Kanara district the purse-seine catch has shown a steady increase from nil in 1976 to 83,765 tonnes in 1978 and 14,184 tonnes in the 1st half of 1979. In contrast, the landings from Rampani have been declining from 41,202 tonnes in 1976 to 10,350 tonnes in 1978 and a mere 109 tonnes in the 1st half of 1979. It is also seen that sardine and mackerel accounted for the bulk of the catch by the purse-seine as well as the Rampani gears.

The total value of fish caught by purse-seines in South Kanara was estimated at 27 million rupees in 1977 and as much as 89 million rupees in 1978. The estimated total value of fish from Rampani nets decreased from 35 million rupees in 1976 to 14 million rupees in 1978.

From Table II it is observed that in North Kanara district of Karnataka State, landings from purse-seines have increased from 1,166 tonnes in 1977 to 2,254 tonnes in 1978 and 4,351 tonnes in the first half of 1979. On the other hand, landings from Rampani nets decreased from 13,215 tonnes in 1976 to 5,953 tonnes in 1977, and then a slight increase to 7,013 tonnes in 1978 but only 1,960 tonnes during the first half of 1979. This indicates that purse-seine operations in this district have not affected Rampani fishing as much as in South Kanara.

A study of the tables showed that in the State as a whole, 57 percent of the total catch in 1976 was accounted for by Rampani nets which decreased to 30 percent in 1977 and 11 percent in 1978. On the other hand, catches by purse-seines increased from 24 percent in 1977 to 56 percent of the total in 1978. While trawl net catches showed a steady increase in South Kanara, the position was more or less static in North Kanara. In general, other gears did not show any noticeable trend over the period under review.

Number of operations of units

From Tables I and II it is observed that the number of operations of purse-seines showed a substantial increase from 1977 to 1979 (1st half). The trend is generally reversed in the case of Rampani nets. In South Kanara district the number of Rampani operations was about 4000 in 1976, 5000 in 1977, 3800 in 1978 and a mere 356 in the first half of 1979. It is alarming to note that the catch per operation of Rampani net has declined from 10.14 tonnes in 1976 to 2.73 tonnes in 1978 and 0.31 tonnes in the first half of 1979.

The details of the number of purse-seine operations and Rampani net operation for the periods of January to June 1978 and January to June 1979 are shown in Table III to indicate the latest position. From the table it is seen that while the number of purse-seine operations have almost doubled at State level, the same in respect to Rampani nets decreased to about one-third. There was a decline from 2320 to 356 and from 1445 to 926 in the number of operations of Rampani nets in South and North Kanara districts respectively.

4. DISCUSSION

Estimates by types of gear of marine fish landings in the two districts of South Kanara and North Kanara in Karnataka State reveal that the landings from purse-seines have shown a steady increase from 1976 to 1979 (1st half), particularly in South Kanara district. The record landings by purse-seines have boosted the total landings of the Karnataka State and the income from the fisheries sector has also increased.

The landings from the traditional Rampani net have shown a steady decline from 1976 to 1979, South Kanara district being the worst hit. The number of operations and the catch per operation have substantially decreased over the period under study. The latest position shows that compared to the first half of 1978, the corresponding period in 1979 registered a decrease to one third in the number of operations in the State as a whole, and to one sixth if South Kanara district alone is considered. As per a 1973-77 survey (C.M.F.R.I. 1978) there were 164 Rampani nets operating in Karnataka State. Taking 80 persons as the average number of fishermen required per net, there were over 13,000 active fishermen engaged in Rampani operations. With the fast dwindling number of operations observed, a significant number of active fishermen are getting displaced year after year.

Although the increased number of purse-seine operations have helped in the development of fishing harbours and other infrastructure facilities and provided employment potential in the mechanised fishing sector, its adverse impact on the traditional fishermen engaged in Rampani net should be taken note of.

Government and other development agencies are aware of the problem and they are giving preferential treatment to the affected Rampani operators in sanctioning loans to purchase purse-seiners on a cooperative basis. But this facility is likely to be cornered mostly by the more enterprising fishermen and the benefits may not very much percolate down to those who are conservative and who do not like to move out of their traditional homelands. Also it may not be possible to secure employment in purse-seiners for all those affected as they very much outnumber the total strength required for purse-seine operations.

Two suggestions are made here for the speedy rehabilitation of the Rampani fishermen displaced from their traditional activities. Extension and social workers may make intensive efforts to persuade more fishermen to take to purse-seine operations and associated ancillary activities. It should be kept in mind however, there is a limit on fishing effort that can be directed to these resources which could in the future affect economic viability. Secondly, some of them might be induced to take up mariculture work in feasible areas in the fishing villages for which the Central Marine Fisheries Research Institute has the technical know-how. The Institute is already having 'lab-to-land' programmes where culture techniques are transferred from the laboratory to actual field conditions. Financing agencies may be encouraged to advance loans on a more liberal basis for such schemes to enable the affected fishermen to get alternative employment.

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Table 1

Landings by Types of Gear of Marine Fish in South Kanara District of Karnataka State in India from 1976 to 1979 (1st half) in tons

Species \ Gear	Purse-seine	Rampani	Other shore seine	Trawl Net	Gill net	Drift net	Others	Total
1976								
Oil sardine	-	34,812	103	-	570	175	493	36,153
Mackerel	-	5,237	214	236	6,296	12	173	12,168
Seer fish	-	29	2	11	149	244	3	438
Sciaenids	-	126	81	1,839	434	54	17	2,551
Cat fish	-	30	50	729	157	102	878	1,946
Penaeid prawns	-	2	1	777	14	2	14	810
Others	-	966	258	3,746	1,066	344	695	7,075
Total	-	41,202	709	7,338	8,686	933	2,273	61,141
No. of operations of units	-	4,063	1,646	38,411	33,229	52,303	39,455	169,107
1977								
Oil sardine	8,837	17,093	-	48	25	53	1,247	27,303
Mackerel	12,447	2,691	1	1,344	1,193	1,146	428	19,250
Seer fish	1	5	-	381	7	467	27	888
Sciaenids	-	109	4	1,076	121	135	95	1,540
Cat fish	-	14	-	1,189	24	611	434	2,272
Penaeid prawns	-	1	-	1,016	60	12	74	1,163
Others	1,323	2,822	14	9,330	393	1,356	1,111	16,349
Total	22,608	22,735	19	14,384	1,823	3,780	3,416	68,765
No. of operations of units	5,125	5,031	398	72,407	23,629	89,783	50,805	247,178
1978								
Oil sardine	41,636	1,022	470	1	78	103	134	43,444
Mackerel	31,887	7,648	464	-	578	56	177	40,810
Seer fish	10	2	3	1	533	157	20	726
Sciaenids	2	61	338	80	58	24	59	622
Cat fish	5	15	2	116	348	216	249	951
Penaeid prawns	-	42	180	4,453	482	14	1,207	6,378
Others	10,225	1,560	655	13,509	1,612	250	2,863	30,674
Total	83,765	10,350	2,112	18,160	3,689	820	4,709	123,605
No. of operations of units	18,595	3,787	2,590	96,486	52,625	55,796	23,496	253,375

Species \ Gear	Purse-seine	Rampani	Other shore seine	Trawl net	Gill net	Drift net	Others	Total
1979 (1st half)*								
Oil sardine	4,557	-	76	61	2	-	-	4,696
Mackerel	6,163	54	58	390	1,007	30	37	7,739
Seer fish	-	-	-	-	107	124	-	231
Sciaenids	2	6	1	94	2	14	3	122
Cat fish	-	-	-	102	38	75	24	239
Penaeid prawns	-	1	-	1,094	-	-	-	1,095
Others	3,462	48	552	3,749	215	159	28	8,213
Total	14,184	109	687	5,490	1,371	402	92	22,335
No. of operations of units	6,756	356	720	35,089	8,687	19,183	4,013	74,804

* provisional

Table 2. Landings by types of gear of marine fish in North Kanara district or Karnataka State in India from 1976 to 1979 (1st half) (in tonnes)

Species \ Gear	Purse seine	Rampani	Other shore seine	Trawl net	Gill net	Drift net	Others	Total
1976								
Oil sardine	-	3,110	64	79	252	184	1,609	5,298
Mackerel	-	8,761	4	-	302	16	1,204	10,287
Seer fish	-	-	3	-	538	358	4	903
Sciaenids	-	2	139	210	88	28	198	665
Catfish	-	22	23	1,018	214	203	853	2,333
Penaeid prawns	-	-	55	1,206	286	4	233	1,784
Others	-	1,320	317	6,906	2,052	859	1,418	12,872
Total	-	13,215	605	9,419	3,732	1,652	5,519	34,142
No. of operations of units	-	3,394	4,755	29,795	80,079	70,599	64,728	253,350
1977								
Oil sardine	234	2,212	-	60	14	272	1,050	3,842
Mackerel	923	3,301	-	18	344	93	2,285	6,964
Seer fish	1	2	-	-	10	878	52	943
Sciaenids	2	94	33	539	24	308	222	1,222
Cat fish	-	1	13	1,586	66	811	413	2,890
Penaeid prawns	-	96	2	1,592	16	219	247	2,172
Others	6	247	80	4,463	837	3,336	1,385	10,354
Total	1,166	5,953	128	8,258	1,311	5,917	5,654	28,387
No. of operations of units	1,068	2,626	2,457	28,786	33,918	211,906	25,412	306,173

Table 2. Landings by types of gear of marine fish in North Kanara district or Karnataka State in India from 1976 to 1979 (1st half) (in tonnes) (cont'd.)

Species \ Gear	Purse seine	Rampani	Other shore seine	Trawl net	Gill net	Drift net	Others	Total
1978								
Oil sardine	380	2,268	94	1	227	131	162	3,263
Mackerel	716	4,425	155	74	829	69	3,626	9,894
Seer fish	-	6	3	-	53	630	45	737
Sciaenids	67	11	145	633	68	32	150	1,106
Catfish	23	62	14	269	126	450	936	1,880
Penaeid prawns	-	-	101	1,901	15	18	9	2,044
Others	1,068	241	299	6,902	783	644	394	10,331
Total	2,254	7,013	811	9,780	2,101	1,974	5,322	29,255
No. of operations of units	1,069	2,192	3,327	31,389	74,860	82,106	23,762	218,705
1979 (1st half)*								
Oil sardine	3,877	-	24	7	68	-	44	4,020
Mackerel	288	1,820	62	85	307	24	311	2,897
Seer fish	-	-	-	-	2	185	-	187
Sciaenids	-	3	140	646	21	18	23	851
Cat fish	-	9	2	232	44	188	76	551
Penaeid prawns	-	-	-	419	1	-	1	421
Others	186	128	61	3,514	223	249	101	4,462
Total	4,351	1,960	289	4,903	666	664	556	13,389
No. of operations of units	2,826	926	1,411	6,072	25,547	20,310	6,466	63,558

m.a.s.24/9

*provisional

Table 3

Number of Sets Made by Purse-Seine and Rampani Nets During the First Half of 1979 and the Corresponding Period in 1978

Gear / Period	Purse-seine			Rampani net		
	South Kanara	North Kanara	Total	South Kanara	North Kanara	Total
January to June 1978	4,385	458	4,843	2,320	1,445	3,765
January to June 1979	6,756	2,826	9,582	356	926	1,282

THE PURSE SEINE FISHERY OF HONG KONG BASED ON AN INVESTIGATION CONDUCTED IN 1975-1976

by

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Abstract

The paper traces the history of the Hong Kong purse seine fishery from the early 1950s to the mid-1970s; during this time there was a gradual transformation from a large wind-driven fleet of vessels to a smaller mechanized fleet of seiners. This is basically a small boat fishery which harvests various pelagic species in shallow coastal waters. Though there were more than 800 mechanized seiners in 1964, the fleet has gradually dwindled to just over 200 boats in 1974. During the early days, purse seiners provided the main source of bait for long line boats. Today, however, the catch is used primarily by the mariculture industry for feed. The future of this fishery does not look particularly promising but suggestions are made for improvements.

CONTENTS

1. INTRODUCTION

Historically, the Hong Kong purse seine fishery provided the main source of bait for the bottom longline fishery, and these two fisheries are therefore interdependent. The demand for coastal pelagic fishes for fish sauce manufacturing and duck raising also contributed to some extent to the viability of the purse seine fishery. The traditional preference for certain forms of sun-dried engraulids in the consumer market was also another factor that sustained its existence.

Since the early fifties, the development of fish preservation through the increasing use of ice, coupled with the development of off-shore fishing grounds, brought about significant increases in the proportion of fresh marine fish landings and an abrupt decline in the production of salt/dried fishes. Subsequent changes in the Hong Kong-based fishing fleet as a result of mechanisation and modernisation development programmes helped to improve the overall performance characteristics and gradually led the Hong Kong fisheries into today's era.

Within these periods, the purse seine fishery experienced considerable setbacks which resulted in a significant reduction in the number of purse seine units from 2,049 in 1958 to 298 in 1979 (Fisheries Development Division, unpublished data), as well as in a rapid decline in its viability during the late 1950's.

In particular, the declining trend in the size of the purse seine fleet was associated with a number of inter-related factors inherent at the time. The most critical event was the intensification in the exploitation rate of the bottom longline fishery, which was stimulated by the increasing demand for premium quality fish and made possible by the rapid development of the bottom longliners. Since purse seining for specific fish taxa is highly seasonal, the limited and sporadic supply of purse seine catches, particularly those of certain forms of engraulids, often resulted in high prices for the bait and thus increased the operational costs of bottom longliners. This forced the longline operators to resort to alternative bait from a cheaper source. At the same time, the pressing need to resolve the problems of the shortage of longline fishermen had led to the introduction of modern-hulled vessels and the "baiting ashore" scheme. These resulted in a significant decrease in the operational costs of longliners through a 60-70% reduction in fisherman crew and the utilisation of low-cost, readily available trawl fishes as a source of cheap bait. Thus, the dependence of the longline fishery on the purse seiners for the supply of bait gradually decreased.

Apart from Lin (1940) and the brief accounts in the Annual Reports of the Director of the Agriculture and Fisheries Department since 1950, very little on the Hong Kong purse seine fishery has been documented. The most recent review of this fishery was made in 1972 (Fisheries Research Station, Department of Agriculture and Fisheries) to provide a comprehensive understanding of this sector of the Hong Kong fisheries.

Recently, the emphasis of the Department of Agriculture and Fisheries on the development of pelagic fish resources has necessitated a general survey in 1975-76 of the existing purse seine fishery.

2. METHODS

A study of the Hong Kong purse seine fishery was initiated in November 1975. The waters covered were divided into six areas according to the major ports used by local purse seiners (Fig. 1). Catch and effort information was collected in interviews with fishermen at the fish markets and at their home ports.

Fishing was usually carried out at night. From the results of a pilot project, no apparent relationship could be established between total catch and the number of hauls made during a fishing trip (Fig. 2). Total fishing time for each trip, however, was relatively constant (from dusk to dawn) and a vessel-night is considered to be a suitable unit for fishing effort assessment. The total catch per trip per vessel-night was therefore taken as the catch per unit of effort. The catch and effort information for each area were pooled to give the catch per unit of effort for that particular area. Landings of individual purse seiners and species composition by weight were derived from market sales vouchers obtainable from the Fish Marketing Organization (FMO), Hong Kong.

3. THE FISHERY

The Fishing Fleet

The early Hong Kong purse seiners, like other local fishing boats, were traditionally wind-driven. In 1948, the Government of Hong Kong initiated a mechanisation scheme for all fishing vessels and as a result, the number of mechanised purse seiners gradually increased. Table 1 gives the estimated number of purse seiners since 1951, from which it can be seen that the total number of local vessels engaged in purse seining declined after the peak year of 1957/58. This decline was caused by a reduction in the number of wind-driven vessels; whereas, the number of mechanised purse seiners continued to increase, reaching a peak in 1963/64. The wind-driven vessels were either mechanised during this period, or changed to other operations because they could no longer compete with the mechanised units. The decline in the number of mechanised purse seiners was first recorded in 1965, and following a drastic reduction in 1967, the number of purse seiners recorded in 1969 (425) was only 50% of that at the peak year of 1964 (856). The recent trend shows a further decline in the number of purse seiners and also the complete disappearance of wind-driven units.

Lin (op. cit), the first to describe the Hong Kong fisheries, provides a comprehensive account of the purse seiners and their method of fishing. He recognized two types of purse seiners differing only in size: the big purse seiners or "pa tang" ranging 47-65 ft. in length, did not take part in the

actual fishing but acted as carrier vessels for the sampans, the seine nets and other gear and equipment to the fishing ground; and the smaller purse seiners or "Ku tsai teng" measuring 16-28 ft. in length, were small boats working in pairs, from which the crew operated the net directly.

In the present study, it has been found that except for one vessel with a modern-hulled design, all the purse seiners continue to retain the traditional Chinese junk type of hull measuring from 4.9 m. (16 ft.) to 20.7 m. (68 ft.) LOA.

The fish hold capacity and engine horsepower are features that limit the productivity of Hong Kong purse seiners. The former restricts the quantity of fish catches to be brought in and therefore, the total quantity to be harvested at times of high fish density. This is found to be directly proportional to the measure of capacity (Thames tonnage x 17) used in Hong Kong for determining the size of a fishing vessel. Fig. 3 shows a scatter plot of length (LOA) against capacity for purse seiners built during 1969-74, suggesting that length and capacity are exponentially related by the following equation:

$$\text{Fish hold capacity (piculs)} = 0.0079 \times K \times LOA^{3.010}$$

where K = constant

It follows that length could be used as an index of the fish hold capacity of a purse seiner.

Engine horsepower determines the speed and operational range of a purse seiner and consequently limits its capability to fish in more distant grounds. A plot of the length of vessel against respective engine horsepower (Fig. 4) suggests a possible method of grouping the Hong Kong purse seiners into the following classes:

		Length	
Class	h.p.	metre	feet
1	18	9.00	30
2	18-100	9.00-13.41	30-44
3	100	13.41	44

Justification of this classification was tested by comparing the activities of the three classes of purse seiners with respect to their operational range as shown in Table 2. It may be seen that class 1 purse seiners are small vessels whose fishing activities are exclusively limited to close proximities to their respective home ports. Class 2 purse seiners are medium-sized vessels having over 70% of their fishing activities conducted within the home port areas with the remainder carried out in areas adjacent to their home ports. Class 3 vessels are the large purse seiners

which have the highest degree of mobility, with 33% of their fishing conducted in adjacent areas and 22% in waters as far afield as the Man Shan Islands and the Lemas (Fig. 5). In addition, factors such as the skippers' knowledge of local geographical and hydrological conditions must also play some part in determining the fishing range of these vessels.

Gear

A typical fishing unit consists of the mother boat and two to four sampans. In general, two to four bright kerosene lights hanging from one or more sampans are used to attract fish. When a sufficient quantity of fish has been concentrated, the mother boat and another sampan each working from different directions encircle the school with a seine net. Each purse seining unit carries two to four sets of seine nets, but some may have as many as eight sets. These differ in dimension and mesh size and are designed for catching specific species or species groups (Table 3). To a certain extent, smaller vessels tend to use smaller nets for a given mesh size because of manpower limitations. In the case where two purse seiners operate together to form one fishing unit, bigger nets or up to 280 m. (150 fm) may be used. In addition, most purse seiners also carry one or two sets of gillnets for catching squids, and some handlines for catching Spanish mackerels.

Grounds

Most of the fishing is conducted in inshore waters between depths of 3.27 m (2-15 fm), but fishing may be extended to over 40 m. (20 fm). Table 4 gives the proportion of fishing activities conducted at various depths, and illustrates the inshore nature of the existing purse seine fishery. In the period November 1974 to February 1975, 80% of the 387 fishing trips for which data are available were carried out in waters less than 18 m. (10 fm), of which 48% were conducted in the 11-18 m. (6-10 fm.) range and 32% in waters less than 9 m. (5 fm.) in depth. The major fishing grounds included areas north and west of Cheung Chau in the west; Tai Tam Bay and Po Toi Island in the south; Leung Sheung Wan, Kau Sai and Clear Water Bay in the east; and Tolo Harbour, Tap Mun and Ping Chau in the northeast (Fig. 1). At times, the large purse seiners operated in more offshore water near the Lemas and the Man Shan Islands (Fig. 5).

4. THE RESOURCE

Species

Resources exploited by the local purse seine fishery consist largely of small coastal pelagic fish including mostly finfishes and some invertebrates. Lin (*op. cit*) noted that the major taxa exploited were mackerel scads (*Decapterus* and *Trachurus spp.*), pouters (*Leiognathus spp.*) and some herring-like fishes, presumably the round herring (*Dussumieria hasselti*) and sardines (*Sardinella spp.*).

Estimated total landings by taxa through FMO markets by the purse seine fleet between July 1975 and June 1976 are given in Table 5. It can be seen that the most important taxa by weight in descending order were mackerel scads, sardines, gizzard shads (Clupanodon and Nematalosa spp.), rabbitfishes (Siganus spp.), pouters, the shrimp scad (Caranx kalla), mackerels (Pneumatophorus spp.), cardinal fishes (Apogon and Apogonichthys spp.), anchovies (Stolephorus and Engraulis spp.) and the black-finned scard (Caranx mate), all having estimated FMO landings exceeding 80 m. tons. Squids are the major invertebrate taxon landed (120 m. tons), although some cuttlefishes and prawns were also caught.

Large coastal pelagic fishes such as Spanish mackerels (Scomberomorus spp.) were also exploited during the peak season using hand and troll lines.

Production

The total annual landings by gear type for the period 1968-1978 sold through FMO markets are shown in Table 6 (FMO Trade Statistics). It may be seen that the annual purse seine landings fluctuated between 4,000 and 5,000 m. tons in 1973 and 1974 respectively (FMO Trade Statistics), while total landings by all gear types for the same period remained fairly constant at 75 thousand m. tons.

However, FMO landing figures for purse seiners are under-estimates of the true annual landings by this gear as it is known that significant proportions of purse seine catches are sold outside FMO markets. Estimated landing figures for purse seiners in fact showed a continual and sizeable decline from 17,000 m. tons in 1976 to only 6,000 m. tons in 1978 (Table 6). The decline in the number of purse seiners together with natural fluctuation in the resources must be responsible for this decrease in landings. In addition, losses due to spoilage including that incurred during the sun-drying process, which might involve the whole catch during bad weather, were again not included.

Seasonal trend

Purse seining activities are particularly sensitive to weather conditions compared with other gears. The activities of a number of purse seiners based at Stanley were closely followed during the period of study to estimate their fishing intensity (Table 7). It may be seen that fishing activity was, in general, low throughout the winter period due to the prevailing northeast monsoon but was generally higher for other seasons. This agrees with the pattern of distribution of the computed monthly fishing effort based on market landing figures and interview data (Table 8).

This dependence of fishing activity on local weather conditions has contributed to seasonal variations in the landings by purse seiners. From the monthly FMO purse seine landings for 1972 to 1974 (Fig. 6), it can be shown that the peak season of purse seine catches falls in the summer months. Minimum landings were consistently recorded in February due partly to poor weather conditions in this month and to the celebration of the Lunar New Year in port by the fisherman.

However, the availability of a species to the fishery must also be governed by its life cycle and the influence of environmental factors on reproduction, growth, feeding and migration. The monthly catch per unit of effort for the major taxa computed from market interviews and sales voucher processing is graphically presented in Fig. 7 to illustrate the seasonal abundance of the resource. It may be seen that catch per unit of effort for all fin fish species peaks in August and September 1975 and June 1976. The high catches in August and September resulted from a high abundance of Sardinella spp. and Decapterus spp., and to a lesser extent of Caranx kalla. The peak in June was attributed to high catches of the mackerel scads (Decapterus and Trachurus spp.). The occurrence of other taxa such as that of the anchovies, the finlet scads (Caranx mate and the cardinal fishes also showed fairly distinct but lesser peaks lasting for one to two months; whereas, the gizzard shads (Clupanodon and Nematalosa spp.), rabbitfishes (Siganus spp.) pouters (Leiognathus spp.) and mackerels (Pneumatophorous spp.) had lower but extended peak occurrences of several months.

5. DISCUSSION

Despite relatively stable purse seiner landings through FMO markets for the period 1974 to 1978, estimated total annual landings by purse seiners, also taking into account landings outside FMO markets, showed a continual and sizeable decline from 17 thousand m. tons in 1976 to 6 thousand m. tons in 1978 (Table 6). The estimated number of purse seiners also declined from 385 in 1976 to 298 in 1979. Thus, apart from natural fluctuations in the resources, the decline in total landings must be partly attributed to a decrease in the size of the purse seine fleet.

A diminishing fleet size, apart from other reasons, suggests unattractive financial return for this particular gear. Although cost-earnings studies of the purse seine fishery have not been conducted, detailed discussions with purse seine fishermen have revealed that the profit margin for this sector of the Hong Kong fisheries has remained low due to the relatively low market price for the catch compared with that for the other fisheries. The FMO figures show that the average price for purse seine catches are always considerably lower than that for the other gear (Table 9).

The low market value of purse seine landings indicate the low demand for the products resulting from the limited market for the species. As a rule, purse seine catches comprise almost exclusively small, bony pelagic fishes which are traditionally much less preferred as food fishes by the consumers. Certain taxa such as the squids and anchovies do fetch a reasonable price both in the fresh or dried state as these are among the preferred food items. However, in the case of the dried anchovies, market saturation often results during the peak season, resulting in a collapse of the price from about US$5 to only US$1.20 per kg. within one to two months. When this happens, purse seine fishermen tend to restrain their fishing effort by staying in port.

A sizeable proportion of the catch is utilized as feed for the culture of marine fish and the farming of ducks. The recent expansion of marine fish farming necessitates additional supplies of fish as feed. In this respect, however, the purse seiners are presently facing keen competition from the trawl sector bringing in trash fish that were previously discarded.

Similarly, trawlers compete with the purse seiners for the supply of bait for the bottom longline fishery. Except for pelagic species almost exclusively exploited by purse seining, other bait species such as the mackerel scads are also caught in quantity by trawlers. The development of the high opening trawl enables trawlers to catch a higher proportion of off-bottom species, including squids and mackerel scads thus increasing the supply of these species as bait for the longliners. The decline of the longline fleet in recent years has resulted in a reduction in the demand for bait and creates further constraints on the purse seine fishery.

Purse seine catches are also utilised for the manufacture of fish sauce and fish meal. However, the seasonal nature of the resource and the relatively low current annual landings do not justify large-scale development of these activities and thus fail to secure the possibility of bulk utilisation of the purse seine catches.

The decreasing landings may also be the result of the limited fish stocks in existing purse seining grounds. Although little information is available to illustrate a lower fish abundance, the loss of purse seining grounds due to land development in recent years is quite apparent. Reclamation in the Tolo area and the construction of the High Island Reservoir in the Sai Kung area are notable examples of the physical loss of purse seining grounds. The lowering of stock abundance in traditional fishing grounds due to deterioration of the environment is less apparent but is not to be overlooked. Purse seine fishermen have attributed the decreasing abundance of some pelagic species in certain areas to contamination of the environment by various types of marine dumping and land-based discharge.

The high sensitivity of the purse seiners to changes in local weather and sea conditions means that they can fish effectively for much shorter periods during the main season than, say, trawlers. This, together with the relative inefficiency of the fishing operation in terms of manpower utilisation, contributes to the lower economic return for this gear.

With increasing job opportunities on shore, fishermen of the younger generation are always tempted to leave the fishing industry to take up jobs in other industries. Although this situation is not unique to the purse seine fishery, it is however more acute in view of the lower price realised for the purse seiner catches and hence the less attractive income for the purse seine fishermen compared with that in other sub-sectors of the fishing industry. Purse seining is a labour-intensive gear as shooting and hauling are all done by hand. The average crew size of a purse seiner is comparable to that of the larger stern trawlers, gill netters or longliners. Thus the effects of labour shortage are felt more severely in the purse seining fishery than in other sub-sectors.

To maintain the competitiveness of the purse seiners in the fish industry, it is necessary to work in three directions, viz to cut operational cost, to increase catches and to stimulate demand for the catch. Cutting operational cost could be achieved through mechanisation of the fishing operation whereby the number of crew required can be minimised. Increased catch can be achieved by improving methods of concentrating and catching the fish. For the latter aspect, electric bright lights for attracting pelagic fishes have been tested by the Fisheries Development Division although conclusive results still await further experimentation. An area of development towards higher demand for the catch is to improve utilisation. In this respect, the Fisheries Development Division has been looking into the feasibility of making silage from trash fish and of utilising this silage as an additive to pig feed and fish pellets.

Faced with increasing running costs, shortage of labour, low utilisation and low market price for their catch, the outlook for the purse seiners is not bright. It is also unlikely that the existing fleet will be able to take advantage of the location of offshore pelagic resources which is being given priority in the Fisheries Branch of the Agriculture and Fisheries Department, as it is likely that new types of vessels and new technology will be required for the exploitation of these new resources. The involvement of local purse seiners in the mariculture industry is at present the only incentive for them to stay in the purse seining business. The present estimated annual production of the mariculture industry is 630 m. tonnes. Taking a conversion ratio of 10:1, a total of 6,300 tons of trash fish would be required as feed for this crop and purse seiners currently provide the bulk of this amount. It has been noted that in Stanley where no mariculture is practised because of geographical limitations, the once active and sizeable purse seine fleet based there is now almost non-existent. Purse seining has today evolved into a part-time operation associated with mariculture and is likely to remain so in the foreseeable future.

6. REFERENCES

Hong Kong Fisheries Research Division, 1972. A review of the Hong Kong pelagic fisheries. Paper presented to the Symposium on Coastal and High Seas Pelagic Resources, IPFC, 15th Session, Wellington, New Zealand, 18-27 October 1972. IPFC/72/SYMP/26: 27p.

Lin, S.Y. 1940. The fishing industries of Hong Kong. J. Hong Kong Fish.Res.Sta., I(1), pts. 1-5: 6-101.

Table 1. The estimated numbers of purse-seiners, 1951-1974

Year	Purse Seiners		Total
	Wind-driven	Mechanised	
1951*	1811	-	1811
1952*	1687	2	1689
1953*	1695	13	1708
1954*	1673	121	1794
1955*	1568	253	1821
1956*	1604	305	1909
1957*	1496	466	1962
1958*	1254	695	1949
1959*	1051	702	1753
1960*	933	723	1656
1961*	808	739	1547
1962*	557	811	1368
1963*	489	842	1331
1964*	428	856	1284
1965*	-	833	833
1966*	264	803	1067
1967*	234	592	826
1968*	-	-	-
1969*	103	425	528
1973**	25	340	365
1974	-	228	228

* date extracted from IPFC/72/SYM 46.

** estimation by the Fisheries Development Division

Table 2. Fishing range of purse seiners categorised by engine horsepower

Vessels categorised by H.P.		Fishing at						Total no. of trips
		Home port area		Adjacent areas		Other areas		
		No. of trips(n)	%	No. of trips(n)	%	No. of trips(n)	%	n
Class 1	18	30	100	/	/	/	/	30
Class 2	18-100	96	73.28	35	26.72	/	/	131
Class 3	100	4	44.44	3	33.33	2	22.22	9
Total		130	76.47	38	22.35	2	1.18	170

Table 3. Dimensions and mesh sizes of seine nets used by local purse seiners.

Length (metres)	Length (Chinese) (fms)	Depth (metres)	Depth (Chinese) (fms)	Mesh (mm.)	Mesh (Chinese) (in)	Species of groups caught
20-50	12-30	11.7-16.7	7-10	5.50-7.50	0.15-0.20	post larval stages of anchovies
50-83.5	30-50	26.7-50	16-30	9.30-11.20	0.25-0.30	small anchovy, anchovy-like species, juvenile sardines, juvenile scad
83.5-116.9	50-70	41.8-66.8	25-40	11.20-22.30	0.30-0.60	sardines, small scad, juvenile mackerel, large size anchovies
100.2-250.5	60-150	40-116.9	24-70	22.30-44.60	0.60-1.20	sardine, scad, pouters, gizzard shad, mullet, other carangids, rabbit fish

Table 4. The proportion of purse seine: fishing conducted at various depth ranges over the period November 1974 to February 1975 inclusive

Depth range		Fishing activity	
(metres)	(fathom)	No. of trips	% of total
9.1	5	123	31.78
11-18.3	6-10	186	48.06
20.1-27.4	11-15	65	16.80
over 27.4	over 15	13	3.36
Total		387	100

Table 5. Species composition by weight (m. tons) by area for purse seiner landings according to FMO auction vouchers for the period July 1975 - June 1976

Species \ Area	1	2	3	4	5	Total
Stolephorus/Engraulis spp.	53.84	31.90	1.71	5.31	9.68	102.44
Apogon spp.	1.49	9.08	-	45.87	69.84	126.29
Caranx mate	58.45	8.01	13.04	-	3.09	82.59
Clupanodon/Nematolosa spp.	3.34	260.25	7.07	4.94	0.48	276.08
Leiognathus brevirostris	18.87	135.00	9.15	2.99	48.04	214.04
Leiognathus spp.	8.51	-	-	24.98	62.53	96.02
Mugil cephalus	7.04	32.32	5.41	11.80	3.01	59.58
Mugil spp.	8.16	22.13	8.70	5.82	36.81	81.61
Pneumatophorus japonicus	20.99	24.32	18.06	53.10	30.86	147.34
Sardinella spp.	274.76	448.54	60.85	32.77	50.60	867.52
Decapterus spp.	128.65	179.31	156.47	76.28	888.25	1428.97
Siganus spp.	28.86	162.91	25.00	10.35	30.49	257.62
Trichiurus spp.	3.00	3.14	1.86	1.50	0.49	9.99
Dussumieria hasseltii	7.66	1.90	2.19	0.13	9.61	21.48
Sphyraena spp.	1.31	1.33	0.33	-	0.04	3.01
Thrissa spp.	0.46	23.58	-	1.31	0.08	25.43
Caranx kalla	17.36	182.36	-	8.34	0.92	208.99
Hemirhamphidae	0.33	0.10	0.15	0.96	5.09	6.64
Selaroides lepitolepis	1.03	3.85	2.81	-	-	7.69
Sparidae	0.39	1.91	0.86	2.26	1.24	6.69
Therapon spp.	0.22	1.23	1.19	-	-	2.65
Atherina spp.	6.69	0.02	-	-	-	6.71
Caranx malabaricus	0.34	0.99	2.59	0.01	4.41	8.34
Chirocentrus dorab	3.82	0.98	0.32	0.04	0.02	5.17
Rastrelliger spp.	0.14	5.15	0.02	-	-	5.31
Monocanthus spp.	-	-	-	-	31.75	31.75
Stromateoides spp.	-	0.03	1.08	0.12	0.11	1.34
Thunnidae	0.16	1.14	-	-	-	1.30
Gerres spp.	0.29	7.99	0.40	-	0.06	8.74
Atropus atropus	0.03	0.08	2.45	0.04	0.32	2.92
Fish larvae	0.01	-	3.06	0.43	-	3.50
Unsorted fish spp.	44.70	319.67	60.66	3.40	13.44	441.87
Squid	35.75	15.06	39.38	6.96	24.65	121.79
Cuttle	2.12	1.66	0.38	0.03	0.98	5.17
Octopus	0.05	-	-	-	-	0.05
Shrimp	0.40	0.60	0.02	-	27.38	28.40
Vertebrate subtotal	700.91	1869.25	385.42	292.77	1301.26	4549.60
Invertebrate subtotal	38.32	17.31	39.78	69.78	53.01	115.41
Gross total landings	739.23	1886.56	425.20	362.55	1354.27	4665.01

Table 6. Landings of fresh marine fish and invertebrates sold through all FMO markets, classified by gear type

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
	'000 m tons	'000 m tons	'000 m tons	'000 m tons	'000 m tons	'000 m tons	'000 m tons	'000 m tons	'000 m tons	'000 m tons	'000 m tons
Trawler	38.6	45.6	48.5	48.0	48.3	50.5	51.1	55.5	61.1	62.1	64.8
Liners	13.3	13.0	10.9	10.4	10.0	8.2	9.3	8.7	8.7	8.2	7.0
Gill-netters	6.2	5.7	5.5	5.7	7.0	8.3	10.4	12.3	12.2	10.8	10.7
Purse seiners	5.2	4.2	5.1	4.5	4.5	2.9	3.2 12.9*	3.8 13.1*	4.7 17.0*	4.3 11.4*	3.0 6.3*
Others	3.4	4.0	3.7	3.4	4.0	4.5	4.6	4.7	1.6	1.1	1.8
Imported	1.2	1.8	2.1	1.8	1.3	1.4	1.5	0.9	0.8	0.5	0.3
Total	6 .	74.3	75.	73.	75.0	75.8	80.1	85.9	89.1	8 .	87.

* Estimated total landings (including landings outside FMO) by Economic Division, A & F D.

Table 7. Intensity of fishing activities for purse seiners based at Stanley (December 1974 to November 1975)

Month	Sample size (no. of vessels)	Total no. of nights fished	% vessel nights fished
December 1974	6	71	38.17
January 1975	6	97	52.15
February	5	33	23.57
March	5	94	60.65
April	5	109	72.67
May	5	86	55.48
June	5	91	60.67
July	6	136	73.12
August	5	69	44.52
September	4	46	38.33
*October	5	27	17.42
November	2	28	46.67

* fishing affected by typhoon during that period

Table 8. Monthly estimated fishing effort (trips) for purse seiners by area from July 1975 to June 1976

Estimated effort (trips) — Month \ Area	1	2	3	4	5	All areas
July 1975	560	349	612	194	79	1 794
August	354	435	433	150	500	1 872
September	324	385	564	205	541	2 019
October	228	628	146	180	307	1 489
November	144	559	49	129	176	1 057
December	128	316	55	164	50	713
January 1976	128	368	89	53	118	756
February	277	190	117	66	31	681
March	182	227	313	79	355	1 156
April	231	131	364	233	426	1 385
May	186	406	259	228	450	1 529
June	380	308	228	152	648	1 716
	3 122	4 302	3 229	1 833	3 681	16 167

Table 9. Average price (HK$) per kg. by gear type of catches sold through F.M.O. markets

Year \ gear	Trawl	Gillnetter	Longliner	Purse seiner	Other gears
1974	2.02	3.74	4.48	1.17	2.96
1975	1.93	3.60	5.24	1.06	3.06
1976	2.13	3.92	6.02	1.21	3.49
1977	2.73	5.06	7.14	1.57	4.12
1978	Stern trawl 4.32 Pair trawl 2.55	5.44	7.80	1.93	4.18

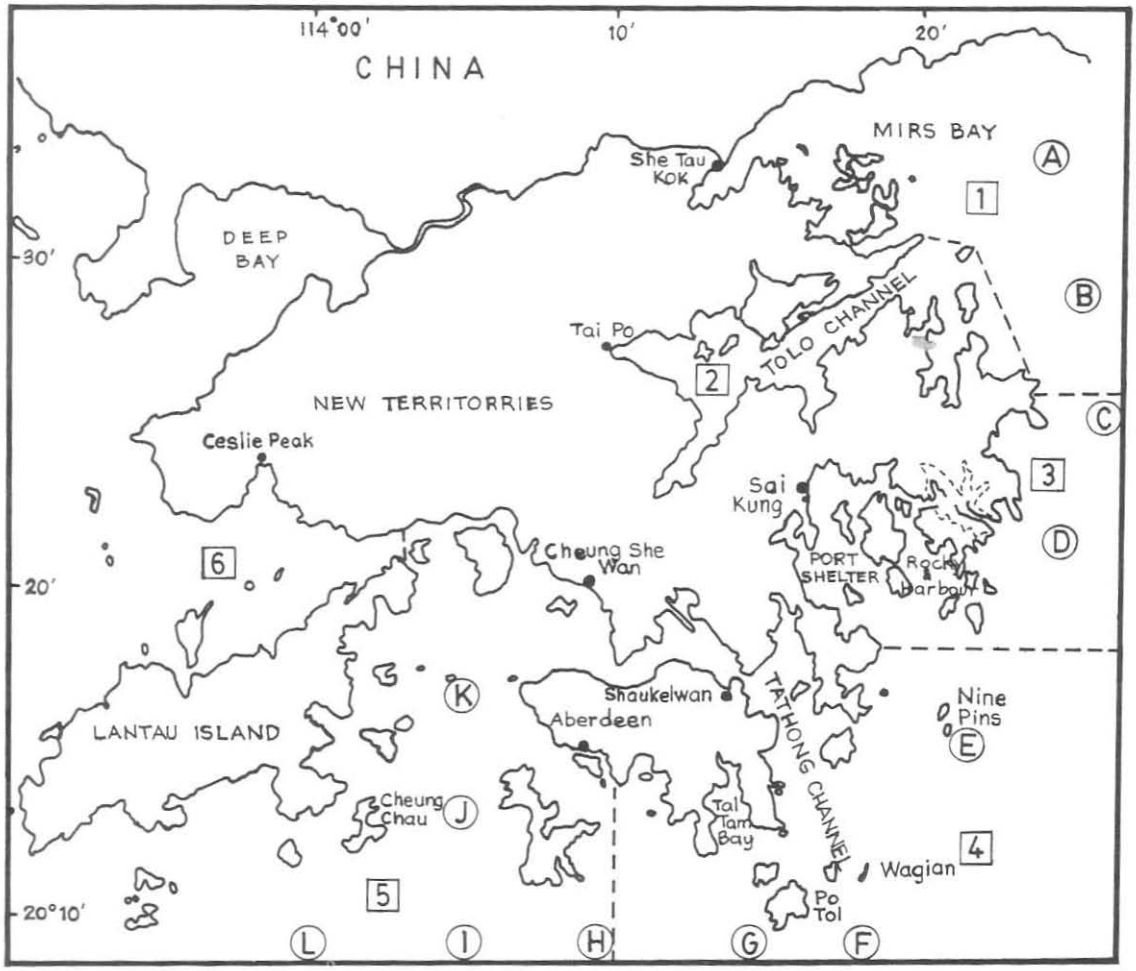

Fig.1 Inshore hydrographical stations and statistical areas for studies of purse seine activities.

□ Statistical areas
-- Area boundary
○ Standard hydrographical stations
• FMO Fish Markets

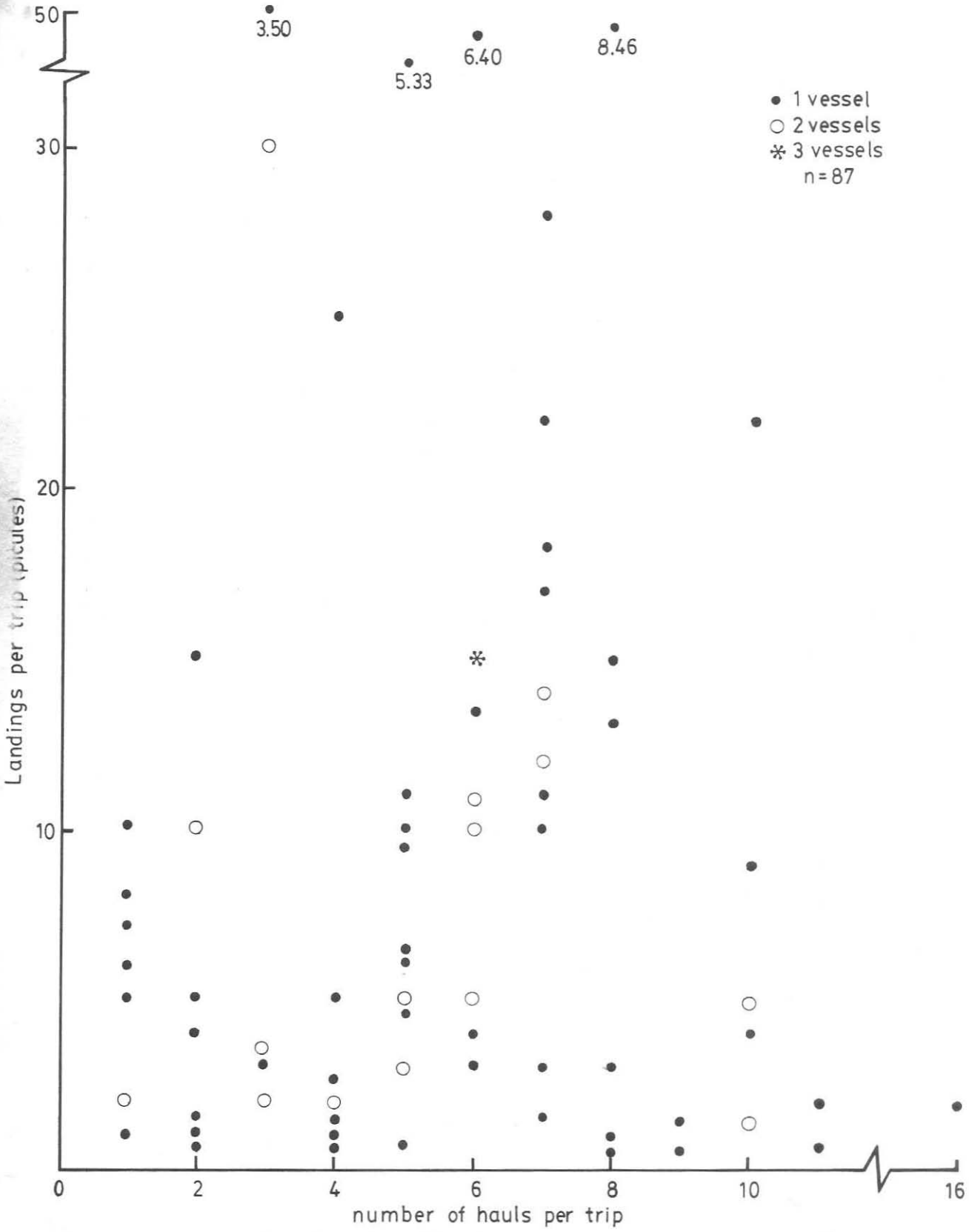

Fig.2 A scatter plot of number of hauls and total catch per fishing trip for purse seiners.

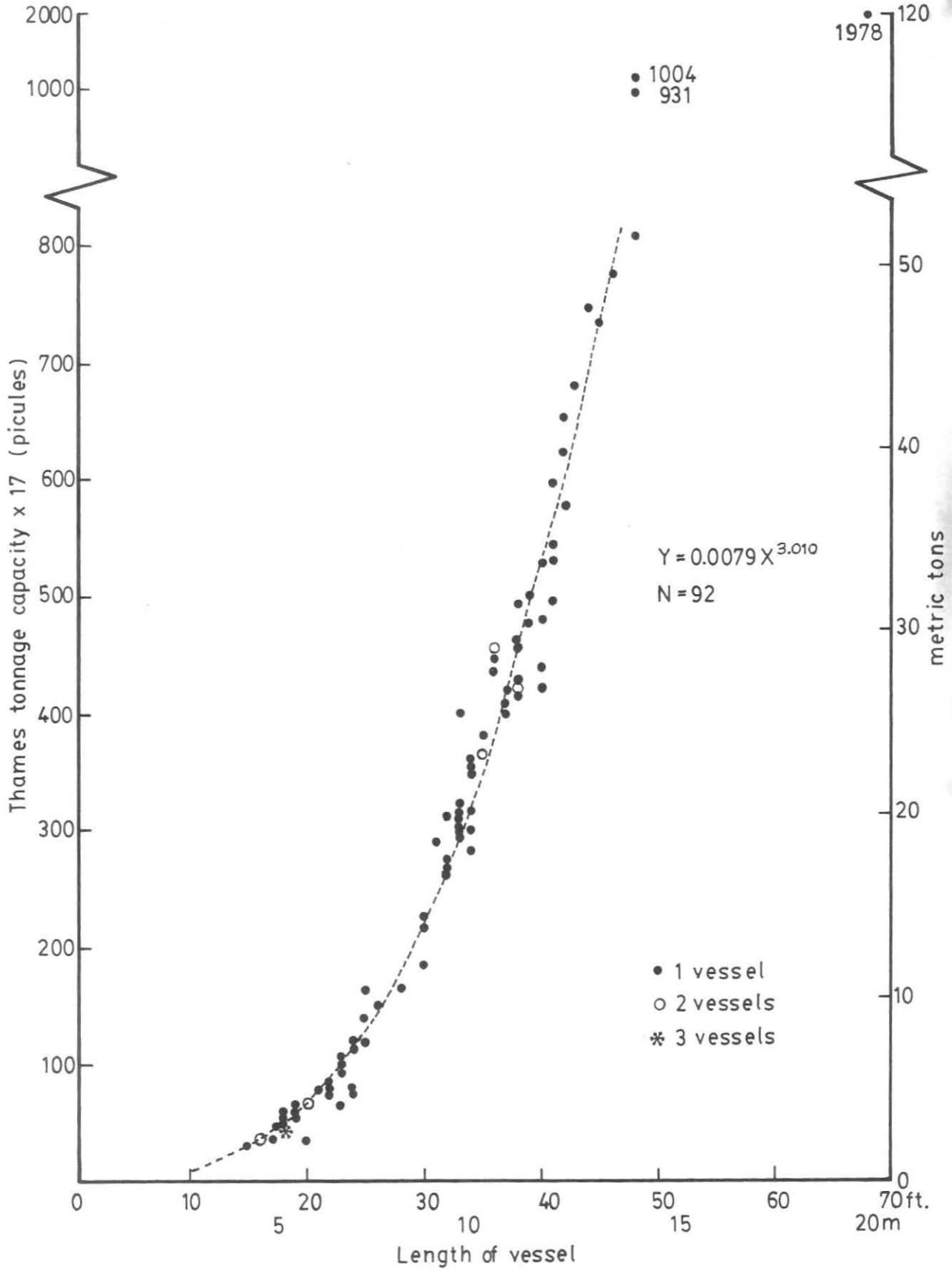

Fig. 3 Relationship of length of vessel to capacity (Thames tonnage x 17)

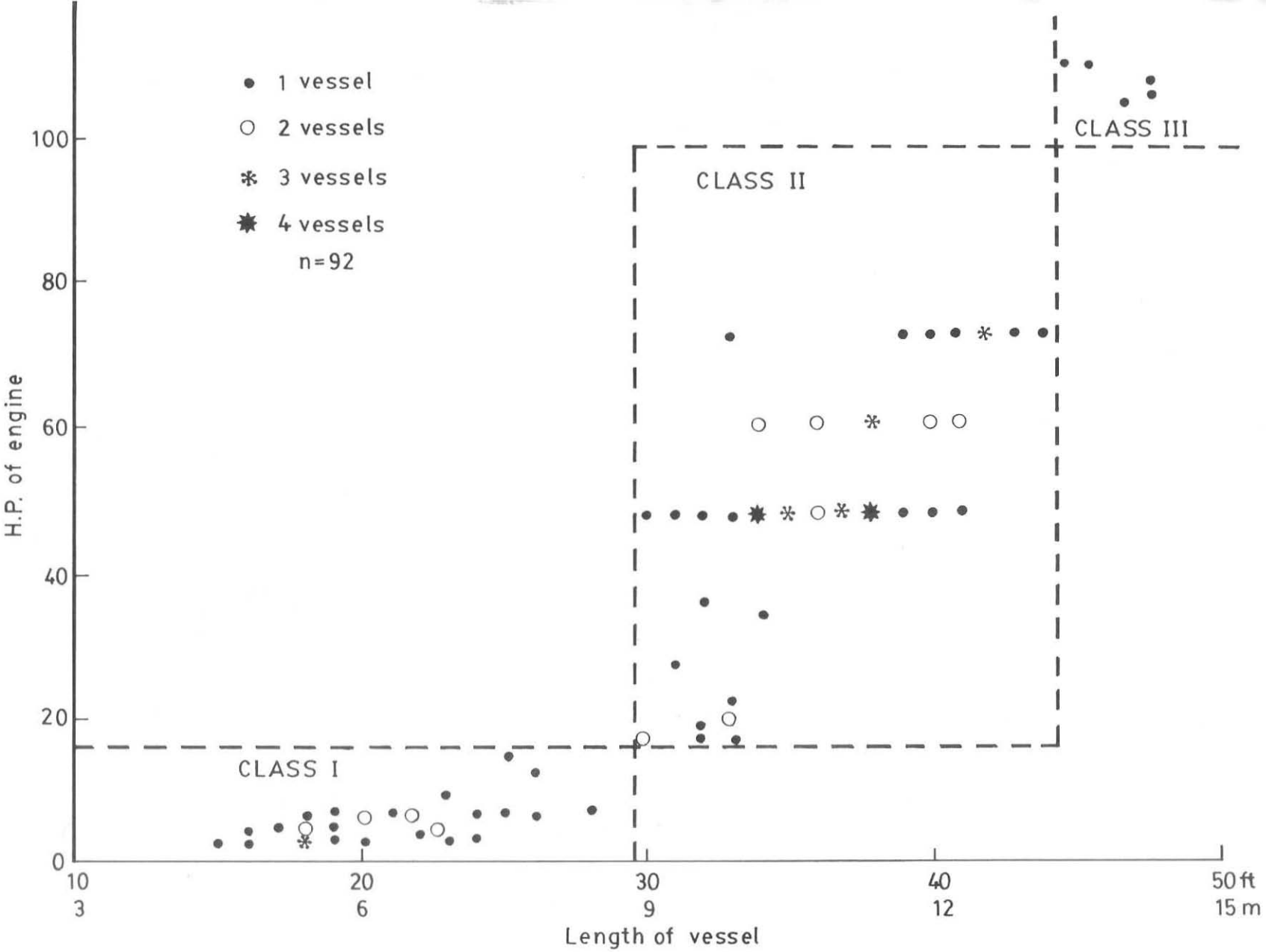

Fig. 4 Relationship of engine horsepower with length of purse seiners.

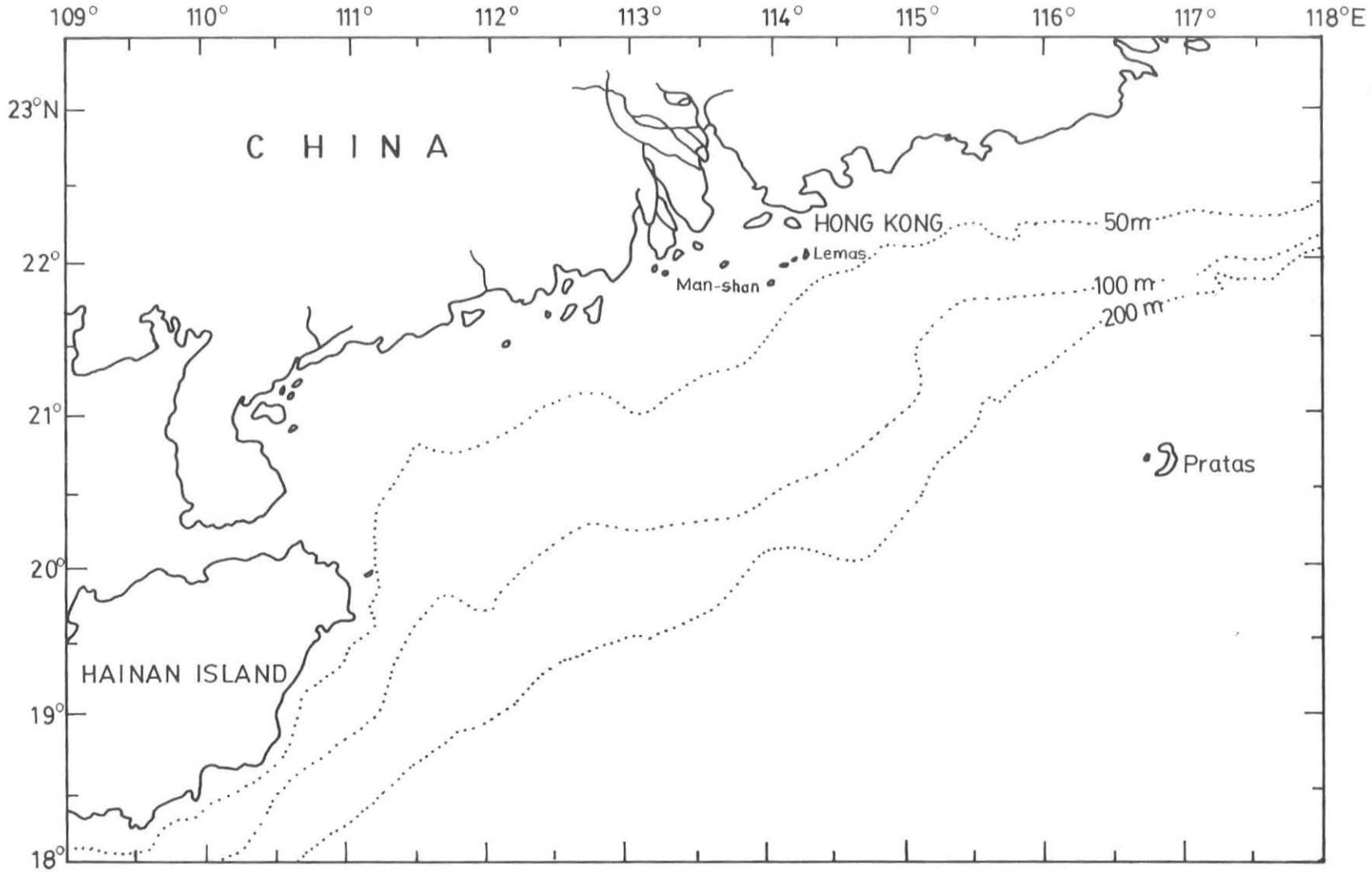

Fig. 5 Figure showing the offshore fishing grounds of purse seiners.

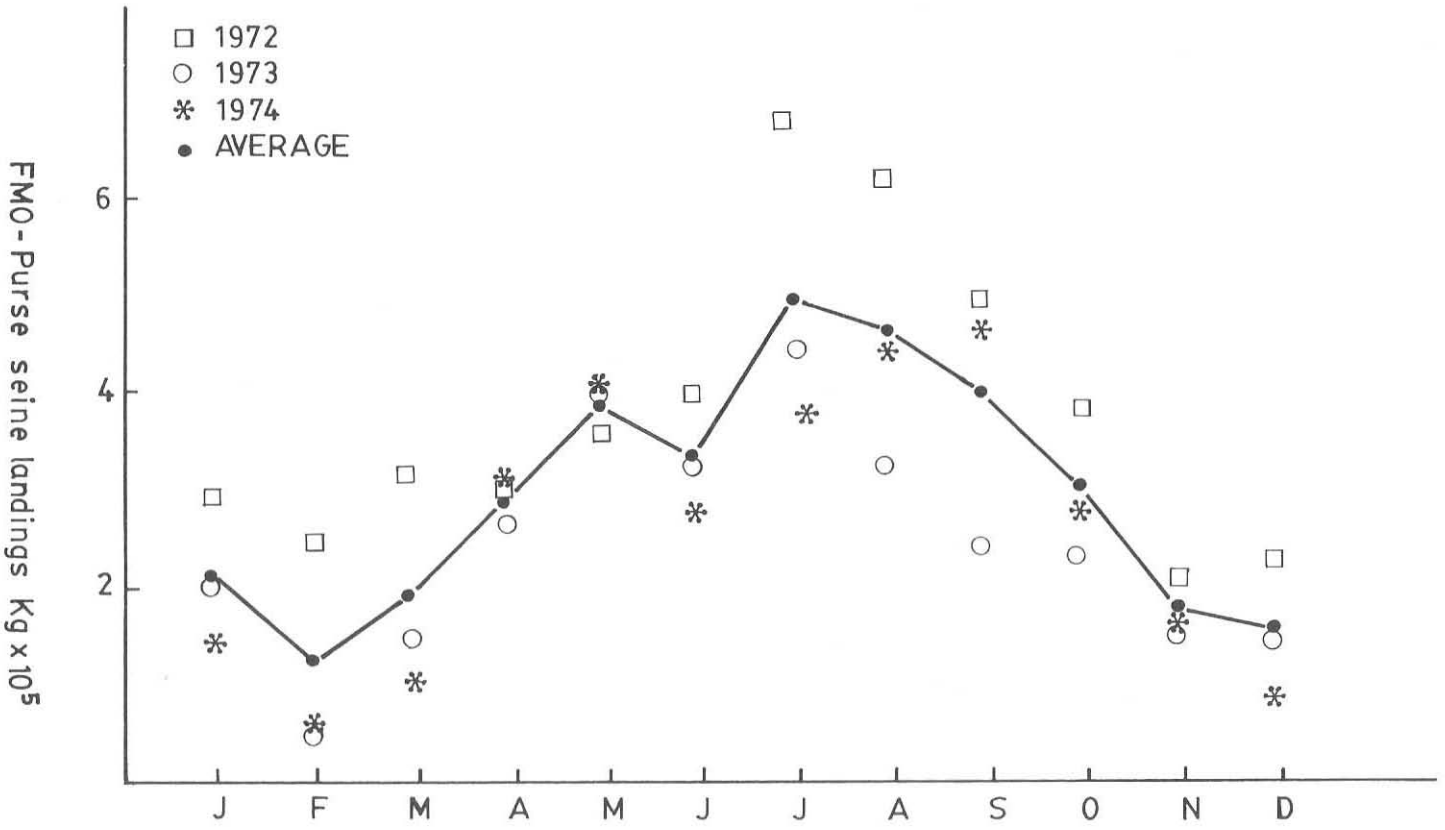

Fig. 6 Monthly variation in purse seine landings, 1972-1974.
(Based on FMO Trade Statistics)

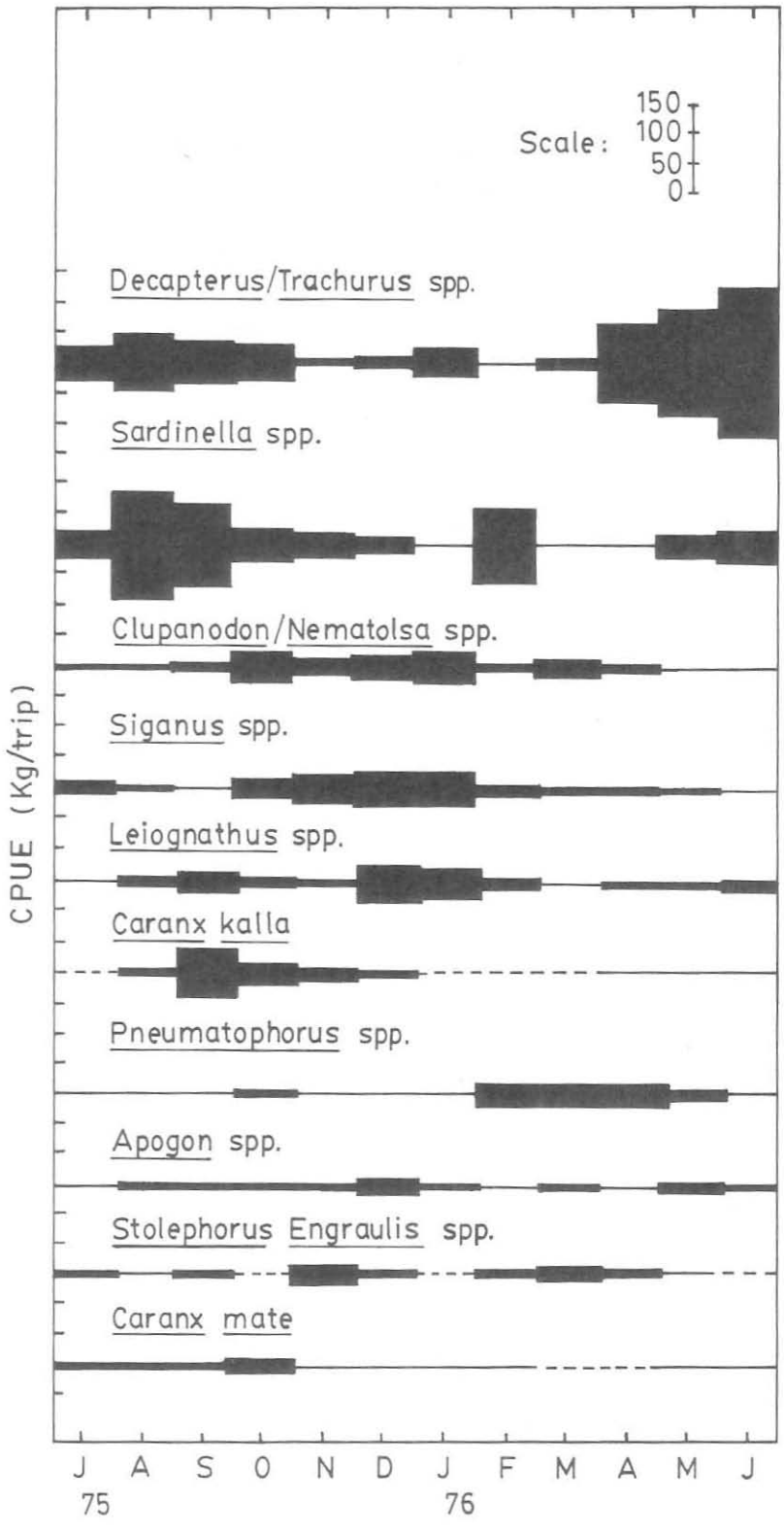

Fig.7 Catch per unit effort (CPUE) of the major taxa landed by purse seiners July 1975-June 1976.

FOUR APPROACHES TO FISH MARKETING IN SRI LANKA

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Abstract

The fishery of Sri Lanka is essentially a small-scale fishery, comprised of four sectors: the private sector, the state sector, the corporation sector and the cooperative sector. Sri Lanka has had the unique experience of fish marketing being undertaken by all of these four sectors. Fish marketing which was traditionally in the hands of the private sector was attempted on a country-wide scale by the government, cooperatives and corporations, in that order. None of these sectors could match the efficiency of the private sector. While the attempts of the government and the corporations resulted in a loss, the cooperative sector operation was able to show a semblance of a profit. In a small-scale fishery like that of Sri Lanka, marketing of fish on a more localized basis is a hazardous enterprise because distance and time are so important. In the Sri Lanka context, free markets distribute a highly perishable and unpredictable commodity like fish more efficiently than government bureaucracies do.

CONTENTS

1. INTRODUCTION

FAO has defined a small-scale fishery in the following terms. "Small-scale fisheries are labour intensive and are conducted by artisanal craftsmen whose level of income, mechanical sophistication, quantity of production, fishing range, political influence, market outlets, employment and social mobility and financial dependence keep them subservient to the economic decisions and operating constraints placed upon them by those who buy their production"[1/]. By this definition or indeed, by any other definition, the fisheries of Sri Lanka can truly be described as small-scale fisheries. This is slightly more true of the production aspect of the fisheries than of the marketing aspect. Whereas 97% of the production is by small-scale fishermen and 3% is by medium scale operations, 93% is marketed by small time traders and 7% by centrally controlled institutions and entrepreneurial enterprises. (Vide page 23, Table 2 for Fishery Related Statistics).

This paper attempts to describe various approaches to the marketing of fish on a country-wide scale and the lessons to be learned from the experience of the different approaches.

This experience of Sri Lanka is perhaps unique in that fish has been marketed on a country-wide basis by three of the four sectors that comprise its economy. Fish marketing which was traditionally in the exclusive hands of the private sector was attempted on a country-wide basis by the state sector, the cooperative sector and the corporation sector.

The four sectors which comprise the economy of Sri Lanka are:

Public Sector	Non-Public Sector
(a) State sector	(c) Private sector
(b) Corporation sector	(d) Cooperative sector

(a) The private sector contributes about 50% to the GDP[2/]. The role of the private sector has progressively diminished with the corporation sector moving into the socially sensitive areas of goods and services.

(b) The state sector contributes about 20% to the GDP. This sector comprises government departments and is predominant in the communications sector.

(c) The corporation sector contributes about 25% to the GDP. This sector comprises statutory boards and corporations in which the government

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1/ Expert Consultation on Small-Scale Fisheries Development, FAO Fisheries Report No. 169, FAO, Rome, 1975.

2/ GDP = Gross Domestic Product. Vide page 21 for Selected Economic Indicators. (Table 1).

is the only shareholder. Management is in the hands of a Board of Directors appointed by the Minister and answerable to him and through him to Parliament.

(d) The cooperative sector's contribution to the GDP is negligible. However it dominates the food distribution sector and has, by far, the largest distribution network, some 2 000 sales points, in the nature of cooperative stores - that is to say one per 7 000 people. These sales points are the channels for selling rationed and/or subsidized commodities.

Although the policy of successive governments has been to retain the commanding heights of the economy in the public sector, the private sector is still the predominant sector[1/].

Fish constitutes an important ingredient in the diet of the nation. This is evident from Table 3. Fish as a source of animal protein is necessary for those of the Buddhist and Hindu religious persuasions who comprise 85% of the population, because eating of beef and eggs is either taboo or not favoured. This casts a burden on the state to make fish available at reasonable prices. Thus successive governments have not been content to allow the marketing of fish to remain exclusively in the hands of the private sector.

In this paper marketing of fish refers to the procurement of supplies, its transport, storage and sale to the consumer. Vide maps 2, 3 and 4.

The sectors of the economy involved in the marketing of fish placed in a simple time-frame are:

Period	Agency/Agencies
Up to 1943	The private sector
1944 to 1952	The private sector and the government Department of Fisheries (Fisheries Department)
1952 to 1964	The private sector and the Ceylon Cooperative Fish Sales Union (Cooperative Union)
1965 to date	The private sector and the Ceylon Fisheries Corporation

1/

Sectors	Gross Domestic Capital Formation 1965 to 1975	Sectoral Estimates of Employment 1975
Private sector	55%	1 110 000
State sector	25%	424 000
Corporation sector	18%	484 000
Cooperative sector	2%	64 000

It will be noted that the entry by the state, cooperative and corporation sectors into the area of fish marketing did not result in the exclusion of the private operation. They co-existed and competed with each other. There was no nationalization of fish marketing. Fish marketing was not an area reserved for any particular sector of the economy. However, there is no gainsaying the fact that the clout derived by the other sectors from government patronage put them at some advantage over the private sector.

2. THE FISHERIES PRIVATE SECTOR OPERATION

The fishing industry was a function of the museum administration and looked after by the marine biologist till 1939. In 1940 a post of Assistant Director of Fisheries was created in the museum cadres. In 1941, the Department of Fisheries came into being. It appears that until 1941 the development of the industry was not subject to any direction or impetus by the government. There was also no entrepreneurial investment in the fishing industry though many had grown to entrepreneurial status from very small beginnings within the industry.

The private sector operation

The marketing channels of the private sector operation are depicted in Sketches 1, 2, 3 and 4. About 75% of the fisherman's catch is routed through the channels depicted in Sketches 1 and 2. The route shown in Sketch 2 is of recent development and is significant in that it has eliminated one middleman. With transport and ice supplies being more freely available, fishermen are increasingly packing their catch themselves and consigning it to the metropolitan and/or inland wholesaler, thus bypassing the coastal wholesaler. The channel at Sketch 3, never of much significance, is gradually dying out, for as is to be expected, succeeding generations of fishermen did not want their wives to hang around the beach awaiting their husbands' return from fishing and then hang around in the selling places, disposing of the catch or part of it.

Disposal at each link of the chain

A. Disposal by the fisherman

He can dispose of fish in one of three ways:

(i) By sale at contracted, that is to say, pre-negotiated prices to the coastal consignor. Sale is by weight. As soon as his craft is beached, the coastal consignor or his representative will arrive with a weighing scale - usually rigged - weigh and take over the catch. A receipt is issued. Payment is made weekly after the coastal consignor receives payment for his consignments from the metropolitan or inland wholesaler. Generally, it is the fishermen indebted to or financed by coastal consignors who have to sell their catch in this manner.

(ii) By auction at the landing point or in an auction shed. Payment is made at once, the next day or weekly. Except where payment is made on the spot, there is no guarantee that settlement is made at the bid price. At the time of settlement some arbitrary reduction is made. Notwithstanding this infirmity, the element of competitive bidding, inherent in the auction system, gives the fisherman a price commensurate with the supply and demand for the day.

(iii) By consigning his catch himself, direct to the metropolitan or inland wholesaler. This can be done only where ice is freely available and a regular transport service operates. In this way, the fisherman eliminates the profits of the middleman coastal consignor. This is not an island-wide phenomena. It has developed only in North Sri Lanka. However, it is a development devoutly to be wished for. In these areas, the ousted coastal consignor has switched to supplying ice to the fisherman and transporting his consignments. He is thus still in business but exercises less of a strangle-hold on the fisherman in his new role.

B. Disposal by the metropolitan wholesalers

The wholesale market in the metropolis, Colombo, is the only wholesale market in Sri Lanka in the true sense of the word. Fish consigned to wholesalers are packed in timber boxes, with crushed ice, 22 kg fish to a box and transported by trucks, 200 boxes to a truck if fully loaded. These trucks leave the fishing areas at dusk and travelling overnight converge on the metropolitan wholesale market at dawn. The wholesale market comes alive with the arrival of the first consignments. With the arrival of the first few trucks and knowledge of the quantities brought in them the wholesaler can make a shrewd forecast of the supply position for the day and one of the market leaders establishes a price which is followed. The truck drivers provide the market intelligence of the day's landings in their areas. With the arrival of the last trucks, the supply position for the day crystalizes and the price stabilizes. Till then, prices change with the arrival of consignments. A change in price by one market leader is followed by the others.

In these wholesale markets the fish is put up for sale, a few boxes at a time. Fish is weighed and sold in toto or in round form, that is to say without cutting, in quantities to suit the smallest retailer. A consignor consigns to more than one wholesaler. There is thus a healthy competition among the wholesalers to return the best price to his consignor because his future supplies will depend on his present performance. A wholesaler who consistently returns poor prices and weights will be starved of supplies and eased out of the market. This built-in insurance protects the consignor who after all, consigns without elaborate documentation or security. The wholesale activity is over in a few hours, generally lasting from 5 a.m. to 10 a.m. Speedy disposal is the essence of this operation. Fish is not stored for sale the next day except in situations of extreme glut. Such occasions are few and far between. The wholesalers advance monies to the consignors who in turn have to give advances to fishermen to obtain their catch.

These wholesalers sell to:

(i) city retailers, who have fish stalls in the various local authority markets.

(ii) vendors, who hawk their fish in head loads, pingos, or bicycles to various parts of the city and its suburbs.

(iii) retailers who use vans to take their fish to suburban markets and fairs.

(iv) institutional buyers who are on contract to supply the bigger hotels, restaurants, schools, nursing homes, etc.

(v) proprietors of smaller hotels, restaurants, eating houses, hostels, etc., who are their own buying agents.

(vi) shipchandlers.

C. Disposal by the retailers

The throughput of the city retailer varies from 100 to 200 kilograms depending on the size of his clientele. He fixes his retail price on the price at which he procured his supplies at the wholesale market. He has the decision making authority to drop his price to dispose of the day's stocks. If he is still unable to dispose of the day's stocks, it is iced and sold the next day. The output of the itinerant vendor, who goes from house to house, does not exceed 15 kilograms. Each has his beat. The small turnover postulates a high profit margin per kilogram. This is therefore a high cost method of sale. However, these itinerant vendors render a very personalized service to their customers. They vary prices to ensure that all their stocks are sold on the same day. The smaller restaurants and eating houses have a fixed budget for each day's purchases of fish. The amount remains fixed whatever the fluctuations in the price of fish. Their commitment is to buy so many pieces of fish for a fixed allocation of money. The allocation being fixed, the size of each piece served is in direct proportion to the day's price of fish. A rise in the price therefore gets passed on to the consumer who eats in his hotel, restaurant or hostel.

The risk element in the chain

The risk areas in the marketing chain are indicated in the sketches with question marks. The greatest risk is taken by the coastal consignor who buys at contracted fixed prices. He is committed to buy the entire catch at the contracted prices. If the net-back from his consignees - the wholesalers - is lower than the price he paid, he stands to lose. He who buys at the auctions also runs a risk but to a lesser extent because he can control the quantities he buys.

An element of risk also attaches to the retailers, including the vendors, in that they have on occasions to sell below their cost to dispose of their stocks, because they are hardly geared to storing fish overnight, and in any event are not accustomed to doing so.

It will be noted that there is no financial risk attached to the operations of the metropolitan wholesaler. He operates on a commission basis and whatever the price, he is assured of his commission. He operates on about a 10% commission. When supplies are meagre his turnover, quantity-wise declines but this was compensated for by an increase in unit price which leads to increased value turnover.

The performance of the private sector

Until the Department of Fisheries entered the field of marketing in 1943, the production, transport and sale of fish was entirely in the hands of the private sector. As stated earlier, the private sector, was composed of small timers, who operated proprietorships. There were no companies or partnerships. By and large they were not educated and depended on lowly paid clerks to keep some basic books and records. Time was when the consignor in the fishing village, the retailer in the city markets and the itinerant vendor were the local bullies. Hence the consumer was always wary of his transactions with them. The deal was always suspect. The laws of supply and demand were very much in operation and fish prices fluctuated wildly upsetting the housewife's budget.

Each coastal consignor and indeed, each retailer, confined himself to a limited area. There was no attempt to expand into unfamiliar areas.

Achievements of the private sector operation

(a) Credit was and is provided to the fisherman for his fishing operations, his subsistence and social needs, albeit on usurious terms, when neither government nor other financial institutions were prepared to finance or risk financing fishing operations of the fisherman.

(b) Quick disposal was the essence of the operation. Storage, which increases losses from shrinkage, pilferage and spoilage inexorably adds to cost and was therefore avoided.

(c) There was a personal association between the people involved built on trust. Documentation was therefore reduced to the bare minimum.

(d) The participants in the various transactions were themselves the decision makers.

(e) There were no clock watchers anywhere in the entire operation. Working hours were arduous and unsocial. Supplies being of an unpredictable nature, periods of intense activity were interspersed with periods of inactivity which somewhat compensated for the unsocial hours.

(f) At most stages of the chain of transactions, title in the product, passed to the transactors so that each had a financial stake which compelled him to dispose of his product expeditiously, efficiently and profitably. He was also compelled to maintain good relations with those from whom he bought and those to whom he sold. The service to the customer was of a high order.

(g) All the fish produced ultimately reached the consumer in the fresh or cured form. There was no undue wastage and spoilage arising from bad handling, irresponsibility and absenteeism.

(h) The operation was efficient and did not countenance the lethargic and dull-witted. Astute persons gathered impressive fortunes.

Weaknesses of the private sector operation

(a) The private sector operation remained in the hands of small timers who operated as individuals. There was no attempt to pool resources or know-how to form companies. Thus the scale of operations remained small. The form of organization tended to inhibit change.

It also inhibited development of technology and techniques. By that same token there was no innovation. The same methods of fishing, fish handling, storage and marketing were perpetuated.

This also inhibited financial institutions from funding the industry. Funds were raised from the traditional sources in the traditional way, by unsecured loans obtained on trust, by mortgaging immovables and movables, especially jewelry.

(b) The entrepreneurial class was not attracted to an industry which was considered a high-risk industry.

(c) Managerial and technical skills were not attracted to the industry because of a reluctance to be employees of an individual. Hence concepts of quality control, hygiene, packaging, etc. did not develop.

(d) Since storage in times of glut was abhorred, prices fluctuated wildly to the discomfiture of the producer, the consumer and the government.

(e) In areas where the roads were bad and there was no competitive buying, fishermen were exploited and their catch bought for a song.

(f) Because the wholesaler was always bent on returning the best possible price to his consignor, he did not hesitate to dispose of fish of a doubtful quality.

3. THE DEPARTMENT OF FISHERIES OPERATION

The function of fisheries was separated from the museum administration, when the Department of Fisheries was established on January 17th 1941 and was allotted to the Ministry of Local Government (See Fig. 1).

With the gaining of Independence in 1948 a Cabinet form of government replaced the Executive Committee form and the function of fisheries was allotted to the Ministry of Industries[1/]. (See Fig. 2).

Fish marketing by the Department of Fisheries

Shortages of food arising from disorganization in shipping during World War II, when rationing and price controls were the order of the day, induced the government to make fish available to the populace at reasonable prices. The government introduced price control of fish and to make price control more of a reality to the consumer the Department of Fisheries entered the arena of fish marketing. It is claimed that at that time, 1944, that this was only the second instance of a government department engaging in fish marketing[2/]. The channels used by the Department are in Figure 3.

The Department of Fisheries was in trouble from the start. To achieve the objective of making fish available at controlled prices, it had to become the market leader and thereby the price leader. To do this it had to have a fair share of the market. The Department did not get adequate supplies to make an impact on the market and the price of fish. (See Table 14).

It was not easy to break the stranglehold the coastal consignor had on the fisherman. The link between the fisherman and the coastal consignor was a personal one. Apart from financing the fishing operation and taking over the marketing function from the fisherman, these consignors were friends-in-need. He was of the fishing village or a man of the area restricting his operations to his home grounds, except where the fishermen of his area migrated to other fishing grounds. Officials of the Fisheries Department who had to occupy his shoes to obtain supplies of fish were transferable officers and could well have been of a different race and/or religion. The coastal consignor helped the fisherman with loans, transport, etc. for their social functions and funerals. This is a service that no public official can offer. The Departmental officials were not and could not be vested with the decision making authority necessary, if he were to replace or compete with the coastal consignor. The only way the Departmental officials could establish the necessary rapport with the fisherman was to organize liberal loans out of government funds. Fishermen were still indebted to their old financier, and so took loans from the new benefactor as well. These loans proved to be a tenuous link. Fishermen were torn between two loyalties. So they supplied to the coastal consignor in times of scarcity, when his price was also better than that of the Department and to the Department in times of glut. This tactic of dumping fish on the Department in times of glut made the position

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1/ The function of fisheries has at various times been an appendage of the Ministry of Local Government, Industries, Agriculture and Lands, and Food and Agriculture, until for the first time a separate Fisheries Ministry was established in 1970.

2/ Fish marketing was undertaken by one of the state governments in Australia.

for the Department more difficult, because it was not able to cope with glut situations of a perishable commodity like fish. Additionally the Departmental cadres lacked expertise. By the time they acquired the expertise they began to think and act like public servants in terms of fixed working hours, adherence to rules and regulations, not intended for an operation like fishing. Above all the Department found itself in the dilemna of having to serve two masters - the fishermen who wanted the Department to better the price offered by the coastal wholesaler, and the consumer who wanted fish at lower prices. At the retailing end, the monthly paid public servant was not concerned whether the day's stock was sold, stored or spoiled. He did not believe in the marketing philosophy that the customer is right. He did not have the authority to vary prices to suit the cut, the time of day or the exigencies of the fish trade. The practice of selling fish through salaried employees was abandoned in 1948 and an association of educated youth organized to replace the public servants. This organization, styled the Fish Distributors' Union, operating under the control of the Department worked on a commission basis and had a stake in the product. This step was a step in the right direction and these pioneering educated youth certainly provided a better service than the salaried officials and this tended to reduce the losses of the Department. Be that as it may, it is clear that the Department of Fisheries could not match the efficiency of the private sector. From the very first year of operation substantial losses were incurred as can be seen from Table 4.

Trawler operation by the Department of Fisheries

To increase the supply of fish available for distribution through its marketing scheme, as also to exploit the unexploited Wadge Bank for demersals, which was a mere 24 hours steaming time from Colombo, the Department entered the arena of large fishing boat operations. It purchased and operated nine vessels. (See Table 5). The performance of these vessels, insofar as they are reported in the administration reports of the Director of Fisheries are listed in Table 6.

Failure of the Fisheries Department big boat operations

The venture of the Fisheries Department into the arena of big boat operations was a loss, overall. There were two reasons for these losses. Firstly, the vessels and the support services like repairs, victualling, etc. were manned by public servants who had no share in the catch or stake in the profitability of the operation. The crew were hired on a basis of salary plus overtime. With one trip each month, the crew earned the maximum overtime permissible under government regulations. They were therefore not interested in a second trip on salary and no overtime. Secondly, those involved in the operation did not have the technology to keep the vessels at maximum operational availability. Certainly, the poor performance of these vessels cannot be attributed to a lack of fish or a lack of the know-how to catch that fish. Looking at the Department's essay into fish marketing and boat operations, the conclusion is inescapable that the state sector is not suited for operations of this nature.

Construction of cold rooms and ice plants by the Department of Fisheries

Since the fish brought in by these vessels was to be released into the market in controlled quantities and not dumped on the market, ice plants to provide ice for the trawlers and storage facilities for holding the catch became necessary and were constructed by the Department in 1957[1/]

Achievements of the Department of Fisheries operation

Whatever the commercial viability of the Department operations, the following can be considered achievements of the Fisheries Department operations.

(a) It introduced the practice of selling fish by the weight. Hitherto, fish had been sold by the heap if wholesale and by the count or by the slice if retail.

(b) It gave marketing advances to fishery cooperatives and individual fishermen, so that for the first time the coastal consignor's stranglehold on the fisherman was jeopardized.

(c) By encouraging educated youth to take to fish consigning, fish wholesaling and fish retailing on a commission basis, it introduced an aura of respectability to a trade which was traditionally in the hands of an uneducated and obstreperous segment of society.

(d) It filled the gap arising from the reluctance of the entrepreneurial class to invest in the fishing industry and commenced operating big boats, ice plants and cold storages.

(e) Prices offered by the Department to fishermen operated as floor prices and coastal wholesalers were compelled to match them.

(f) Big boat operations, which meant that a large quantity of fish was landed at one single point enabled them to begin making secondary products like shark liver oil and fish meal.

(g) Not to be outdone by the itinerant vendor, the Department started a "bungalow delivery" sending fish from door to door in vans. This was a measure that was widely acclaimed by the housewife.

4. THE COOPERATIVE SECTOR OPERATION

The cooperative movement in Sri Lanka received a tremendous impetus during World War II when government decided to distribute rationed and subsidized commodities through consumer cooperatives. Similarly the Department of Fisheries, fish marketing scheme gave tremendous impetus to the cooperative movement among fishermen. To receive loans and benefits of the Department's minimum purchase price, fishermen were encouraged to form themselves into cooperatives. (Initially the Department fish marketing scheme purchased

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1/ Along with the trawler "Maple Leaf" Canada gave a munificient gift of a Fishery Harbour, Ice Plant, Cold Room Complex and Workshop. (This is sited at Mutwal)

fish only from cooperatives but owing to inadequacy of supplies, purchases were later made from individual fishermen and even Coastal Consignors.)

Notwithstanding the formation of cooperatives, the Department's fish marketing scheme was not getting adequate supplies and therefore was making no impact on the market or price of fish. It was operating at a loss and was a burden on the ex-chequer. Clearly this organization had to be replaced by an organization which derived its clout from the producer and which could operate as a commercial proposition, unhampered by government red tape, rules and regulations.

The Ceylon Cooperative Fish Sales Union, Ltd. (cooperative union)

Thus in 1952 the Ceylon Cooperative Fish Sales Union, Ltd. was registered as an apex cooperative union to which primary producer societies were affiliated. It was a two-tier structure. The union was run by a Board of Directors, some elected by the membership at general meeting and some nominated by the Registrar of Cooperative Societies. Though ultimate authority resided by law in the membership exercised through general meeting, real authority resided in the President and the Manager Secretary. Being a federation of fishermen's cooperatives it was inevitable that the policies and activities of the union were producer-interest oriented. (See Fig. 4 for the place of the cooperative union).

Although the cooperative union was in theory an independent organization with supreme power vested in the membership at general meeting, in fact it was subject to the control of:

(a) The Registrar of Cooperative Societies, who in terms of the by-laws nominated a little less than half the Directors of the Board.

(b) The Director of Fisheries, who by virtue of the by-laws and being the biggest single supplier of fish to the union was also a member of the Board. Additionally, the Director of Fisheries was elected the President of the union from 1960 onwards.

The marketing channels of the cooperative union

The marketing channels of the cooperative union are shown in Fig. 5. It must be noted that it was only some of the Department's functions that were handed over to the CCFSU[1/]. While the purchase of fish from fishermen and its sale to the consumer were handed over, the operations of trawlers, ice plants, storage facilities and the by-products factory were retained by the Department of Fisheries. However the entire catches of the Departmental trawlers were sold to the cooperative union, initially on a commission basis, and later at prenegotiated prices.

1/ CCFSU = cooperative union

Ideally, the Cooperative Union should have obtained its supplies from Producer Cooperatives and sold through Consumer Cooperatives. But confining procurement of supplies to Fishery Coops would not have put sufficient supplies in the hands of the Cooperative Union nor resulted in the right product mix to please consumers. Therefore, purchases were also made from groups of fishermen, especially migrants and individual fishermen. In fact to obtain the right product mix, fish was even imported.

The performance of the Cooperative Union

After inevitable teething problems, the Cooperative Union settled down to functioning as a viable, dynamic organization and registered a satisfactory record of growth. Its performance is listed in Table 7.

Achievements of the Cooperative Union operation

(a) The Cooperative Union's power base was the fishermen, who were its members. The fishermen's interests were therefore paramount in its operations. The power base of the Department of Fisheries was the Ministry. The Department was therefore committed to serve the interests of consumers, who were more numerous, if not more vociferous than the fishermen.

(b) The Union won the respect and confidence of its member societies and the fishermen in general. It maintained excellent relations with them.

(c) The Cooperative Union operation was a closely integrated operation. For supplies, it concentrated on remote areas where there was no competitive buying and fishermen were therefore exploited. It was thus able to make an immediate impact. For sales, it started in the metropolis and fanned outwards. It did not attempt island-wide coverage overnight.

(d) The Cooperative Union took over from the Department of Fisheries a losing activity and while gradually expanding it made it pay.

(e) It demonstrated for the first time in Sri Lanka that fish marketing on a more than localized basis could be done at a profit. All attempts, before and after, whether by Government Departments, Corporations or Companies, have resulted in a loss.

(f) The Cooperative Union gave a guaranteed price to the fishermen. Coastal consignors, were therefore compelled to better these prices if they wanted to get supplies. The Cooperative Union's guaranteed prices were widely circulated and were therefore a powerful bargaining weapon in the hands of the fishermen for a better price and a better deal from the Coastal Consignors.

(g) Not only did the Cooperative Union buy the entire catch at guaranteed prices, it took the admirable step of giving the fishermen a rebate, if a profit was made on his fish.

(h) When it was found that a black market was developing in fishing gear, the Union entered the field of fishing-gear import and sale and made the gear requirements of the fishermen available in adequate quantities and at reasonable prices. The performance of this activity is listed in Table 8.

(i) The frozen packetted fish distribution scheme. One of the most noteworthy achievements of the Cooperative Union was its Packetted Fish Scheme inaugurated in 1959. This was a daring cooperative innovation. At the time the Scheme was inaugurated, the consumers' general order of preference was as follows:

Uniced wet fish
Iced wet fish
Frozen fish

Uniced wet fish is available only to those living in areas of production and the immediate hinterland. Frozen fish was not handled by the private sector because wholesalers and retailers alike, abhorred storing of fish. Their marketing strategy was to dispose of each day's stocks on that self-same day. Thus, most of the fish consumed in Sri Lanka was in the iced wet form. The Cooperative Union found that selling of iced wet fish, especially where cutting was involved, led to argument with and complaints from the consumer regarding the cuts and the pricing of different cuts. Furthermore, the percentage of waste in cutting and retailing could not be calculated to a nicety, making accounting and stock-control a somewhat less than perfect exercise. Then there was the fact that the salaried sales-persons of the Cooperative Union did not have the authority to reduce prices, if necessary, to dispose of the days stocks. There was also the problem of storing leftovers overnight at the point of sale. This required ice to be distributed to the point of sale and however well the leftovers were iced and stored overnight, the condition and appearance of the fish deteriorated. Additionally, customers were able to identify fish stored overnight and were reluctant to buy it. Furthermore, the supplies from the trawlers, which did 10-14 day trips and would bring 80 tons on a good trip, were unloaded in a day or two. Fish unloaded in these quantities could not be disposed of on the day it was unloaded. It had to be deep frozen and stored for later sale. Deep frozen fish when thawed and cut suffers in appearance and quality. A method had therefore to be found for selling this fish in the frozen form without a break in the cold chain. The Packetted Fish Scheme was the result. In controlled conditions, the frozen fish was band-saw cut into convenient cuts, put in printed polyethylene bags, sealed, variety, weight and price marked and re-stored in master polyethylene bags in the cold rooms. Distribution was in insulated boxes in insulated trucks or by refrigerated trucks to frozen food cabinets at the point of sale. Thus, the cold chain was maintained. The advantages were:

(i) The cutting was done under controlled conditions in a central place.

(ii) Centralized cutting meant that the waste was available in one place for conversion into fish meal.

(iii) Since variety, weight and price were indicated on each pack, customers were protected and were assured of correct variety, correct weight and correct price.

(iv) As compared to wet fish, this was an infinitely more hygienic, a less risky and a less complicated product to handle. Thereby, consumer cooperatives, food shops, chemists and indeed anyone was able to carry fish as his stock-in-trade. For the Cooperative Union, this meant that there was a ready-made island-wide distribution network, waiting to be harnessed.

(v) The commuter was able to carry his fish requirements without incurring the disapproval of fellow passengers.

(vi) The convenient form offset the prejudice against frozen fish and gradually wore out this prejudice.

The popularity of this method of selling a difficult commodity can be seen from Table 9. The marketing channel is depicted in Sketch 6.

Weaknesses of the Cooperative Union operation

(a) Although with less government backing, less finances, less staff and less facilities, the Cooperative Union did an infinitely better job of fish marketing than did the Department, the Cooperative Union still did not have an adequate share of the market to become the price leader. Its supplies came from two main sources - the fishermen's cooperatives and the Departmental trawlers. The Cooperative Union had no control over both these sources. The organization of fishermen into cooperatives was a function of the Cooperative Department and the operation of trawlers was a function of the Fisheries Department. Depending on the efficiency of two government departments for its vital supplies made the Cooperative Union's situation unenvious and perilous.

(b) The Central Storage in the metropolis, to which and from which 75 percent of the supplies came and went belonged to the Department of Fisheries and the services of handling, freezing, storage and issue of fish was in the hands of public servants to whom the Cooperative Union was anathema, because the Union had taken over certain functions of the Department and had by its better performance highlighted the inefficiencies of the Department. Dependence on the Fisheries Department for the handling and storage of Union fish was the biggest stumbling block to the success of the Cooperative Union.

(c) The image of a cooperative as the food-shop at the corner of the street, inhibited government and foreign funding, and expansion of the cooperatives was not an element in the development strategy of the Government. The Cooperative Union was, therefore, though wrongly, not envisioned as a vehicle for the development of the fishing industry. The Fisheries Corporation therefore wished its demise.

5. THE CEYLON FISHERIES CORPORATION OPERATION

Just as it seemed the Cooperative Union had establishd itself as a viable enterprise equal to the challenge of serving the needs of a broad spectrum of fishermen and consumers and fulfilling its aims and objectives,

the Government, without consulting the fishermen, the trade and others concerned, decided to establish a Corporation for Fisheries. What motivated this step could well have been the difficulties encountered by a government department - the Fisheries Department - in managing a commercial operation like operating trawlers, ice plants, cold storages, by-products, etc. A corporation for these limited purposes may have been a step in the right direction, but the corporation that was, in fact, established had as its objectives the entire gamut of fishery activity and the Fisheries Corporation was conceived as a giant corporation and an empire-building exercise.

Overtures made by the Cooperative Union to the Fisheries Corporation for a method whereby the Cooperative Union be allowed to continue its commercial activities and the Fisheries Corporation concentrate on providing the necessary infrastructure, like harbours, ice plants, cold storage, etc. for the development of the industry was not only rejected, but it was also made clear that the Corporation would flex its government muscle to achieve its objects. The Cooperative Union had, therefore, to decide to hand over its commercial functions, assets and staff to the Corporation. The Department of Fisheries, on the other hand, hamstrung by red tape and regulation was happy to hand over its commercial activities to the Corporation, while retaining statutory, regulatory, socio-economic and research functions. Thus, the trawlers, ice plants, cold storages and the by-products factory of the Department was also to be handed over to the Corporation.

Thus on October 1, 1964, the Ceylon Fisheries Corporation was established. The objects of the Fisheries Corporation were spelled out in the Incorporation Order, as follows:

Objects of the Fisheries Corporation

The purpose for which the industrial undertaking is constituted shall be to undertake all or any of the following functions:

(a) Fishing operations, including deep sea trawler fishing, to be undertaken directly by the Corporation or through authorized agents;

(b) The processing of fish (including canning, curing and drying) and the manufacture of fish by-products, either directly by the Corporation or through authorized agents;

(c) The wholesale or retail marketing and distribution of fish, either directly by the Corporation or through authorized agents;

(d) The construction and maintenance of fisheries harbours and fisheries shore installations, including cold rooms;

(e) The import and export of fish and fish products;

(f) The importation and sale of gear, tackle and other requirements necessary for the fishing industry;

(g) The execution of work for and on behalf of the Fisheries Department or any other government department, being work connected with or for the promotion of the fishing industry;

(h) The construction of boats and other craft for the fishing industry.

(i) The provision of repair and maintenance facilities for fishing boats;

(j) The manufacture and sale of fisheries requisites.

The Fisheries Corporation ten-year development plan

The first Board of Directors, nominated by the Minister in charge of the function of fisheries, proceeded to produce a highly ambitious though unrealistic ten-year development plan. Some of the plan targets juxta-posed against actuals are seen in Table 10. It will be seen from the table how the expectations generated by the plan to make Sri Lanka not only self-sufficient in fish, but an exporter as well have not materialized. Far from generating profit as predicted in the plan, the Fisheries Corporation has become a burden on the Exchequer.

Although the assumptions and magnitudes in the plan came in for a great deal of criticism and some ridicule, the plan served the purpose of spotlighting the potential and need for modernizing the fishing industry. At the same time, the Government decided on a high priority for the rapid development of the fishing industry. In this situation, the Corporation had no difficulty in obtaining the allocation of funds for the building of a vast empire that was in the minds of the first Board of Directors (see Figure 6 for the place of the Fisheries Corporation in the government organization).

A separate Ministry of Fisheries

In 1970, for the first time, a separate Ministry was established for the function of fisheries and this function was no longer an appendage of another Ministry. Nineteen hundred and seventy marks a watershed in the importance of the Fisheries Industry and Fisheries Development.

By the end of 1971 and after seven years of operation, the losses of the Fisheries Corporation are seen in Table 11.

Establishment of the Ceylon Fisheries Harbour Corporation

In 1971, a team of foreign consultants engaged by the Asian Development Bank, recommended that some of the functions, especially provision of infrastructure like fishery harbours, shore facilities, etc. be transferred to a new corporation. Accordingly, on February 11, 1972, the Ceylon Fishery Harbours Corporation was established. The objects of the new Corporation, as in the Incorporation Order, were:

(a) The establishment, construction and maintenance of fishery harbours, anchorages and shore facilities for fishing operations;

(b) The operation and management of fishery harbours and anchorages for fishing operations;

(c) The provision of repair and maintenance facilities for fishing craft;

(d) The establishment, maintenance and leasing out of cold room, ice plants, and other refrigeration facilities and the sale of ice;

(e) The carrying out of investigations and studies for the development of fishery harbours and anchorages;

(f) The imposition and recovery of charges and fees for the use of certain facilities.

The Fisheries Corporation operation

The predecessors of the Fisheries Corporation, namely the Department of Fisheries and the Cooperative Union had only a very small share of the market. The Corporation was bent on becoming the market leader and thereby the price leader, two positions its predecessors intended to achieve, but failed. The Corporation knew that he who controlled the ice controls the movement of fish. Ice would be used as a weapon to obtain supplies for the Corporation and thus make it the market leader. The Corporation, therefore, in a secretive, lightning operation, contracted with all the ice plants in the island to buy their entire production. It was not a takeover or nationalization of the ice plants, though critics said it was tantamount to being so. There was a storm of protest from the coastal consignors and metropolitan and inland wholesalers, who constituted a powerful lobby and possessed some political influence. Pressure was brought to bear on the government and on the instructions of the Minister the contracts were rescinded. This meant that the keystone of the Corporation's strategy was removed and the Corporation, like its predecessors, had to compete with the established traders for its supplies.

The marketing channels of the Fisheries Corporation

The marketing channels of the Fisheries Corporation are seen in Figure 7.

The performance of the Fisheries Corporation

Table 12 shows the performance of the Fisheries Corporation for the years 1972-1978, in respect of activities common to the Department of Fisheries operation and the Cooperative Union operation.

The losses of the Fisheries Corporation for the years prior to 1972 have been shown in Table 12. The losses of the Fisheries Corporation from inception to the end of 1978 amounts to Rs. 97 432 432. Every year has been a loss.

The achievements of the Corporation operation

In the light of the consistent losses incurred by the Fisheries Corporation, is it a contradiction in terms to cite any achievements of the Corporation?

Be that as it may, the following can be considered achievements of the Fisheries Corporation:

(a) It constructed infrastructure facilities in the nature of fishery harbours, cold storages, ice plants, and repair facilities;

(b) It sought to introduce into the inshore fishery a two-monsoon boat that could brave both monsoons and as a first step introduced 30 Nos. 11 meter multi-purpose boats;

(c) It introduced 2 Nos. tuna boats (38 meters) to fish outside Sri Lanka's traditional and territorial waters.

Weaknesses of the Fisheries Corporation operation

When the establishment of a Fisheries Corporation was mooted, the Cooperative Union made the following suggestion: the Union should be allowed to continue as it had, while the Corporation should concentrate on infrastructure for the industry as a whole, and should introduce and operate larger vessels. If this had taken place, the Fisheries Corporation might not have turned into the fiasco it is now. The suggestions made by the Cooperative Union are as follows:

"The relationship that the Ceylon Cooperative Fish Sales Union has hitherto maintained with the section of the Department of Fisheries which is engaged in trawler production has been of considerable assistance in maintaining a balance between the interests of the inshore fishermen and the influx of trawler produce in the consumer market. When a reorganization of this section of the Fisheries Department is carried out, you would agree that the continuance of the same relationship would: -

(a) Maintain the same position vis-a-vis the inshore fishermen;

(b) Relieve the burden on the new organization in the sphere of wholesale and retail marketing;

(c) Provide the fishermen with strong apex organization which will be able to look after his interests as a producer, thus reducing the possible continuance of middlemen.

The Ceylon Cooperative Fish Sales Union has a wealth of experience acquired by trial and error over the last 12 years and can thereby continue to be of assistance to the government to market its trawler fish and to operate a marketing organization on a national scale without any cost to government either in capital costs or working expenses."

(b) The Fisheries Corporation sought to establish itself as a gigantic vertically integrated enterprise not realizing that the philosophy of economies of scale does not apply to a perishable commodity and to small-scale fisheries in a developing country.

(c) It failed to benefit from the experience of its predecessors, the Department of Fisheries and the Cooperative Union, that salaried employees were not suitable for a fishery operation of the magnitude it contemplated.

(d) It failed to win the confidence of the fishermen - necessary for obtaining supplies. The fishermen regarded it as another rapacious trader.

(e) It alienated the trade by its ice monopoly adventure.

(f) Saddled with heavy overheads, it had to operate on high profit margins which made it unpopular with the consumer and the producer.

(g) Failure to make an impact on the price of fish coupled with consistent losses have made it the despair of its single shareholder, the Government.

(h) Above all, it showed no development; it did not come up with either a new product or a new strategy. It just kept on doing what was done by the Fisheries Department and the Cooperative Union, in spite of worldwide development in techniques of fish handling, fish storage and fish marketing.

6. LESSONS TO BE LEARNED FROM THE SRI LANKA EXPERIENCE

The Sri Lanka experience discussed in this paper covers a period extending from the early forties up to 1978, the following lessons may be noted, in order to avoid the same problems another time.

(a) The Sri Lanka experience highlights the fact that in a small-scale fishery, where fish is still highly perishable and fishing is in the hunting stage, free markets distribute it more efficiently than government bureaucracies do. Government departments and corporations are certainly not geared to the catching and marketing of fish. Both these activities are best left to the private sector.

(b) The Government and Corporation function is to provide the necessary infrastructure in the form of fishery harbours, shore installations, cold storages, ice plants, fishery roads and radio and telephonic communications.

(c) The private sector will undertake the catching of fish by big boats if it is given fiscal and tax incentives to offset the high risk inherent in a small-scale fishery.

(d) However, government intervention may be necessary to ensure that fish prices do not fluctuate unduly. This can be achieved if a corporation, not a government department, steps in as a buyer of last resort in times of glut.

(e) These inventories can be put out in times of scarcity in the packetted fish form where the risk element is minimized and existing private sector outlets can be utilized to sell the product.

(f) An apex cooperative is eminently suited to market fish successfully because it can obtain supplies from its own membership and sell through consumer cooperatives and government food shops as well as private sector outlets.

(g) The theory of economies of scale does not apply to fish marketing in a small-scale fishery. Giant organizations with many functions covering huge territories do not succeed.

(h) Two factors that militate against successful fish marketing on more than a localized scale are the dimensions of time and space. Movement of fish over distance and time puts up costs because as fish is moved, losses arising from shrinkage, spoilage, pilferage, malpractice, etc. increase inexorably.

(i) If the movement of fish is limited in space and time, the decision making authority can be delegated and simultaneously supervised.

(j) Since in a small-scale fishery there are many imponderables, fishery planners must be pragmatic and practical persons. Plans must be so designed that implementation can be done on a stop-go basis.