

# Coastal Fisheries

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## Introduction

The coastal zone of Ceylon is the most important area of fish production at present. This coastal zone is limited seawards to the edge of our relatively narrow continental shelf. The fishing methods employed are such that only a fraction of the shelf area is exploited. However, during the past five or six years, with the introduction of mechanization, the area of exploitation has been extended.

The extent to which the coastal zone is exploited depends on the craft and gear used in the fishing operations. For instance the beach seines or "madels" usually operate within a mile off-shore and only occasionally extend their operations to about three miles beyond the shore. The non-mechanized traditional crafts such as the teppams and orus generally operate within about five miles from shore. The mechanized traditional crafts and the small mechanized boats introduced around 1957 carry out fishing operations up to the continental shelf or beyond.

The gear used by these fishing crafts is determined by the habits of the type of fish to be caught, the nature of the sea bed and other related conditions. For the pelagic fishes they use trolling lines or float long lines or drift nets. For the demersal fishes hand lines, bottom long lines, bottom set nets or drag nets are used. However, the net is the preferred fishing gear.

The beach seines or madels, the traditional crafts such as orus, teppams and vallams, and the small mechanized boats are the important contributors in the coastal fishery. Of these the madels are considered the most important since a high percentage (25 per cent.—35 per cent.) of the Island's landings are produced by the operation of these nets.

## Beach Seines

Beach seine fishing can be carried out only in relatively calm waters and hence it is a seasonal operation governed by the monsoons. Its operation is also confined to a very narrow strip with an average width of about a mile of the coastal terrain where the sea bottom is devoid of sharp drops, reefs and rocks. In areas around Mannar and Kalpitiya fishing takes place throughout the year because there is always a lee coast during both monsoons. Beach seines are cast from a boat called a vallam or paru and hauled on to the beach by hand. Each net, depending on its size and locality of operation, is usually handled by a team of 20-40 men. It is not unusual to see over a 100 men particularly in the western coast engaged in hauling.

There are two types of beach seine operations. In many beach seine fishing centres seining is "blind" i.e., the net is set and hauled two or three times a day whether there are signs of fish in the area or not. The quantity and quality of the catch from the day's first set usually determines whether further operations are worthwhile. When the operation is regulated to take advantage of the appearance of shoals of fish it is called seining "shoals". This seining of fish shoals is most common when such varieties as paraw, herring and bloodfish are being exploited. The surface feeding habits and migratory behaviours of these fish are familiar to the fishermen who have developed special operational tactics for taking them.

The beach seine is the most important single contributor in the coastal fishery and in fact in the total fish landings of the island. Approximately 3,600 beach seines are available for operations throughout the island but no more than a fraction of this number is used on any particular day. As mentioned earlier beach seines are operated seasonally, i.e., six months of the year on each side of the island. The catch statistics for the beach seine fishery for the

years 1959 to 1963 (Table I) indicate that there is a gradual increase in the landings up to 1961. Unfortunately we do not know whether this has been due to the increase in the number of operations or that particularly large catches have been taken during these years. The latter is an unlikely reason because occasional bumper hauls are encountered in beach seine fishing. We must also consider the collection of statistics too. During these years the field staff was increased and therefore more data were collected. The drop in 1962 and 1963 (Table I) may be due to poor fishing conditions (weather) and fewer bumper hauls. We are still unable to state precisely the main reason for the increase or the decrease in the total landings from beach seines for any particular year. Nevertheless, the occurrence of bumper hauls contribute to the success or failure of beach seine fishing.

The total catch from these seines is not a true indication that this method of fishing is very efficient. If we consider the number of men (wage earners) involved and the total man hours spent in obtaining these fish catches we will be surprised to see that a man receives only about Rs. 3 or Rs. 4 per working day.

An analysis of some beach seine operations in many localities for the period 1964-65 is given in Table II. In these observations only the first operation on any particular day, whether in the morning or afternoon, was taken. The average catch per haul ranges from 216 lbs. in Karaduwa to 1,798 lbs. in Lunawa. The number of man hours expended in obtaining the total catches recorded shows that the catch per man hour is relatively very low. In these observations the lowest figure of 3.5 lbs. per man hour was recorded from Weligama and the highest figure of 7.8 lbs. per man hour was from Sinnapadu. The type of fish taken, though popular, fetches poor rates.

Most of the catches include a high percentage of species of the clupeid group. Large catches of the larger and better varieties of fishes only occur in seining for shoals and these are usually those bumper hauls referred to earlier. Bumper hauls of the smaller species also occur in some of the blind seining operations with the unexpected arrival of shoals just before setting of the net. One such instance was observed in Lunawa in January this year (1965) where nearly 15,000 lbs. of sprats were landed in the first haul.

### **Traditional Crafts**

The traditional crafts which include the orus, vallams and teppams operate in waters usually beyond that stretch meant for beach seine operations. Where beach seines are not operable the area of fishing is not restricted. Lines and nets are used by these crafts and the fishing area occupies a much wider stretch than that of beach seines. Only a few orus venture beyond ten miles off the coast.

Among the approximately 17,000 traditional crafts the teppams are by far the largest in numbers. Their catches include a large variety of fishes belonging to both the larger and smaller groups. The larger pelagic and demersal forms are usually caught by lines. The majority of the smaller pelagic forms are caught by nets.

The total fish landings brought in by these traditional crafts have been on the increase (Table I). The number of crafts too have been on the increase but the increase in catch is not in proportion. For instance in 1959 the number of crafts was around 13,000 or 14,000 and these brought in 29,498 tons while in 1963 with about 17,000 vessels 48,632 tons were landed. This increase of nearly 70 per cent. can be attributed to the use of nylon nets.

### **Mechanized Crafts**

Mechanization of traditional crafts was begun in 1953 with the assistance of FAO Engineers. After many successful demonstrations several fishermen began to use engines in their crafts and by 1959 these mechanized crafts contributed 588 tons of fish. By 1963 there were well over a thousand such crafts which landed 7,956 tons of fish.

Mechanized boats, different in structure from the traditional crafts, were also introduced about seven years ago. The original boats were equipped to carry out tuna long line fishing. This fishery was not a success because tuna were beyond the range of these vessels. However, until

1960, the many sharks caught by this gear made the operation profitable. With the increase of these boats there was competition and this long line fishery was not economical. Then, the nylon nets came to their rescue and fishing operations carried out by these mechanized boats produced good catches.

These mechanized boats can operate beyond the range of the mechanized traditional craft. Some of these boats operate beyond the coastal zone. Assuming that the majority of these boats operate within the coastal zone their contribution to the coastal fishery is significant. Their catches which consist mainly of sharks, tuna, sailfish, swordfish, rockfish, seer and bloodfish have been increased considerably in the past few years. The total landings in 1953 was 18,396 tons and this was produced by about 1,200 boats. The catch per man hour is many times higher than in the shore seine fishery.

### Varieties Caught

The varieties and the quantities of these varieties caught by the various methods used in the coastal zone for the years 1955, 1959 and 1963 are given in Table III. In the beach seine fishery there are two groups A and B. Group A includes the kumbala, bolla, katuwalla, parati, angila and savalaya. Group B includes the herring, sardine, hurulla, sudaya, halmessa and karalla. All the figures for 1955 and 1963, except that for rockfish, show that within 8 years production has been increased many times. The figures for the bloodfish group have been omitted because this will be dealt with by the next speaker. The manifold increase in seer, paraw and sharks occurred after the introduction of mechanized boats.

### Development

The entire coastal zone is not being fished intensively. The increased total landings year after year indicate that much more could be got from these waters. There are many occasions when shore seine operators look helplessly at large shoals of fish moving just beyond their range. Similarly we know nothing about many migratory shoals that could be exploited using the small mechanized boats or larger vessels. Very little is known of the demersal potentialities. At the moment an estimate of our coastal zone fishing potential has to be based on our thoroughly inadequate records. Hence if we increase fishing activity by the known methods or new methods until the catches begin to drop then the fishermen will find it uneconomical. This is wasteful for large numbers of boats and gear will be left to idle and eat up the capital invested. There is also the danger of over-exploitation and ruining a fishery. In developing our coastal zone resources we must have adequate data on the present status of the fishery.

Data concerning a fishery must be adequate to represent facts with reasonable accuracy. This could be done by having a program where it must be extensive enough to sample the whole fishery and include

- (a) the whole of an area in which it operates
- (b) the main populations exploited
- (c) the whole cycle of a year and
- (d) a long enough series of years to cover a wide range of annual variations.

Economically and technically feasible methods of further exploitation will be possible only when we have a comprehensive knowledge of the fishery and the area in which it operates. I would like to conclude by quoting Walford. "Comprehensiveness in marine biological research is not a luxury. It is in fact a necessity usually neglected in the programs of most institutions. Our use of the sea as a source of food and other biological raw material is technologically and philosophically about 200 years behind our use of the land. Full use of the sea resources depends on a web of knowledge. No thread of this web can be singled out as exclusively essential and no one knows enough about the sea to say which threads of the web can be safely ignored for the sake of economy".

TABLE I

Comparison of Fish landings from various sources for the years 1959-1963 (metric tons)

	1959	1960	1961	1962	1963
Beach seines	19,572	26,320	31,696	30,996	24,472
Traditional craft : orus, vallams, teppams	29,498	30,508	34,104	42,924	48,632
Mechanized orus, vallams, teppams	588	840	3,556	3,500	7,956
Mechanized boats	1,246	4,116	9,800	12,096	18,396
Trawlers : Govt. and Private	2,240	2,016	2,604	3,024	2,660
<b>Total</b>	<b>53,144</b>	<b>63,700</b>	<b>81,760</b>	<b>92,540</b>	<b>102,116</b>

TABLE II

Analysis of some beach seine operations observed in 1964-65

Locality	No. of hauls	Total catch (lbs)	Average catch (lbs)	Total No. Man hours	Catch per Man hour	Main varieties	Remarks
Weligama	4	1,160	290	397	3.5	Sprats	'Blind' seining
Lunawa	12	21,575	1,798	5,172	5.2	Sprats Sardine Savalaya	'Blind' seining one bumper haul 15,000lbs
Sinnapadu	4	3,420	855	520	7.8	Sardine Sprats Herring Paraw, Kumbala	3 'Blind' seining 1 shoal seining
Karaduwa	11	2,378	216	528	4.8	Sardines Sprats Paraw Karalla	'Blind' seining
Jaffna	8	3,191	398	497	6.5	Sardine, Kumbala, Sprats Karalla, Paraw Halfbeaks Lethrinids	'Blind' seining
Batticaloa	16	15,364	960	1,912	6.8	Herring, Half- beaks, Sardine, Sprats, Paraw, Karalla, Kumbala	10 'Blind' sein- ing 6 shoal seining

TABLE III

COASTAL CATCHES : Some of the main varieties caught in the waters excluding the blood fish group (metric tons)

Varieties	1955	1959	1963
Seer .. ..	896	1,456	3,556
Paraw .. ..	1,624	2,996	5,012
Sharks and Skates .. ..	2,436	4,396	13,664
Rockfish .. ..	9,324	10,668	12,460
Beach seine A .. ..	2,912	4,452	5,796
Beach seine B .. ..	12,796	18,732	24,528
Other varieties .. ..	1,540	3,948	7,392

A—Kumbala, Bolla, Katuwalla, Parati, Angila, Savalaya.

B—Herring, Sardine, Hurulla, Sudaya, Halmessa, Karalla.