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A PRELIMINARY INVESTIGATION ON THE HANDLINE FISHERY IN THE WEST COAST OF SRI LANKA

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Abstract

A preliminary analysis of the handline fishery in Negombo is presented. The fishery is carried out along the continental shelf edge with the depth range of 10-20 *fathoms and within the distance of* 20 *miles from the coast. Out of the* 75 *crafts engaged in this fishery* 70% *are* 17 *FRP boats. The catch rates of these boats vary from* 11-24 *kg/boat/day and show no marked monthly fluctuations. The total annual production of handline fishery in Negombo was estimated at* 367 *MT which is about* 18% *of the total marine fish production in the area. Carangids, rock fish, and seer fish dominate the catch in most of the months. Relatively more rock fish varieties are caught in the first half of the year and carangids in the latter half.*

Key words : Handline fishery, West coast of Sri Lanka

1. Introduction

Handline is a common fishing method widely and seasonally operated by artisanal fishermen even up to the edge of the continental shelf. More than 90% of the demersal fish landed around Negombo are caught by handlines (Maldeniya, 1985).

It has been reported that beach seining and handlining were the primary fishing method in Sri Lanka in the mid 50's (Chaplin 1958). Bottom handline has been a very popular method for catching big demersal fishes like emperor fishes (Lethrinids) and snappers (Lutjanids) (Sivasubramanium, 1985). This method was initially carried out with 'vallam' towed by motherships to the fishing grounds close to the continental slope specially in North, North West and off Colombo and the total landings by handlines were very high and probably exceeded only by those of beach seines and gillnetters (Medcof, 1963).

Surface handlines has also been used for large pelagics such as yellowfin tuna, sail fish and marlin as well as for small pelagics like scad mackerel and barracudas (de Silva & Boniface 1990).

Handline fishery in Negombo has been in existence for more than hundred years although there is hardly any published information or annual catch statistics. There are very few exploratory surveys carried out using handline fishing around Sri Lanka including those of RV North Star—1954 (Jean, 1957) and RV Hoyamaru—1975 (Anon, 1975)) which had not covered the area around Negombo.

The present paper describes the crafts and gear used in this fishery, the area of operation, the monthly variation in the catch rates, effort and production, and the change in the species composition of the catches.

2. Materials and Methods

The material for the present study was collected from the main fish landing center at Pitipana, Negombo over a period of one year from January to December 1988. Fortnightly visits were made to collect the information such as total number of boats operated on handline fishery, type of crafts engaged, the catch data, species composition of the catch and the length measurments of

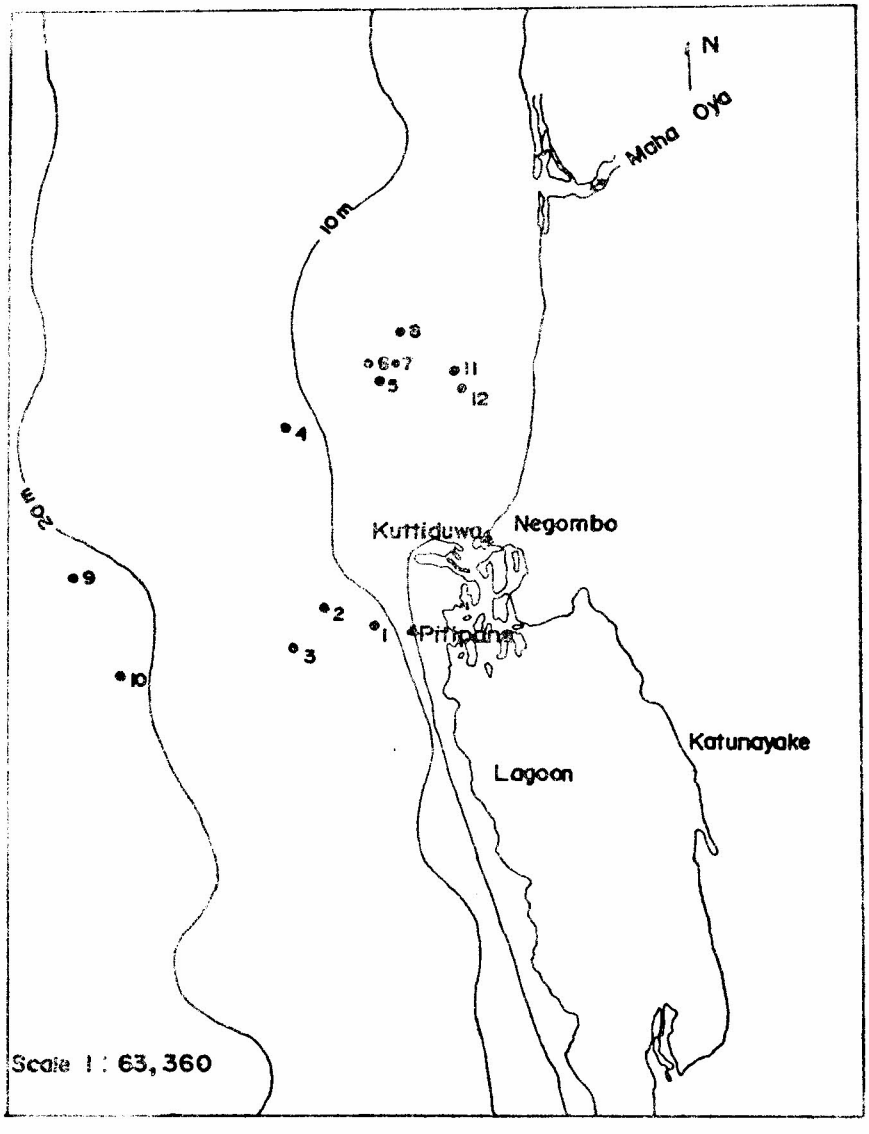

Fig. 1 Map of Negombo lagoon adjacent to the sea.
▲- are the main fish landing centres; 1-12 are the locations of handline fishing operations on one particular day.

the important varieties. The incidental catch of demersals in FRP boats operated for small pelagics were also recorded at Kuttiduwa (Fig. 1). A total of about 25 handline boats were sampled on each sampling day.

To locate the area fished by the handliners a one day survey was carried out on 20th November 1987 by using a 9m boat. The positions of the handline boats in operation was noted by using a sextant resection (Fig. 1).

3.0 RESULTS

3.1 Area of Operation

Handline fishing for demersals as well as for pelagics is carried out along the continental shelf edge. The position marked in Fig 1, are the positions of boats operated on one particular day. Fishing grounds are generally within 32 km from the shore. According to the fishermen, there is apparently a shifting of the fishing area towards offshore. The main fish landing center for demersals in West coast is Negombo Lellama. There are also a number of small landing centres located south of Lellama in close proximity.

3.2 Fishing Craft and Gear

The handline fishing in the West coast of Sri Lanka is carried out by three types of crafts. They are 5-6 m (FRP) boats, 9 m (3.5 ton) boats and Dugout canoes.

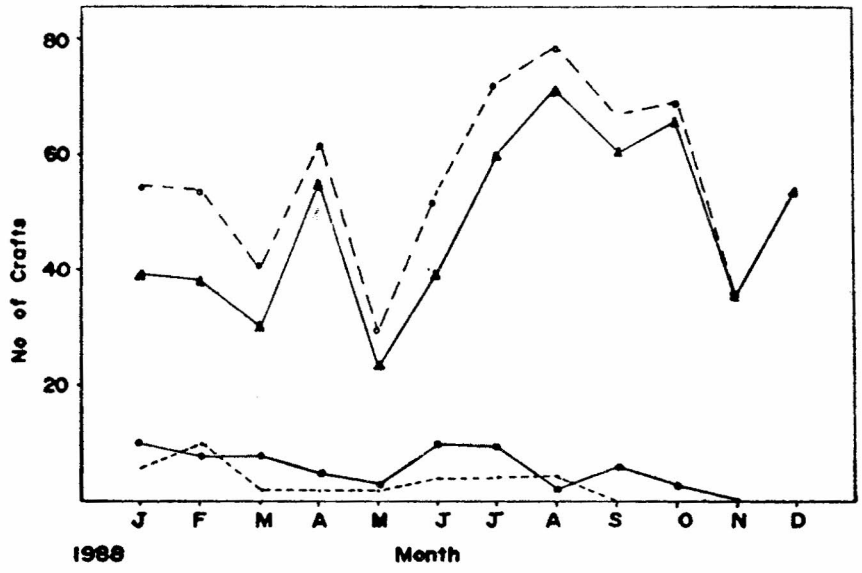

Fig. 2. Monthly variation in mean number of crafts operated per day in the handline fishery at Negombo.
total number of crafts, (o---o); 5-6m FRT boats, (▲——▲) 9m boats, (●——●); dug-out canoes (●----●).

The monthly variation in the number of crafts operated is given in Fig. 2. The number of boats operated per day range from 30 in May to 77 in August with a peak season from July to October. Of the three types of crafts, the 5-6 m FRP boats are the most commonly used for handlining. Fig. 2 shows that almost in every month more than 70% of the crafts used are of this type. In certain months, eg., November and December, the handline fishing is exclusively carried out by a fleet of 5-6 m FRP boats.

The percentage contribution by the other two types of crafts is rather low. The dugout canoes are not operated for handlining during September-December and the 9m boats do not operate during November-December months. Low fishing effort as shown in Fig. 2, during May and November may be due to the rough sea condition at the beginning of south west and north east monsoon. A wide range of hook sizes (12-19) are used in the handline fishery depending on the type of fish species that are aimed at. The type of bait too depend on the type of fish. Small prawns are used to catch small pelagic fish such as scad mackerel and baraccudas, and for demersals like snappers and carangids bigger baits such as squids and sardines are used.

3.3 Fishing effort and Catch rates

Handlining is normally a single day operation; the boats leave for fishing early morning and return to the coast around 1.00 p.m. In Negombo, handline boats leave early morning around (4.00 a.m.) and return to the landing site at Pitipana in the afternoon (1.00 p.m. – 4.00 p.m.). Some boats which are operated for small mesh gill nets do bring demersals as incidental catch using handlines at Kuttiduwa around 12.00 noon. The handline fishery on the West coast is carried out continuously throughout the year with some fluctuations in monthly effort. Fishing effort was estimated in terms of fishing trips per month which is proportionate to the mean number of crafts operated per month (Fig. 2). Fig. 3 shows the monthly variation in catch rates for different crafts. Catch in kilograms per boat per fishing day is considered as the catch per unit effort (CPUE). The 9 m boats recorded the highest CPUE of 54 kg and showed two peak seasons, one in January to February and the other from July to October. These boats target at large pelagics such as marlins and yellowfin. The CPUE of 5-6 m boats vary from 11 kg – 24 kg and show no marked monthly fluctuations. The average CPUE for this type of boat is around 18 kg. The catch rate of dugout canoes is still lower with an average value of around 10 kg.

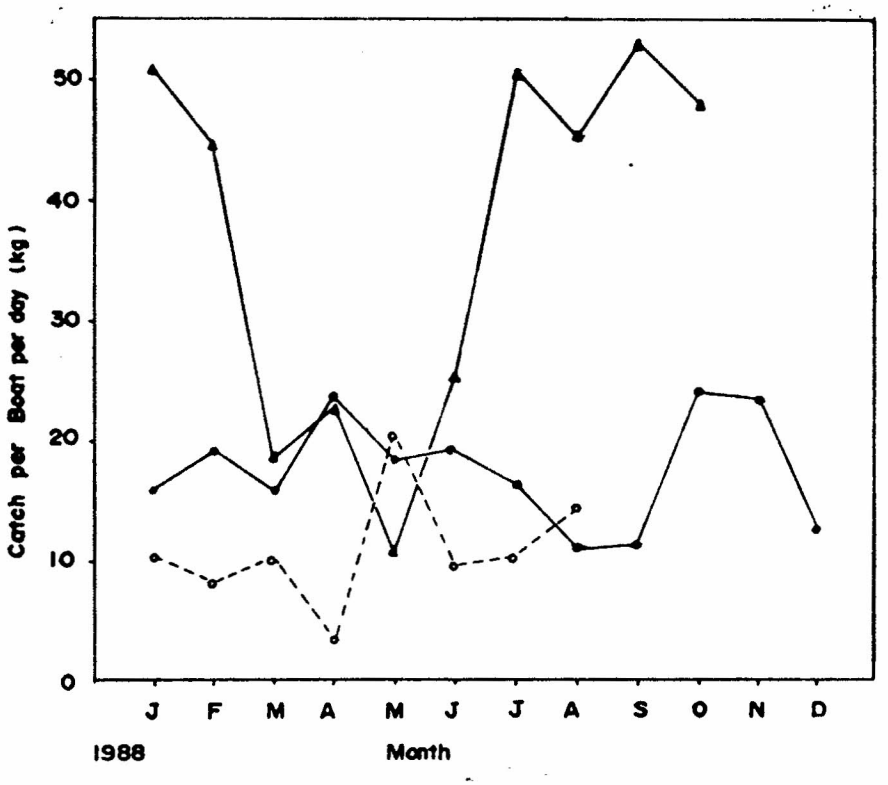

Fig. 3. Monthly variation in catch rates of different crafts engaged in hand line fishery at Negombo. 9m boats, (▲——▲) 5-6 boats, (●——●) dug-out canoes, (o---o)

3.4 Production

The total effort for each craft and CPUE were used to estimate the monthly production. The average fishing days per month was taken as 22 due to the fact that this fishery is highly dependent on the weather conditions. The estimated total production for three different types of crafts were added to get at the total production.

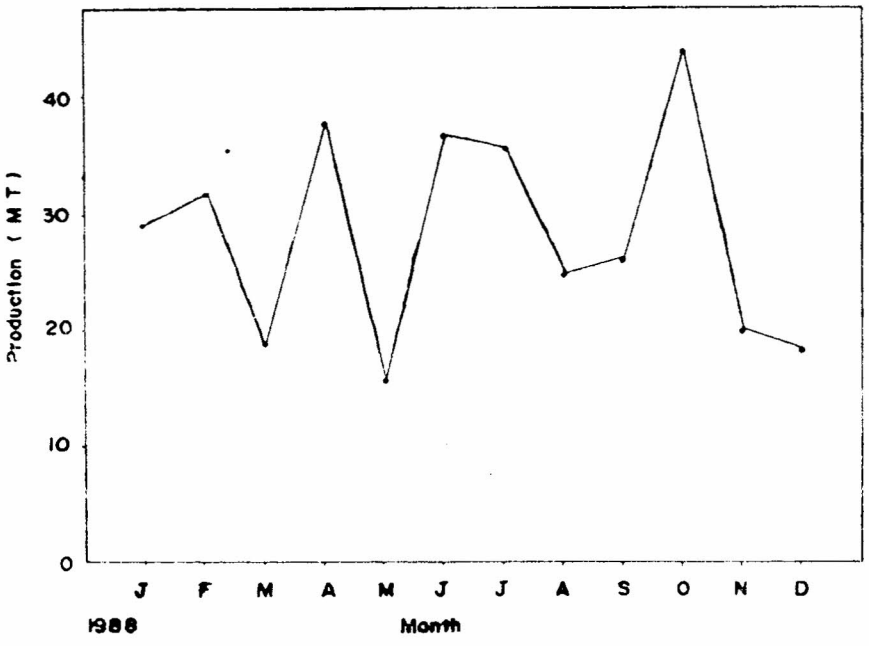

Fig. 4 Monthly variation in production in the handline fishery at Negombo.

Fig. 4 shows the monthly variation in the total production by the handline fishery. No major peaks were seen in the monthly production. The total annual production for handline boats alone was estimated at 340 MT. This is further increased by another 27 MT which is the estimated production for the incidental handline fishery carried out by small meshed gillnetters. Thus the total production for the handline fishery in the coastal waters around Negombo could be estimated at 367 MT/annum. This is about 18 percent of the total fish production in this area.

3.5 Species composition of the catches

A large number of species are caught by the handline fishery. This includes a large number of small and large demersals, and a few small and large pelagics. In the present study all the fish in the catches were not identified to the species level. Hence the species were categorised into major groups to study the monthly variation in the species composition (Table I & Fig. 5).

Table I

Major groups and species composition

	Scientific names	Common names	Length range (cm)
Rock fish			
Lethrinidae :	*Lethrinus nebulosus*	Spangled emperor	16 — 60
	L. elongates	Longface emperor	20 — 71
	L. lentjan	Red spot emperor	14 — 45
	L. mahsena	Mahsena emperor	22 — 50
Lutjanidae	*Lutjanus malabaricus*	Malaba blood snapper	
	L. rivulatus	Blubberlip snapper	
	L. fulvus	Blacktail snapper	
	Pristipomoides typus	Sharptooth jobfish	
	Aprion virescens	Green jobfish	24 — 60
Seranidae	*Ephinephelus undulosus*	Midwater grouper	
	E. areolatus	Areolated grouper	
	E. tauvina	Greasy grouper	
	Cephelopholis sonerati	Tomato hind	
Nemipteridae	*Scilopsis bimbaculatus*	Bream	
Carangids			
Carangidae	*Caranx ignobilis*	Giant trevally	35 — 102
	Caranx sem	Blacktail trevally	
	C. sexfasciatus	Bigeye trevally	
	Atule mate	Yellowtail scad	
	Gnathanodon spaciosus	Golden trevally	16 — 80
Seer fish			
Scombridae	*Scomberomorus commerson*	Spanish makerel	40 — 116
	Acanthocybium solandri	Wahoo	60 — 124
Small pelagics			
Clupaedae	*Amblygaster sirm*		
Carangidae	*Decapterus sp*	Indian scad	
Scombridae	*Rastrelliger kanagurta*	Indian makerel	
Sphyraenidae	*Sphyraena obtusata*	Obtuse barracuda	
Tuna Species	*Thunnus albacares*	Yellowfin Tuna	
Others			
Xiphidae	*Xiphias gladius*	Broadbill swordfish	
Scombridae	*Thunnus albacares*	Yellowfin tuna	
	Euthinus affinis	Kawakawa	
Sphyraenidae	*Sphyraena jellow*	Pickhandle barracuda	

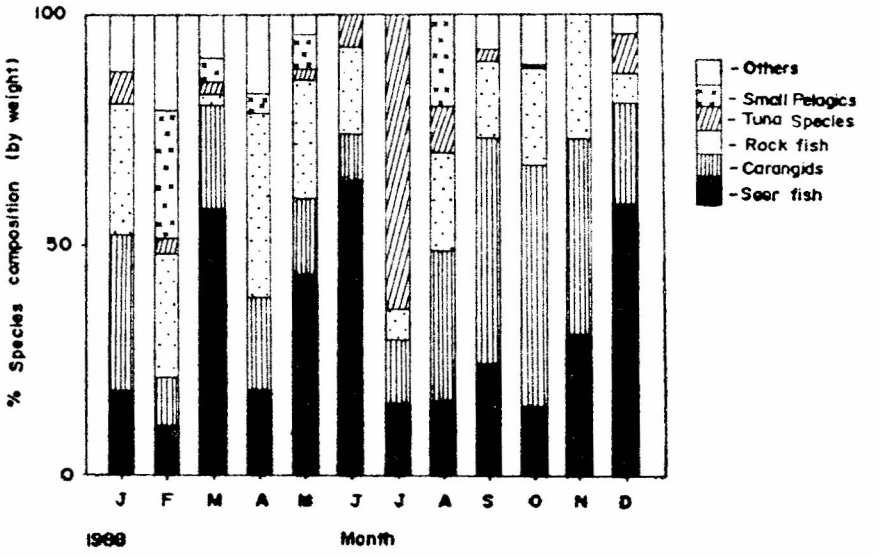

Fig. 5. Monthly variation in species composion (by weight) in the hand line catches Negombo.

Fig. 5 gives the monthly variation in species composition by weight. Carangids, rockfish and seer fish dominate the catch in most of the months. Relatively more rock fish varieties are caught in the first half of the year and carangids in the latter half. Tuna species are caught heavily in July. Small pelagics are very seasonal appearing only from February to March. Seer fish are caught throughout the year with higher contributions in March, June and December.

4.0 DISCUSSION

The differences in the catch rates between three types of boats are attributed to the differences in the size and efficiency of the boats. High catch rates were recorded in 9 m boats and 6-5m FRP boats which are more efficient and requiring less time for sailing to the fishing grounds. The number of fishermen involved in such crafts are also high and is usually 4-6 in 9m boats, 3-4 in FRP boats and 2 in canoes. The seasonal variation of catch rates is mainly due to the inability of these boats to withstand weather conditions rather than to lack of fish on the grounds.

As the fishing area is restricted to the continental shelf edge, the seasonal variation in the catch composition could be due to the migration of different fish species into and away from the fishing grounds. The results from the survey by R/V Dr. Fridtjof Nansen also suggested that there is a northerly migration of demersal fish on the West coast of Sri Lanka during the South-

west monsoon (Blindheim *et al.*, 1980). Large pelagics like marlin, yellowfin and sailfish caught at the continental shelf edge clearly indicate that they migrate towards the coastal waters especially during the months of February, April and October.

4.1 Conclusive remarks

The catch rates of the crafts engaged in this fishery are relatively low compared to the other fishing methods such as gill nets. However, handline seem to give the fishermen better economic returns. The following may be the factors attributed to this :

a) Less fuel needed for the handline fishery operations as it is carried out at the edge of the continental shelf.

b) Less time spent for handlining (5 - 6 hours) compared to bottom set gillnet and bottom longline fisheries.

c) There is a greater demand for fish caught by handline due to the freshness of the catch and hence fetch a higher price.

d) Invariably the handline boats bring with them at least two or three seer fish which fetch high prices.

Handline is a selective fishery and therefore is less harmful to the stocks. Other fishing methods for demersal stocks in this area such as trawling and bottom longline may not be possible because of the rocky bottom conditions and scarcity and high cost of good quality bait.

The results from the survey by R/V Dr. Fridtjof Nansen indicated that the availability of demersals in the west coast is relatively high (Blindheim *et al.*, 1979). Therefore detailed studies on the demersal stocks in this area have to be carried out for efficient management of this fishery. Meanwhile it is recommended to expand the handline fishery further north where no demersal fishing activities are presently carried out.

5. Acknowledgements

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