THE DECLINING POLE AND LINE FISHERY IN

SRI LANKA

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Abstract

Pole and line fishing, which is specifically aimed at skipjack tuna has been practised in Sri Lanka for about 70 years. Originally, this method was popular amongst fishermen in the southern coast, and was later expanded to the eastern coast by migrant fishermen from the southern coast. In early 1960's the pole and linecatch contributed over 40% to the total tuna production in Sri Lanka. However, over the last 2-3 decades, the pole and line fishery has fallen to a relatively low level of significance. In early 1960's, the fishing effort by pole and line was about 21% of the total fishing effort on tunas in the southern coast. It is now reduced to about 7%. The catch rates also show a decline by about 50% from 1960's to 1980's. The total production of pole and line fishery during early 1960's was 1200-2400 tonnes per annum, equivalent to 60% of the tuna production. The present production of 1057MT is equivalent to about 7% of the tuna production in the region. The decline is due to various factors such as limited supply of live bait, introduction of drift gillnets, scarcity of surface tuna schools etc.

Key words: Pole and Line, Red Bait

1. Introduction

Tuna is an important group in Sri Lankan fish catches; the current production of 30-35000 MT per annum representing 15-20% of all fish landed in the country (Joseph, 1984). Forty percent of the tuna catch consists of skipjack, caugnt mainly by driftnet and traditional pole and line methods. Pole and line tishing, which is specifically aimed at skipjack, is reported to have a history dating as far back as the early twentieth century. Originally, this method was practised by fishermen on the South-West coast, using large sail driven outrigger cances. With the introduction of new mechanised crafts into the country's fishing industry in early 1960's, the sail driven outrigger cances were gradually replaced by new mechanised crafts to practise pole and line fishery (Sivasubramanium 1965). Moreover, with the fishermen from South and South West migrating into the East coast, pole and line fishery was also extended to the East coast. However, like most other fisheries, pole and line fishery in the East coast has virtually ceased due to civil unrest in the area since early 1980's. In the early 1960's, pole and line catches contributed over 40% to the total tuna production in Sri Lanka (Sivasubramanium, 1965). In the South and South-West, this fishery makes an important contribution to fish production during inter-monsoonal months which are less productive months for coastal drift gillnet fishery. In the 1970's, a number of exploratory and experimental surveys were carried out with a view to expanding the pole and line fishery into offshore areas and thereby increase production of skipjack tuna. Investigations into availability of live bait resources also formed an important component of some of the surveys (Joseph, 1984). However, over the last two decades the pole and line fishery has fallen to a relatively low level of significance.

The present status of the pole and line fishery on the southern coast has been assessed following a study in this area from 1984 to 1986, with an analysis of factors that have affected this fishery over the years.



Fig. 1. Map showing location of sample sites.

2.0 Materials and Methods

The study area covered South and South-West coasts, from Kalutara to Kirinde. Eight landing centres were selected for sampling from around 16 major fish landing centres scattered along the study area (Fig. 1). The South-West included landing centres between Kalutara and Galle and the South included landing centres between Galle and Kirinde.

Sampling of commercial landings were carried out four to six days a month, fortnightly at each sub-area throughout the period July 1984 to June 1986. Although pole and line fishery was not carried out during the southwest monsoon period, sampling of the tuna fishery was continued throughout the year in order to determine the relative importance of the pole and line fishery *vis-avis* the other fisheries. The data collected included the total umber of boats operated, catch and species composition. There were 225 boats in South-West and 300 boats in South of 3.5 GT, E 26 type engaged in tuna fisheries using different fishing methods. Other relevant information such as sighting of tuna schools, fishing time, fishing area and success of the live bait fishery were obtained by interviewing the fishermen and by observations.

The pole and line boats, manned by a crew of five to six, leave early morning and may return late in the afternoon if pole and line fishing is successful. The boat may also return in the morning itself in the event of an unsuccessful live bait fishery. A single fishing trip lasts a duration of less than 24 hours. Therefore, fishing effort is considered in terms of boat-days. The effective pole and line fishing days per boat per month averaged 15 days.

2.1 Description of the fishery

This fishery is composed of two fisheries, namely the fishery for live bait and pole and line fishery for tuna. The live bait popular with the fishermen in Sri Lanka is the red bait (*Dipterygonotus leucogrammicus*, Bleeker), due to its ability to survive the crude system of bait handling and transport practiced by the local fishermen. They are known to concentrate over large rocks at five to ten fathom depths and are caught with a rectangular dip or lift net. Sometimes the fish appears at the surface, when they are caught with scoop nets. The bait is then transferred to the pole and line fishing boats and taken to the tuna fishing grounds in cane baskets tied outside the boat and partly submerged in water.

The canoes engaged in live bait fishery leave in the early hours of the morning in search of bait fish. If the bait fishery is successful, the pole and line boats can leave for pole and line fishing and return to port in the late afternoon. When the bait fishery is delayed so that there is very little time available for pole and line fishing, the bait is brought back to port and the pole and line boats leave for fishing early on the following day.

Declining Pole and Line Fishery

Five to six men of the crew operate individual poles with barbless hooks during fishing. Pole and line fishery is very much seasonal and the best season for this method is November to March in the South coast and July to September in the East coast, when the sea water is relatively clear (Sivasubramanium, 1972, 1965.)

3.0 Results

3.1 Fishing Effort

The estimated fishing effort on a monthly basis for the pole and line, trolling and gillnet, which are the main fishing methods used to exploit tunas in the southern region for the period July 1984 to June 1986 is given in Fig. 2.



Fig. 2. Monthly mean fishing effort by gillnet, troll and pole and line from the southern region during July 1984-June 1986.

It is estimated that 64.2, 29.6 and 6.2 percent of the mean annual effort by 9m class of boats in the region has been extended through gillnet, troll line and pole and line respectively. This represents a total of 181, 119 and 91 boats operating per day during inter-monsoon period, engaged in gillnetting, trolling and pole and line fishing respectively. Even though the pole and line fishing is the most suitable for catching skipjack during the inter-monsoonal months,

84

the effort during this period is still less than that of gillnets. The annual breakdown of efforts by gillnet, troll, pole and line and longline by percentage during 1963-67, 1968-70 and 1984-86 in the southern region reflects the gradual changes in the importance of different fishing methods during the last 2-3 decades (Table I). Until about 1967, the mechanised 3.5 ton boats directed their effort on tunas mainly through trolling and to some extent through pole and line and long line. Aftsr 1967, pole and line effort has been reduced to less than 10% of the total effort due to the introduction of drift gillnets in late 1960's (Sivasubramanium, 1970). Trolling effort has remained fairly high as it is the most economical gear operated for tunas in Sri Lanka. Almost all mechanised 3.5 ton boats operate gillnets during the monsoon period.

LL	Pole & line	Gill net	Troll	Period	Area
6.1	21.5	2.1	70.3	*63-67	SW
10.0	9.1	45.9	35.0	*68-70	
	5.4	66.3	28.2	84-85	
	7.2	61.5	31.2	85-86	
8.3	29.7	0.5	61.5	63-67	S
0.5	4.5	70.6	24.4	68-70	
	6.4	58.8	34.8	84-85	
ووسفريه	9.3	53.7	36.9	85-86	

Table I : Percentage distribution of effort in the South coast tuna fishery during the period1963-70 and 1984-86.

* Source - Sivasubramanium (1970)

In early 1960's there were about 350 large sized out-rigger cances engaged in pole and line fishery in the South-West region between November to April and on the East coast between June to October (Sivasubramanium, 1972). In addition to the traditional crafts, a number of 9m class of boats were also engaged in pole and line fishery, though not as regular as the traditional crafts. These traditional crafts have only averaged 9-10 active fishing days per month due to the problem of availability and the time consumed in searching and collecting the live bait (Sivasubramanium, 1972).

3.2 Catch rates

Fig. 3 gives the variation in monthly catch rates in the pole and line, gillnet and troll fishing conducted by 9m class boats during the period July 84 to June 86 in the southern region. The pole and line catch rates were high

during the inter-monsoon period, averaging 70-90 kg/boat day while gill nets brought an average of 27 kg per day during the same period. Tabls II shows the changes in the mean catch rates in the pole and line fishery during the past two decades.



Fig. 3. Monthly mean CPUE of skipjack tuna of pole and line (*----*), troll (+----+) and gillnet (x----x) and CPUE of total fish of gillnet fishery (o----o) of the southern region during July 84--June 86.

 Table II :
 Mcan catch rates in the pole and line fishery during 1965-86 in the southern region.

Period	Boat Ty	pe	Catch rate	s (Kg/boat day)
\tilde{s}_{c}			South	S-West
* 1965	3.5 ton	P/L	N A	195.45
* 1967-71	3.5 ton	P/L	80.2	81.2
	Oru	P/L	58.0	63.8
1984-86	3.5 ton	P/L	78.5	90.03

N A — not available

* Saurce - Sivasubramanim (1965 and 1972)

High catch rates have been recorded in early 60's by mechanised pole and line boats. At least two percent of the fleet brought over a short ton per boat per day (Sivasubramanium, 1965).

C. Amarasiri

There appears to be a decline in the catch rates of the mechanised pole and line boats during the past two decades. The reason for this is not clearly known, but may be due to pressure for the gillnet fishery on the resource. It is seen that the gillnet fishery which is also directed towards skipjack and yellowfin, has developed rapidly since 1960's, the percentage contribution to the tuna fishery in the southern coast increasing from less than 5% in 1963 (Sivasubramanium 1970) to over50% in 1985/86. The highest catch rates in the pole and line fishery during inter-monsoon and gill net fishery during monsoon indicate the differences in abundance of surface and sub-surface tuna schools or the relative efficiency of the gear during that particular season.

3.4 Production

The skipjack tuna production by pole and line, trolling and drift net fisheries in South and South-West for the period July 1984 to June 1986 are given in Fig 4. The production during the second season, Nov. 1985 to April 1986, is comparatively higher than during the first season, Nov. 1984 to April 1985. According to the fishermen the abundance of surface schools during the second season was higher than that during the first. The contribution from pole and line fishery to the annual production in the area was about 1057MT. This is about 7.4 % of the annual tuna production from the region. However, this fishery contributed more than 25% to the region's tuna production during the inter-monsoonal months.



Fig. 4. Monthly skipjack tuna production of pole and line (*----*), troll (+----+) and gillnet (x----x) from the southern region during July 1984-June 1986.

Declining Pole and Line Fishery

The average annual production of tuna in Sri Lanka from 1950 to 1960 was around 2000-4000 tons which represented approximately 10% of the annual total fish production in the country (Sivasubramanium, 1965). Nearly 60% of the tuna catch or about 1200-2400 tonnes had come from the pole and line fishery.

4. Discussion

The high percentage contribution from pole and line fishery during the inter-monsoon period reflects its importance on a seasonal basis. Expansion of pole and line method is limited due to various factors. In the recent past, it was mainly due to limited supply of live bait. It is believed that the live bait used by local fishermen Dipterygonotus leucogrammicus are not sufficiently available in Sri Lankan waters. The UNDP/FAO Fishery Development Project in 1972-77 carried out a survey on live bait resources around Sri Lanka with a view of expanding the pole and line fishery in Sri Lankan waters (Pajot, 1977). The results showed that the red bait is widely distributed in other areas, in addition to southern and eastern areas where pole and line is traditionally carried out. Red bait constituted 36.2% of the total catch in the inshore small purse seine fishery carried out with light attraction in the night on the West coast during September 1972 to Aug. 1973 (Joseph 1974), 30.8% during Nov. 1973-Apl. 1974 (Joseph, 1975) and 23.9% during Nov. 1974 to Apl. 1975. Promising new red bait fishing grounds were located off Hendala, Pammunugama, Wennappuwa, Chilaw and Udappuwa, in depths ranging from 7-10 fathoms. Therefore, the survey recommended that the expansion of pole and line fishery to other areas could be possible. To overcome the live bait problem, numerous varieties of small fish such as Sardinella jussieu, S. fimbriata, Thrissocles mystax, T. setirostris, T. hamiltonii, Apogon spp. Decapterus russelli, Allanetta forskali and Caesio spp. have been used as live bait (Pajot 1977). However, only a few of them were found to be very suitable. considering their size, mortality and acceptability to the skipjack. Under the above project, a Japanese pole and line vessel 'Kosei Maru' carried out exploratory pole and line fishing around Sri Lanka from December 1973 to March 1975 (Sivasubramanium, 1977). These results also showed the possibilities of establishing small scale pole and line fishery in new areas such as Chilaw, Negombo and even Mulaitivu, in addition to other areas in the South-West, South and East coasts where existing traditional pole and line fishery could be improved and expanded. The fishery could also be developed by improving the live bait transportation, collection, introduction of sprinkler systems to the boats etc. The recorded average catch rate of pole and line fishing per day was 682.1 kg. However, the vessel had not been able to conduct an efficient live bait fishery and it had spent a large proportion of its fishing time (152 days out of 332 sea days or 45%) on bait fishery. During the period March '73 to Oct. '74, three pole and line vessels belonging to the Nichiro Fishing Company of Japan also carried out experimental pole and line fishing around Sri Lanka with a view to establishing a joint commercial fishing venture with the Government of Sri Lanka, especially in the off-shore range (Sivasubramanium 1975). The results were not satisfactory because there were very few tuna schools beyond 60 miles and even within 60 miles the catch rates declined from the outer boundary line to the offshore (Sivasubramanium 1975). These vessels used a lift net and a purse seine for live bait fishery during the survey. Bait fishery was limited to three fishing grounds; off Chilaw, Boulder Point on East coast and off Trincomalee. Out of 597 sea days recorded, bait fishery has been conducted on 384 days or 66% of the total sea days.

Even though a lot of effort has been made to improve the fishery during the last two decades, the fishery has declined drastically and is still confined to the South and South-West only. Even in the South-West, the effort has declined by about 70 percent.

Another reason for declining of this fishery is the rapid expansion of the drift gillnet fishery. Until the late 80's, pole and line fishing was relatively important during the inter-monsoonal months. From the early 1980's, the fishery has been affected due to the introduction of multiday drift gillnet fishing bocts which are getting high catches even in inter-monsoonal months, so that fishermen tend to go for reliable high income fishery. Although there has been a number of resource surveys to expand pole and line fishery in Sri Lanka, there had been no parallel investigations in regard to design and development of a suitable small pole and line fishing vessel with inboard bait tank and provision of sea water circulation. This has limited the choice of bait varieties that could be taken on pole and line vessels used in the Sri Lankan fishery, thereby adversely affecting its growth and expansion.

Even though the fishery is declining, it is important to revive and encourage pole and line fishing due to the following reasons:

- compared to the gillnet fishery, pole and line brings in better quality tuna which could even be exported.
- the accidental catch of small marine mammals such as dolfins in the gillnet fishery in Sri Lanka has been of some concern in recent years. Diversification of fishing effort through the use of pole and line would contribute to a reduction of marine mammal catch in the fisheries.
- promotion of fishing methods such as pole and line to harvest surface dwelling resources such as skipjack tuna would also help to achieve a balanced exploitation of resources. At present, there is an unbalanced exploitation, with the gillnet fishery exploiting a large proportion of subsurface resources while the surface resources are relatively less exploited.
- expansion of fisheries such as gillnetting and purse seining could cause environmental and management problems. For instance, the gillnet

Declining Pole and Line Fishery

fishery tend to harvest non-targeted resources (marine mammals) while purse seing fishery is widely regarded as a method that is detrimental to the resource if allowed to expand. In view of these, methods such as pole and line would be environmentaly sound and would cause no threat to the resource exploited.

-- the cost of pole and line fishing gear is also relatively cheaper than that of gillnet fishing gear.

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