

DECLARATION

I hereby certify that the work included in this thesis was carried out by me under the supervision of Professor J. Jinadasa in the Department of Zoology, University of Sri Jayewardenepura and a report on this has not been submitted to any University for another degree.



.....
L.S.A. Weerasinghe

DECLARATION

I/we certify that the work of L. S. A. Weerasinghe on Economic status of Theppam Fishery for the degree of M Sc. in the faculty of science at University of Sri Jayewardenepura.

I/we feel that the candidate's work is complete and suitable for the purpose of evaluation.

.....
Prof. J Jinadasa

Supervisor

Dept of Zoology,

University of Sri Jayewardenepura,

Gangodawila, Nugegoda

.....
Course coordinator

Dr. Nishshanka De Silva,

Dept of Zoology,

University of Sri Jayewardenepura,

Gangodawila, Nugegoda

**Economic Status of the Theppam Fishery
In Negambo**

By

Lakshika Shriyanthi Alwis Weerasinghe

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ABSTRACT

Economic analysis of Theppam fishery was made from April 2008 to December 2008. "Theppama" is a traditional fishing craft and usually fishing is carried out with small meshed gillnets. Fishing operation was limited to the region within 0.8km - 1.5km from the shore and depth is about 7m -10 m. More than 45% of the fishermen fished at 9m depth and more than 50% catch were recorded from the 9m depth. Usually, Theppam fishermen depart from the shore about 3.30am to 4.00am and return to shore about 7.30am to 8.00am actual effective time of fishing is range 1 hour to 2hours. In early stages, Theppam were made out of timber, but now Theppams are made out with Fiber Reinforced Plastics. After 1950s some Theppams were powered with out board engines. But in the study area only non motorized plastic Theppams were found and they were operated using an oar. Sizes of the Theppam's are range from 11.5ft to 12.5ft in length. Crew size of the Theppam is usually one. Gillnets were the main gear use in Theppam fishery. Length of the one net piece was 1500 meshes and width of the one net piece was 330 meshes. Usually 4-6 net pieces were used. 12mm, 19mm, 23mm, 28mm, 45mm and 50mm stretched mesh nets were operated during the study period. July to September was

the peak period to Theppam fishery. *Sardinella* sp were the main fish sp contributes to the catch. They contribute about 50% of the total catches. Daily catch ranged from 0 – 15kg. The lowest estimated annual catch of a Theppam was 1357kg and the highest was 2001kg. Estimated annual total catch from the study area was 29443 kg. Daily income of a Theppam ranged from 0 to 2350 rupees. Estimated annual income was 206744 to 302833 rupees. Daily cost of operation Theppam ranged from 0 to 1000 rupees while estimated annual operational cost was 288 to 5750 rupees. Investing to a “Theppama” and Gillnets are the capital costs of a Theppam fishery. Price of a “Theppama” ranged 24,000 – 40,000 rupees and price of a twine multifilament gillnet is 7000 rupees. Theppams earn a profit which is 10 times its cost. It is a highly economic craft.

CHAPTER 1

1. Introduction

Sri Lanka is an island in the Indian Ocean, south-east of the Indian sub-continent between latitudes 6-10° N longitudes 80-82° E and it is approximately 66,000 km² with a 1340 km long coastline. Sri Lanka claims sovereign rights of 223,000 km² of Exclusive Economic Zone (EEZ) of the Indian Ocean (Wijayarathne, 2001). The Sri Lankan fisheries sector is divided into three production sub sectors for administrative and analytical purposes as coastal fisheries, offshore / deep-sea fisheries and inland fisheries (Nevill, 2005). Coastal fishery consists of the activities in the area of the sea up to about 25 miles from the coast which include continental shelf and an area extending a few miles beyond the shelf (Pietersz, 1978). The total area of the shelf is about 26,000km² which is approximately 11% of the EEZ of Sri Lanka (Wijayarathne, 2001).

The coastal zone of Ceylon (Sri Lanka) is the most important area of fish production at present (Canagaratnam, 1965). The bulk (99%) of the island's marine fish comes from the coastal fishery (Ahmed, 1986). 40-50% of the marine fish landed to Sri Lanka consist of small fish (Karunasinghe and Fonseka, 1984). In 2006 the coastal production was 150,110 metric tons (Fisheries year book, 2007).

Marine small pelagic fish species form an important part of the animal protein requirements of Sri Lanka (Karunasinghe et al., 2000). The per capita consumption of fish is 12.06 kilogram per year (Annual Report of Central bank, 2007). Fisheries provides 65% of the animal protein consumed in Sri Lanka, provides employment for around 120,000 people and accounts for 2.6% of the Gross National

Production (GNP) (Wijayarathne, 2001). The domestic market consists of high value species such as Spanish mackerel, horse mackerel, trevally, tunas and tuna like species (Pietersz, 1985). There is a heavy consumption of low valued species such as sharks and small pelagic species such as sardines, herrings, anchovies and Indian mackerels (Pietersz, 1985).

Fishing for small pelagic species is usually carried out in shallow coastal waters (Dayarathne, 1985). In the shallower regions the fish are small and consist of species whose adults do not grow beyond a foot in length and the juveniles of the large species also occur (Bruin, 1985). Small pelagic fish species show very significant contribution to fish production in Sri Lanka (Dayaratne, 1985). In the past the beach seine (Madel) and the non – mechanized log rafts (Theppam) were mainly responsible for these catches (Dayarathne, 1985).

Over the last five decades, the fisheries sector of Sri Lanka has undergone a significant transformation resulting in the modernization of the crafts, fishing methods and gears (Nevil, 2005). Fishing in Sri Lanka has been carried on largely with the use of traditional methods up to 1958 and in recent years there has been marked increase in the use of mechanized crafts for fishing (Fernando, 1978). The fishing fleet in the early 1950s comprised only traditional crafts such as dug out canoes (Oru, Vallam) and log rafts (Theppam, Kattumaram) and those are the important contributors in the coastal fishery (Canagaratnam, 1965). By the year 2007, the number of non motorized traditional crafts comprised 16,640 which were only 45% of the fleet of around 37040 crafts (Fisheries year book, 2007). Balance 55% numbering 20,400 are modern fishing boats made out of timber or Fiber Reinforced Plastic (FRP) and powered by inboard or

outboard engines / motors (Fisheries year book, 2007). Early 50s among the traditional crafts Theppam were by far the largest in numbers (Canagaratnam, 1965) when in year 2001 Oru were the largest in number (Wijayaratne, 2001). Table 01 shows the number of fishing crafts in 2001(Wijayaratne, 2001).

Table 01: Numbers of traditional fishing crafts in Sri Lanka (Wijayaratne, 2001).

Craft Category	Paaru	Oru	Vallam	Theppam
No. of crafts	126	9478	2335	2949

Concomitantly there also been a similar change in respect of fishing nets and gear (Nevil, 2005). Of the variety of gear used, small mesh gillnets and beach seines are the main methods (Wijayaratne, 2001). In the early 1950s the most important fishing method was beach seining (Madel) which is reported to have 40% of total marine landings (Nevil, 2005). However, today it has paled into insignificance and its contribution to production marginal (Nevil, 2005). Gillnet is now the most important fishing gear in terms of its contribution to production (Nevil, 2005). Since introduction of small mesh gill nets to the coastal fishery in late 1950s, gillnet fishery became extremely popular and at present gillnets are being operated by non mechanized traditional crafts, mechanized traditional crafts and Fiber Reinforced Plastic (FRP) boats (Karunasinghe and Fonseka, 1984).

Fishing has been a major economic activity in the coastal areas of the country (Nevil, 2005). The investment needed and the running and maintenance costs of bigger vessels are so high consider the small crafts so smaller the craft productivity is

high (Unni, 1978). Boat owners had an annual average incomes ranging between US \$ 1,150 for traditional crafts (Wijayaratne, 2001). Smaller vessels are owner operated and overhead expenses are kept a minimum (Unni, 1978). Theppam provide better income than the Kattumaram, operating in the same area (Sivasubramanium, 1991). The income from catches are based on

- The composition of fish / prawns in the catches and their quality, quantity of each variety caught, and their relative price
- Average hours of fishing per day
- Number of days fished in a year (Unni, 1978).

1.1 Literature survey - Theppam

Traditional indigenous crafts of Sri Lanka consist, dugouts with or without triggers, log rafts and planked rafts (Yadava, 2002). Sri Lanka's current marine fishing fleet consists of over 37,000 crafts of several types as shown in Table 02 (Fisheries year book, 2007).

Theppam is a traditional fishing craft in Sri Lanka (Pietersz, 1985) and it is a primitive type of fishing craft that has been used for centuries by the fishermen in Sri Lanka and India (Sivasubramanium, 1991). The indigenous fishing crafts represent a large number of different building methods and designs (Yadava, 2002). They are mainly utilized for coastal and lagoon fishing (Yadava, 2002). Theppam and Kattumaram are called as log rafts (Yadava, 2002). The Theppam is roughly about 10-14 ft in length and

generally used within 10 miles from shore (Pietersz, 1985) and usually use drift gillnets as gears (Pietersz, 1985). These are made of 4 or 5 roughly shaped logs pegged / tied together (Pietersz, 1978). The solid logs are the only source of buoyancy (Yadava, 2002). In the Theppam all logs are of almost equal size with a slight shaping fore and aft (Wijayarathne, 2001). Theppam acquires a curved shape when the logs are held together (Sivasubramaniam, 1991). The traditional material used for construction of Theppam was solid logs of *Albizzia sp.* (Anderson, 1992). Wooden Theppam are now replaced by the plastic ones.

Table 02: Sri Lanka's marine fishing fleet in 2006 (Fisheries year book, 2007)

Type of vessel	Number
Traditional non motorized craft such as outrigger canoes (Oru) and log rafts (Theppam , Kattumaram)	16,640
Traditional crafts powered by outboard motors	1,680
Fiber reinforced plastic boats powered by outboard motors	15,200
One day fishing boats (28 – 32 ft) powered by inboard engines	1,060
Multi - day boats powered by inboard engines	2,460
Total	37,040

The Theppams are found on the West and North West coasts of Sri Lanka (Sivasubramaniam, 1991). Colombo to Mannar coastline is the main coastline where the Theppams are operated (Yadava, 2002). Traditionally these crafts use drift nets, bottom set gill nets, scoop nets and hook & line to catch such varieties as skates, rays, guitar