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A present scenario of seine nets fishing gears of pulicat coast, Tamil Nadu, India

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Abstract

Two different types of seine nets namely purse seine and shore seine were found to be operated in Pulicat coast. Purse seine operated only in marine and Shore seine operated only in brackish water of Pulicat lagoon. Purse seine locally called as *Surukku valai* and shore seine locally called as *Badi valai* or *karai valai*. Three different types of purse seine viz. purse seine with 18mm mesh size called Type-1, purse seine with 50mm mesh size called Type-2 and purse seine with 90mm of Type-3 were mostly deployed for fishing in marine. Totally around 123 numbers of purse seines and 38 numbers of shore seines were operated. *Paadu* is a traditional system of fishing practiced in fishing village of Pulicat it's controlled by fishermen from three villages: Kottai Kuppam, Christian Kuppam and Andikuppam

Keywords: Purse seine, Shore seine, Fish catch

1. Introduction

Purse seines are fishing nets designed to catch schooling fish. There are two different methods of purse seining: the one-boat and the two-boat system. Although both have their advantages and disadvantages, purse seining with a single boat is now considered more economical in large fishing operations (Gabriel *et al.* 2005) [7]. In two-boat purse seining, two boats operate together with each carrying about half the gear. In the tropical tuna purse seine fishery, sets on floating objects have long been known to have a higher rate of by catch than sets on free schools (Fonteneau *et al.* 2000) [6]. Aspects of classification, structure and operation of purse seine nets have been discussed by Ben-Yami (1987, 1994) [1, 2], Sainsbury (1996) [14] and others. The design, construction and operational details of purse seines have been reported by many authors (Iitaka, 1971 [8]; Mukundan *et al.*, 1980) [10]. The purse seine operation for sardine and mackerel along the Indian coast was first attempted by the FAO experts worked along the Malabar (Kerala) coast and Mangalore (Karnataka) coast during 1970s (Sadanandan *et al.*, 1975) [13]. Verghese (1976) [15] studied the introduction of purse seine fishing along Indian coasts from 36 ft and 57 ft vessels for sardine and mackerel. Seining is a fishing technique traditionally done in areas with large schools or groups of fish. The earliest form of seining was drag netting (also called beach seining). The beach seines which are mostly operated along the east and west coasts of India, mainly used for catching mackerel and sardine can be broadly categorized into two types based on the presence of cod end. The first type consists of a seine body, cod end with two wings on the other hand the second type is without cod end and consist of a net that is narrow at the ends and broad at the centre like rampani net. The current status of beach seining in India shows marked differences from state to state and even from region to region within a state. On the Coromandel Coast, in Tamil Nadu, and in Andhra Pradesh, the importance of beach seines has declined. In 2005, the Central Marine Fisheries Research Institute recorded that the total number of beach seines in India was 46 621 (FAO, 2011) [5]. Pulicat Lake is a second largest brackish water body in India after Chilka Lake. Most of the fishing gears are operated by traditional form till now they are not modernized and also fishing gears of Pulicat has less documented. This preliminary study provides insight into the major fishing gears operated in Pulicat coast. The studies in simulating the process of fishing in a seine nets (Purse seine and Shore seine) have rarely been done in spite of its importance in fishery.

2. Material and methods

The present study was carried out for five months from January 2016 to May 2016 at Pulicat fishing village of Thiruvallur district of Tamil Nadu (Lat:13°25'N;Long :80°21' E) for observe type of seine nets using along the coast of Pulicat (Fig.1). There are two different types seine nets were found in this present study viz. Purse seine and Shore seine or Beach seine. Purse seines operated only in marine and shore seine operated only in brackish water of Pulicat lagoon. Purse seine locally called as *Surukku valai* and shore seine locally called as *Badi valai* or *Karai valai*. Totally around 123 number of purse seines from the six fishing villages of Pulicat such as Arangum kuppam, Koonam kuppam, Sempassalli kuppam, Sathan kuppam, Jamilapath and Thirumalai nagar were operated (Table 1.) and 38 numbers of shore seines were operated from three fishing villages like 15 numbers of shore seine in Naduvar matha kuppam, 12 numbers of shore seine in Kottai kuppam and 11 number of shore seine in Aandi kuppam. The type of shore seine were operated in Pulicat was consists of seine body, cod end and two wings. A community based management was followed among three fishing villages who engaged in shore seine fishing. From these three fishing villages, one fishing village should allow to use shore seine per day.

3. Results

Different types of purse seines were operated in marine waters of Pulicat coast viz. purse seine with 18mm mesh size called Type-1 used to catch lesser sardines and oil sardines, purse seine with 50mm mesh size called Type-2 used to catch mackerel, tuna, carangids and purse seine with 90mm of Type-3 used to catch all type fishes (Fig.2). The design details of purse seine are given in Table 2. The main webbing made of nylon multifilament and selvages are made by polyethylene with different specifications. Type-1 purse seine has 4 number of selvedge's with 40mm mesh size, Type-2 selvages has 14 number of meshes with 20 mesh size mm and Type-3 net has 8 meshes of selvages with 80mm mesh

size. The net consist 20000 to 30000 meshes in length and 2500 meshes in height with PVC (70mm dia) as floats and lead balls (50gms) or Purse seine rings (1kg) as sinkers in order to keep the net in desired position (Fig.2). For operation of the Purse Seine a Large sized boat (LOA 51feet) with five small boats or *skiff* (LOA 20 feet) for encircles the school of fishes by the net are used, the net operation takes about 3 hrs. Shore seine is a another seine nets locally called *Badi valai* or *Karai valai* operated in Pulicat lagoon mainly used to catch mullet, milk fish, sardine, shrimps. It is operated from the beach by means of a boat laying the gear in a semi-circular form, consequent to which both ends of the hauling ropes are pulled simultaneously on to the beach. The gear consists of a long wall of webbing called main body, bag made of thicker twine where the fishes get accumulated is called bunt or cod end. End part of the net to be shot last is called wing. The portion between bunt and wing is called shoulder. The design details of shore seine are given in Table 3. The net consist 15000 meshes in length and 450 meshes in height with 30mm mesh size. The operation was carried out at depth of 15m. Wing portion of the shore seine has 7 meshes of selvages with 50mm mesh and shoulder part of shore seine has 12 meshes of selvages with 40mm mesh size. Cod end or bunt was fixed at end of the net with 850 meshes in length and 1200 meshes in depth with mesh size of 10 mm. The head rope made of polypropylene with 15mm dia. and foot rope was made of nylon with 30mm (Fig.3). Five boats (three FRP with 15 feet and 2 country craft with 20 feet) were engaged during operation period. 100 numbers of persons required to operate shore seine. The hauling rope were attached with main body of shore seine with length of 100 m. Total catch of shore seine was obtained at 0.5tonnes/trip. By catch was the main problem prevailing in shore seine compared to purse seine because during operation of shore seine the entire organism which living in bottom was washout per one run of shore seine. Puffer fish, Leiognathus, Therapon, Scatophagus species are mostly caught in shore seine as a by catch.

Table 1: Total number of Purse seine in Pulicat

| Name of the fishing village | Nos. of purse seine with 18mm mesh size | Nos. of purse seine with 50mm mesh size | Nos. of purse seine with 90mm mesh size | Total no. of purse seines |
|-----------------------------|---|---|---|---------------------------|
| Arangu kuppam | 13 | 13 | 13 | 39 |
| Koonang kuppam | 11 | 11 | 11 | 33 |
| Sempass palli kuppam | 6 | 6 | 6 | 18 |
| Thirumalai nagar | 5 | 5 | 5 | 15 |
| Jamilapath | 4 | 4 | 4 | 12 |
| Sathankuppam | 2 | 2 | 2 | 6 |

Table 2: Details of purse seine

| Parameters | Type-1 | Type-2 | Type-3 |
|----------------------------|--------------------------------|--------------------------------------|---|
| Mesh size(mm) | 18 | 50 | 90 |
| No.of meshes in length | 20000 | 25000 | 30000 |
| No.of meshes in Depth | 2500 | 2500 | 2500 |
| Fishes captured | Oil sardine and lesser sardine | Mackerals, tuna, carangids, sardines | Seer fish, carangids, mackerel, tuna and sardines |
| No.of floats | 2000 | 5000 | 10000 |
| No.of sinkers | 2000 | 5000 | 10000 |
| Type of floats | Plastic. 60mm dia. | Plastic. 70mm dia. | Plastic. 70mm dia. |
| Type of sinkers | Lead (50g) | Lead (50g) | Lead (100g) |
| Distance to fishing ground | 20km | 20km | 20km |
| Duration of operation(hrs) | 3 | 3 | 3 |
| Depth of operation(metre) | 300 | 300 | 300 |
| Diesel used per trip | 50litres | 50litres | >50litres |
| Total catch (ton) | 5 | 10 | >10 |

| | | | |
|-------------------------|--|---|--|
| Selvedges specification | 40mm with 4 no.of meshes of Polyethylene | 20mm with 14 no.of meshes of Polyethylene | 80mm with 8 no.of meshes of Polyethylene |
| Netting material | PA multifilament | PA multifilament | PA multifilament |
| No.of rings | 133(750g) | 166(750g) | 200(1kg) |

Table 3: Details of shore seine

| Parameters | Specifications |
|----------------------------|---|
| Local Name | Baadi valai(or) Karai valai |
| Fishes captured | Sardine, Mullet, Milk fish, Mathi, shrimps |
| No. Of meshes in length | 15000 |
| No.of meshes in depth | 450 |
| Mesh size of main webbing | 50mm |
| Selvedge specification | 7 meshes of PE with 50mm mesh size |
| Distance to fishing ground | 7km |
| Depth of operation | 15m |
| Duration of operation | 2hrs |
| Total catch per operation | 0.5 ton |
| Head rope | PP with 15mm dia. |
| Specification of floats | Thermocol (Styrofoam), 50mmx40mm |
| Specification of sinkers | Lead with 50 g |
| Cod end specification | 850 meshes in length and 1200 meshes in depth with 10mm mesh size |
| warp length | 100 m for each side |

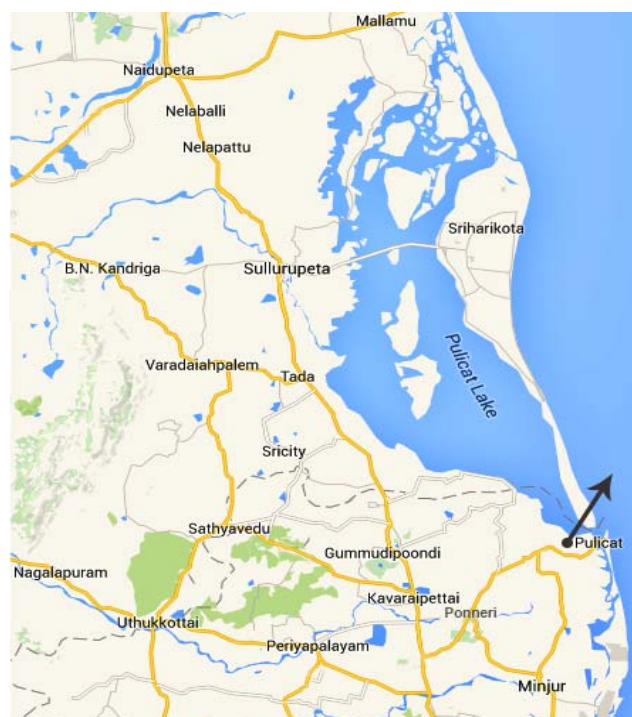


Fig 1: Description of the study area

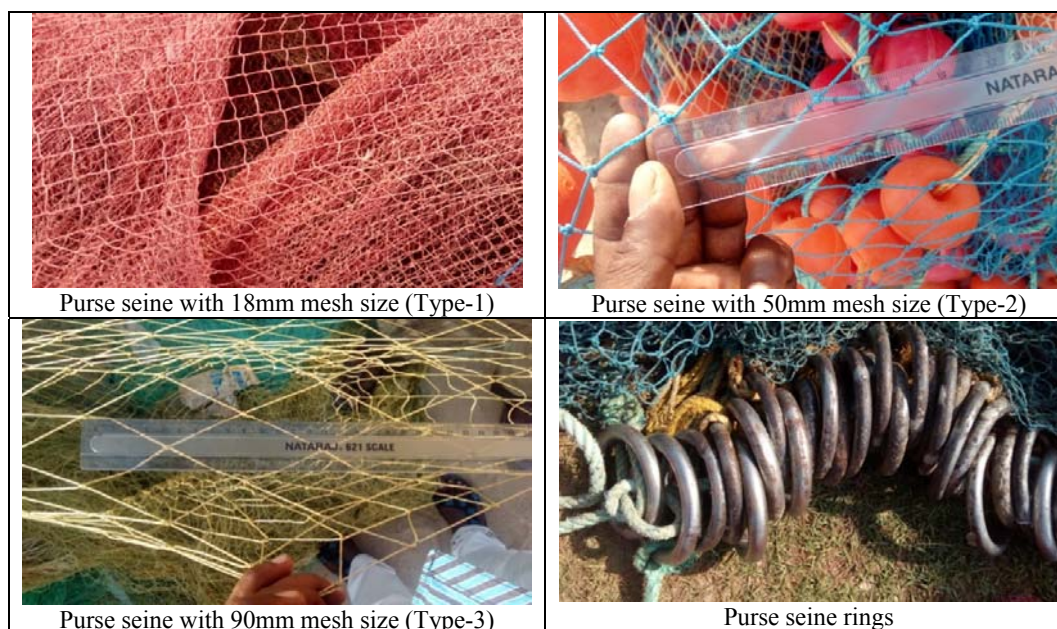


Fig 2: Specifications of purse seine

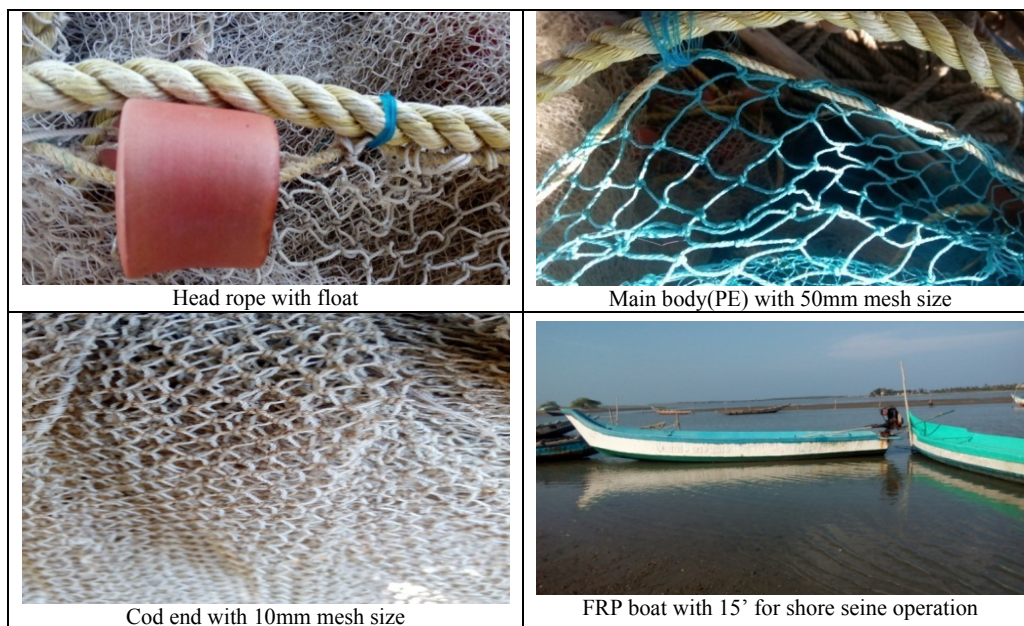


Fig 3: Specifications of shore seine

4. Discussion

Sadanandan *et al.* (1975) ^[13] presented the design details of purse seines off Goa which had 18 to 20 mm mesh size in all the sections. In this present study we found that, purse seines had 18mm to 90mm mesh size to captured different group of fishes in Pulicat coast. Similar observations were reported by Sadanandan *et al.* (1975) ^[13], who observed the method of operation of purse seines of Goa and Boopendranath and Hameed (2007) ^[3] described the single vessel purse seining operations conducted from Cochin. In this present study we observed that, to operate purse seine one large sized vessel with 51feet was used for carrying purse seines to the fishing ground and additionally five boats with 20 feet namely called *skiff* have used for encircles the school of fishes. The purse seine operation for sardine and mackerel on the Indian coast was first attempted by the FAO experts working on the Malabar (Kerala) coast and Mangalore (Karnataka) coast during the year 1970's to 1980's (Sadanandan *et al.*, 1975) ^[13]. In the present study, purse seine with different mesh size (18mm, 50mm, 90mm) used to catch sardines, mackerel, seer fish, carangids and tuna. By catch from beach seines can comprise up to 60% of the total catch, and often includes large numbers of juveniles of economically-important species (Broadhurst *et al.*, 2007) ^[4]. During this present study we found that. Puffer fish, Leiognathus, Therapon, Scatophagus species are mostly caught as a by catch from total catch of shore seine. Rosário (2011) ^[12] reported that the appropriate mesh size of netting in the bunt to catch sardine and trachurus was calculated to be 19.05 mm for purse seines in Mozambique The present study elicited that, Type-1 purse seine with 18mm mesh size used to catch oil sardines and lesser sardines in Pulicat coast. Shore seines, locally known as "Karamadi" or "Kamba valai", are operated using canoes, catamaran and by fiberglass boats (8.5 to 11.0 m LOA) at 5 to 7 m depth within 0.5 km to 3 km from the sea shore in Thiruvananthapuram district southwest coast of India (Saleela *et al.*, 2015) ^[9]. The present study found that shore seine locally called as "Karai valai" or Badi valai" are operated by FRP boat (15 feet LOA) and country craft (20 feet LOA) within 7km distance from the sea shore. Ririk *et al* (2014) ^[11] reported that Purse seine was the main gears to catch

kawakawa (*Euthynnus affinis*) in Sibolga, Western part of North Sumatera with different mesh size; they are bag (diameter 4 inch), body (diameter 3 inch) and wings (diameter 1 – 2 inch). The present study reveals that purse seine with mesh size of 50mm (type-2) and 90mm(type-3) used to catch tuna in Pulicat coast. This documentation would pave way to study the basic design and technical specifications of seine nets operation in Pulicat coast.

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