

A Profile of Mechanised Fishing Activities based at Cochin Fisheries Harbour, Kerala, India

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Cochin Fisheries Harbour situated at Thoppumpady (Kerala, India), was commissioned in September 1978 and function under the administrative control of Cochin Port Trust. A profile of mechanised fishing activities, based at Cochin Fisheries Harbour is presented in this paper, based on investigations conducted during 1997-98. During the period of investigations, 1543 mechanised fishing vessels were registered with the Port, of which 931 (60.3%) were in active operation. Three types of vessels were operating from this harbour. These included 72.4% trawlers, 22.6% gillnetter-cum-liners and 5.0% purse seiners. Trawlers operating from the harbour ranged from 9.1 to 16.0 m L_{OA} (89-122 hp), gillnetter-cum-liners 7.1-14.0 m L_{OA} (<60-99 hp) and purse seiners (12.1-19.0 m L_{OA} (106-235 hp). Mean catch per year of the trawlers and gillnetter-cum-liners were 52.8 t and 32.83 t, respectively. Mean catch per year varied from 277.6 to 340.5 t, in the case purse seiners, depending on the type and installed engine horse power of the seiners. Salient features of the fishing craft, fishing gear, and fish production of these three categories of fishing vessels are discussed.

Key words: Fishing craft, fishing gear, fish production, Cochin Fisheries Harbour

Cochin Fisheries Harbour is situated at Thoppumpady (Kerala, India), on the western side of Willingdon Island where the Cochin Port is situated. Construction of this major fisheries harbour was sanctioned by Government of India during the Fifth Plan, in March 1969, in pursuant of the decision to set up fisheries harbours attached to major ports of the nation. Cochin Port Trust submitted the plan to the Government of Kerala with an estimated initial outlay of Rs. 38×10^6 and the sanction was obtained in June 1971. Construction work began in March 1972 and the harbour was commissioned in September 1978. There has been no comprehensive study, so far, covering different aspects of fishing activities, based at this harbour. In this paper, an attempt is made to present a profile of the Cochin Fisheries Harbour and the mechanised fishing activities, based at this harbour.

Materials and Methods

Statistics on Cochin Fisheries Harbour and fishing crafts operating from the harbour were collected from Cochin Port Trust and Department of State Fisheries. Details were further verified by sample surveys, interviews and visits to the facilities. Data on fish production by mechanised fishing vessels landing at Cochin Fisheries Harbour, were collected according to a pre-fixed sampling schedule, during 1997-98. Sample sizes were (i) 1.2% (7 units) (99-106 hp; 13-14 m L_{OA}) with a sampling frequency of every landing day, for trawling (ii) 4.6% (5 units) (89 hp; 9-11 L_{OA} vessels) with a sampling frequency of every landing day, for mechanised gill netting; and (iii) 14.9% (7 units) with sampling frequency of every three days, for purse seiners. Data on fishing craft, fishing gear and fishing operations were collected by discussions with the

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operators as per a structured Schedule prepared for the purpose and also through onboard visits.

Results and Discussion

The Cochin Fisheries Harbour is the only designated Major Fisheries Harbour in Kerala state. The harbour was developed with full central assistance, and commissioned in September 1978. The average estimated value of the daily fish-landing at the harbour is between Rs. 5 to 7.5 million (Mani, 2004).

A layout of the Cochin Fisheries Harbour is given in Fig. 1 and facilities available at the harbour are given in Table 1. The harbour occupies an area of 26.7 acres of land with a coastline of 384 m. An area

of 7 acres are utilised for common service facilities, 16.9 acres for industrial plots and 2.8 acres for the slip way facilities. The harbour is well connected to the National Highway No. 47 to enable long distance transport services including commodities. The facilities within the harbour is planned to provide streamlined movement of the fishing vessels in the quay and movement of vehicles and men on the shore side for quick materials handling including commodities. Draught along the quay is about 5 m. The port is designed to handle about 900 vessels of up to 16 m L_{OA} (2 m draught) and about 59 vessels of 16-25 m L_{OA} (2-3.5 m draught).

Cochin fisheries harbour is under the direct administrative control of the Cochin Port Trust. Activities of the fisheries port is controlled through Traffic, Engineering and Administration Departments under the Chief Engineer, in charge of the fisheries harbour. Administration building is situated in the north-west corner of the harbour area. Landing quay is of 170 m length. Retail fuel outlets are provided at the northern and southern ends of the quay. Adjoining this is an additional berthing quay of 180 m length and 76 m berthing jetty. Piled platform and auction-cum-packing hall occupies 153 m x 18 m, in which an observation cabin and cash collection office are also housed. Auction of the landed fish, icing and packing are carried out in this hall which is provided with protective asbestos roofing. Iced fish are boxed in plastic containers prior to transportation. Among the facilities currently being refurbished are the raised platforms for landing and auctioning fish, the structural members of the auction/landing-centre halls, and the toilets. The display platforms for fish-landings are being finished with well-drained stainless-steel troughs to maintain hygienic operation (Mani, 2004).

Table 1. Details of facilities at Cochin fisheries harbour

<i>Land side facilities</i>		
1	Total area, ha	11
2	Auction hall, sq.m	2340
3	Ice pants, t.day ⁻¹	40
4	Slipways/drydock, No. of bays	9
5	Water storage, x10 ⁶ liters	0.4
6	Electric substation, KV	11
7	Fuel	available
<i>Water side facilities</i>		
1	Fish landing quay, length, m	259
2	Idle berthing quay	
	Length, m	176
	Depth, m	6
3	Outfitting quay length, m	125
4	Repair quay	
	Length, m	30
	Depth, m	3
<i>Ancillary facilities</i>		
1	Parking area, m ²	864
2	Loading area, m ²	900
3	Net mending area, m ²	756
4	Processing industry, ha	2.42
5	Land leased to ancillary industries, ha	0.2

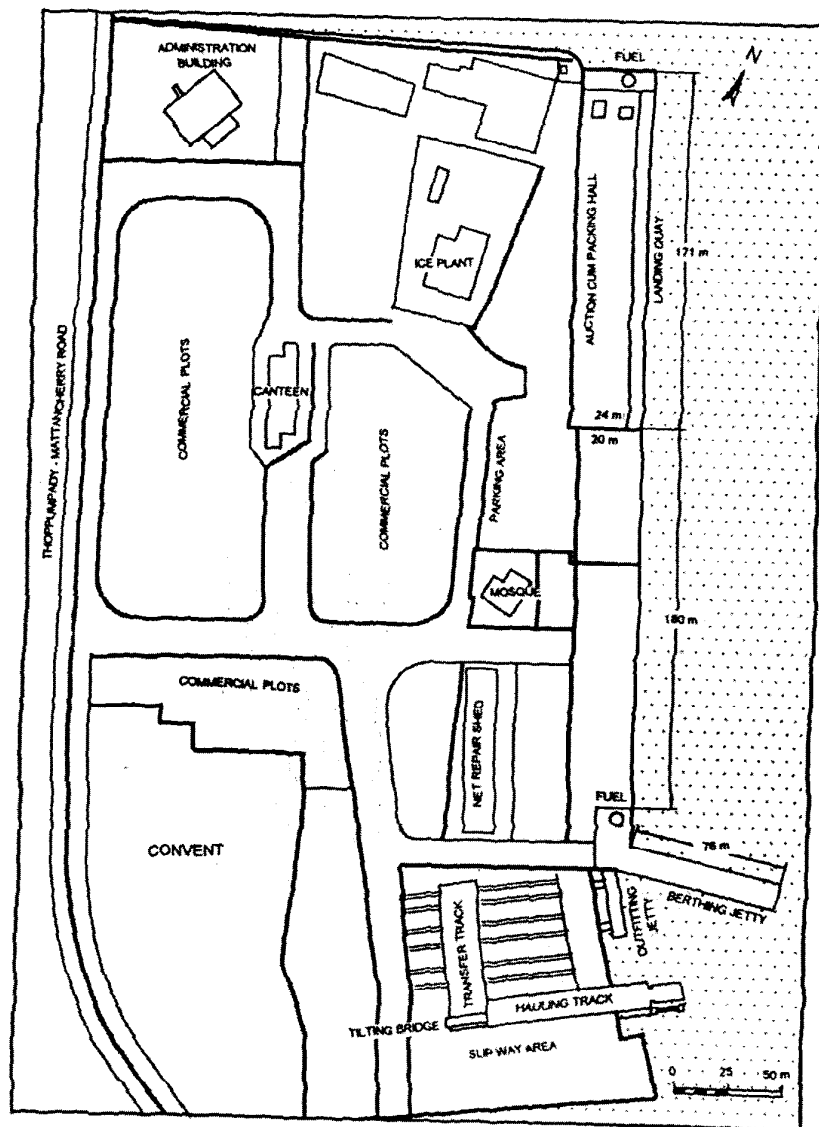


Fig. 1. Cochin Fisheries Harbour- layout of wharf and industrial area

Berth Utilisation Index (BUI) which is a measure of utilisation of port facilities is defined as the ratio of berth length required under ideal conditions to the berth length actually available. At Cochin, the BUI for landing is 2.88 and BUI for lay-by is 0.40. As a part of the second stage of expansion, a second auction hall and deep draught jetty for trawlers are proposed. This would change BUI to 2.27 for landing and unity for lay-by (Gopakumar, 1993; Joseph & Deviah, 1993).

The fisheries harbour is provided with parking area for transport vehicles, close to the auction cum packing hall; ice plant; canteen; and a number of plots for ancillary industries, facilities, stores and shops. A slip way with side slipping facility enabling simultaneous repair of a number of vessels, is provided in the southern part of the harbour area. This dry repair facility can handle fishing vessels up to 34 m length overall and 300 t displacement.



Fig. 2. Percentage composition of mechanised vessels operating from Cochin Fisheries Harbour

During the period of investigations, 1543 mechanised fishing vessels were registered with the Port, of which 931 (60.3%) were in active operation. Three types of vessels were operating from this harbour. These included 72.4% trawlers, 22.6% gillnetter-cum-liners and 5.0% purse seiners (Fig. 2). Unloading of these vessels generally take place between 06:00 and 08:00 h for gillnetters; from 13:00 h for trawlers and from 09:00 h for purse seiners.

In the initial phases of development of trawling, wooden crafts in the range of 8-9 m L_{OA} , equipped with 10-60 hp diesel engines, were used for trawling in Cochin and elsewhere along the coast of Kerala, mainly undertaking single-day operations. (Kristjonsson, 1967). The overall size and installed horse power of trawlers have increased subsequently, over the years. About 1120 trawlers were registered at the

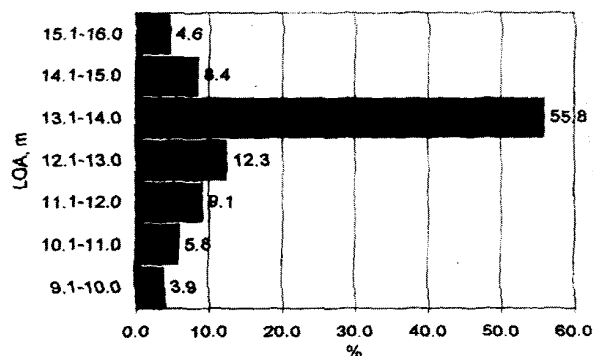


Fig. 3. Distribution of length classes of trawlers operating from Cochin

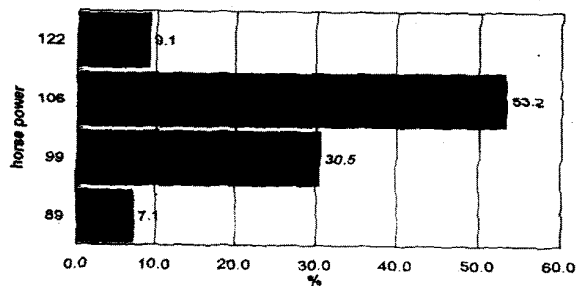


Fig. 4. Distribution of installed horse power of trawlers operating from Cochin

Cochin fisheries harbour, during the period of study. An estimated 674 trawlers land their catches at Cochin fisheries harbour.

Distribution of length classes of trawlers operating from Cochin is given in Fig. 3. Length class of 13.1-14.0 m L_{OA} predominated in the fleet (55.8%), followed by 12.1-13.0 m (12.3%), 11.1-12.0 m (9.1%), 14.1-15.0 m (8.4%), 10.1-11.0 m (5.8%), 15.1-16.0 m (4.6%) and 9.1-10.0 m (3.9%) vessel classes (Fig. 3). Distribution of installed engine power among the trawlers is given in Fig. 4. Largest number of vessels were equipped with 106 hp engines (53.2%), followed by 99 hp (30.5%), 122 hp (9.1%) and 89 hp engines (7.1%). Thus, over 80% of the trawlers belonged to the length class of 13.1-14.0 m L_{OA} and were fitted with 99-106 hp power plants. Non-availability of quality timber at reasonable price, difficulties in the maintenance of wooden crafts, and the availability of steel of the required grade, have increased the acceptance of steel as a construction material for trawlers. During the period of study, about 20% of the trawlers operating from Cochin had steel hulls and the rest were of wooden hull construction.

One-boat bottom otter trawling is conducted by small-scale trawlers of Cochin. Four types of trawl nets were widely used, during the period of observations. They typically included (i) 33.5 m demersal shrimp trawl with 20 mm mesh codend,

known as *chemmeen vala* in vernacular, primarily targeting shrimps, (ii) 41.2 m demersal fish trawl with 40 mm mesh codend, known as *meen vala* or *mixture vala*, in vernacular, primarily targeting finfish resource, (iii) 43.6 m squid-anchovy demersal trawl, known as *chooda vala* in vernacular, primarily targeting squid, and (iv) 41.6 m Demersal cuttlefish trawl, with 25 mm mesh codend, known as *kanava vala* in vernacular, primarily for cuttlefish resources. Two types of otter boards were commonly used, *viz.*, rectangular flat otter boards and rectangular V-type otter boards. About 60% of the trawlers operating from Cochin, use flat rectangular otter boards and about 35% of the trawlers, use V-shaped steel otter boards. The advantages of the V-shaped boards have been discussed by FAO (1974), Kunjipalu *et al.* (1984a), and Sahu & Sheshappa (1998). Generally, multi-day fishing operations are undertaken, due to its economic advantages, over single day fishing. The average trip duration varied from 2 to 4 days. Normal fishing depth is up to about 110 m.

Mean catch per year of trawlers was 52.8 t and major catch components were threadfin breams 22.9%, perches 17.7%, carangids 9.9%, lizard fish 2.8%, sciaenids 1.7%, crustaceans 8.8%, cephalopods 12.2% and miscellaneous fish 24.0%. Fishing operations were suspended during a period of 45 days from 15th June to the end of July, during the period of study, due to the monsoon trawl ban imposed by the State Government.

Mechanised drift gillnetting was introduced off Cochin in 1969. About 90 small mechanised fishing boats, operating drift gill nets were in operation in 1977 and their number gradually rose to 130 with the commissioning of Cochin Fisheries Harbour in 1977 (Silas, 1984). About 210 mechanised gillnetter-cum-liners were operating from Cochin and landing their catches at the

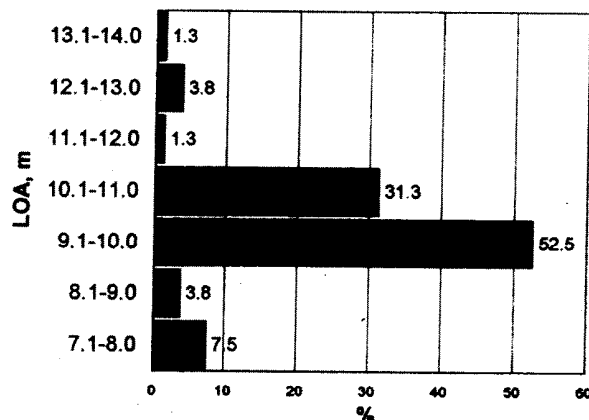


Fig. 5. Distribution of length classes of gillnetter-cum-liners operating from Cochin

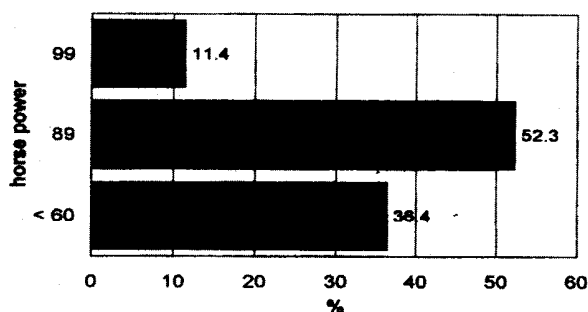


Fig. 6. Distribution of installed horse power of gillnetter-cum-liners operating from Cochin

Cochin Fisheries Harbour, during the period of observations.

In the initial stages of introduction of mechanised gillnetting off Cochin, fishing crafts of 6.71 to 9.14 m L_{OA} fitted with 24 to 45 hp inboard diesel engines were used (Silas, 1984). These vessels were equipped to undertake daily fishing and their area of operation was confined to coastal waters generally in the 20-50 m depth zone. With the increasing fishing pressure in the coastal waters and diminishing returns, the area of operation was further extended to deeper waters and bigger vessels equipped for multi-day fishing were introduced. Now-a-days the vessels cruise to distant fishing grounds such as Pedro bank and surround-

ing areas and in depths beyond continental shelf. They were equipped with adequate fish hold capacity and carry ice for fish preservation.

Gillnetter-cum-liners operated from Cochin were all wooden hulled. The mechanised gillnetter-cum-liners are owned by local persons and the fishermen from Kanyakumari, Tamilnadu. Distribution of length classes of gillnetter-cum-liners operating from Cochin is given Fig. 5. The predominant length class was 9.1-10.0 m (52.5%), followed by 10.1-11.0 m (31.3%). Distribution of installed horse power among gillnetter-cum-liners operating from Cochin is given in Fig. 6. Fishing crafts with 89 hp was maximum (52.3%), followed by <60 hp crafts (36.4%) and 99 hp crafts (11.4%).

In the initial stages of development of mechanised gill net fishing, the size of the gill nets operated varied from 800 to 1000 m with a hung depth of 4-8 m (Silas, 1984) The nets were constructed of nylon netting with a stretched mesh size of 90 to 180 mm. Gill nets used in mechanised fishing boats operated from Cochin was made of polyamide knotted netting. The netting is, sometimes, indigenously treated with tannin extracted from vegetable sources. The hung depth of the net is usually 11 m and total length of the net ranges from 1620 to 1890 m.

In addition to gill nets, two types of lines are operated from gill netters, depending on season, availability of target resources and market demand, in order to further improve the economics of operations. Long lines, known as *aricha mattu* in vernacular, are operated for large pelagic sharks. Total length of the main line of long line varies from 13,500 m to 16,200 m. Multiple hook hand lines are operated from gillnetter-cum-liners for small carangids using light attraction (*mayakka* in vernacular), and for perches

in rocky terrain (*paru choonda* in vernacular). Gill net fishing season generally extends from the end of May to the end of October. Lines are generally operated from November to April. Intensity of hand line operations are higher during November-February, while drift long lining for sharks intensify during February-March.

Mean number of fishing days per boat per year during the period of study was 252 days. 113 days were lost due to vessel maintenance, repairs and holidays. Roughly 50 percent of the available fishing days are used for gillnetting operations which take place from the end of May to the end of October, and the other 50 percent for various lining operations.

Mean annual catch per gillnetter-cum-liner worked out to be 32.83 t. Tunas and bill fishes along with pelagic sharks formed 57% of the total landings. Perches belonging to the genus *Epinephelus*, *Lutjanus*, *Lethrinus*, *Pristipomoides* formed 22.8% of the landings. Spanish mackerel (*Scomberomorus* spp.) and carangids contributed 9.5% and 5.7%, respectively and the balance was made up of miscellaneous fishes.

Purse seining was started from Cochin by entrepreneurs only during the latter half of 1979 (Mukundan & Hakkim, 1980). About 78 purse seiners are registered at Cochin

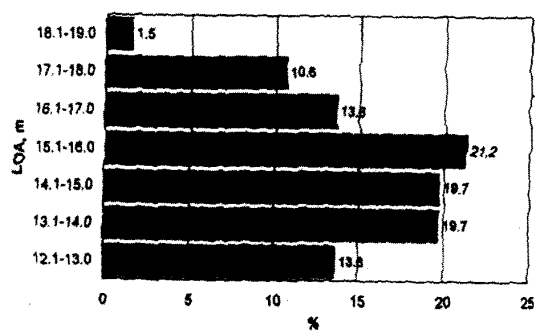


Fig. 7. Distribution of length classes of purse seiners operating from Cochin

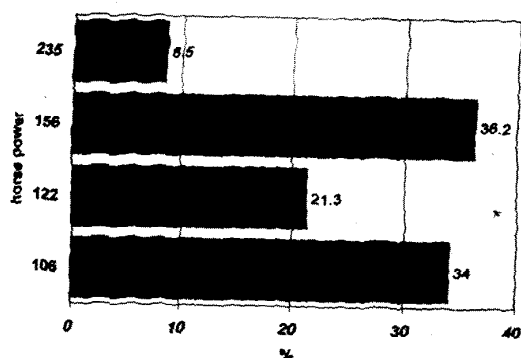


Fig. 8. Distribution of installed horse power of purse seiners operating from Cochin

Fisheries Harbour, of which 47 vessels forming 5.0% of the entire mechanised fleet operating from the harbour, were in active operation during the period of study.

Purse seiners, operating from Cochin Fisheries Harbour are either wooden or steel hulled. Wooden vessels constitute 78.3% of the purse seine fleet and the balance 21.7% constitute steel vessels. The vessels generally have low free board to facilitate the hauling of the gear. The wheel house is placed forward. The winch is fitted with parallel drums and situated opposite to the pursuing gallows. The net is carried in the stern of the vessel. Observation crow's nest is provided at an elevated platform in the fore deck of the vessel, to assist in the spotting of fish schools. The skiff which is towed behind the purse seiner is unpowered and its size varies from 3 to 3.7 m.

Distribution of length classes of purse seiners operated from Cochin is given in Fig. 7. Purse seiners of length class 15.1-16.0 m L_{OA} constituted 21.2%, followed by 14.1-15.0 m (19.7%), 13.1-14.0 m (19.7%) 16.1-17.0 m (13.6%), 12.1-13.0 m (13.6%), 17.1-18.0 m (10.6%) and 18.1-19.0 m (1.5%) length classes. Distribution of installed horse power among purse seiners operated from Cochin is given in Fig. 8. Maximum number of purse seiners

were powered by 156 hp engines (36.2%), followed by 106 hp engines (34.0%), 122 hp engines (21.3%) and 235 hp engines (8.5%). Thus, most abundant length class of purse seiners were 13.1-17.0 m L_{OA} and about 45% of the vessels were having installed power of 156-235 hp.

The length of the purse seine net varied from 768 to 823 m and its hung depth varied from 65 to 73 m depending on the size of the vessel. Purse seines operated from smaller vessels, at the time of introduction of the technique ranged from 340 to 410 m in length (Mukundan and Hakkim, 1980). Single vessel purse seining operations are conducted from Cochin. Fishing operations consist of (i) active search, chase and interception of the shoal, (ii) encircling and pursuing operations, (iii) concentrating the catch in the bunt by progressively hauling in the net, and (iv) brailing out the catch, before concluding the operation.

Mean number of fishing days were 124 days for 235 hp wooden purse seiners and 181 days for 156 hp steel and wooden seiners. No fishing was conducted during the months of June, July and August as it is closed season for purse seining in the State, on account of fishery regulations. Both day time and night-time operations are conducted. Cruising to the fishing ground, typically takes about 3 h, searching 1-1.5 h, encircling 3-4 min, pursuing about 20 min, hauling of net prior to brailing 1.5 to 2 h, brailing 1 h, return cruise to port another 3 h.

Mean catch per year varied from 277.6 to 340.5 t, depending on the type of vessel and the installed horsepower. The catch was constituted by sardines 54.30%, mackerel 44.5%, tunnies 0.23%, pomfrets 0.08% and miscellaneous fish 0.89%.

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