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भारतीय कृषि अनुसंधान परिषद
INDIAN COUNCIL OF AGRICULTURAL RESEARCH

840 MAJOR AND MINOR FISHERIES HARBOURS OF INDIA

6. THE FISHERIES HARBOUR AND FISHERY AT TUTICORIN

The Tuticorin Fisheries Harbour is one of the old and important fishery ports of India located on the southern Tamil Nadu coast and on the western side of the Gulf of Mannar. Now owing to its commercial and economic importance from the marine fisheries point of view it is considered as one of the major fisheries harbours on the east coast of India. The harbour was constructed at a cost of Rs. 2.1 crore in 1968 in a total area of 17 acres, out of which the berthing area is 2.7 acres. This harbour has a berthing facility to accommodate 450 medium sized mechanised wooden trawlers. The total length of the jetty is 800 m and the depth in the area of berthing is 3m.

Infrastructure and other facilities

The harbour is provided with a fuel station maintained by the Tamil Nadu Fisheries Corporation which cater to the fuel needs of the trawling units based at this fisheries harbour. There is a mechanical workshop run by the above corporation which attends to the maintenance and repair work of the vessels. There is a slip-way with electrically operated winch system maintained by the mechanical workshop for dry-docking the trawlers and to attend to the repair works. The boat building yard belonging to the Tamil Nadu Fisheries Corporation undertakes construction of new trawlers, the repair and maintenance of the super structure and hulls of wooden trawlers. There are many private mechanical workshops, boat building yards, battery shops and other establishments which deal with spares. Different accessories such as the gear materials are also available to the trawl fishing industry. There are ware-houses available on rentals from the Tamil Nadu Fisheries Corporation for storing the dry fishes meant for marketing in internal as well as outside markets. Above all these, there is an off-shore laboratory of the Fisheries College which is ready to offer consultancy on the need of the hour.

Processing industries

Within the campus of the Fisheries Harbour one ice plant is functioning under the care of the Tamil Nadu Fisheries Corporation which is leased to private parties.

Thirteen processing units belonging to private parties function in and around Tuticorin. Half of these units have their own cold storages of varying tonnage capacities for the storage of marine products meant for export markets. They mainly deal with prawns, lobsters, crabs, cuttlefish, squids, snappers and rock-cods. Apart from these units there are about a dozen fish merchants who deal with marketing fresh fish to the neighbouring states. There are many merchants who deal with different varieties of dryfish such

R. Marichamy, D.B. James, H.M. Kasim, M. Rajamani, V.S. Rengaswamy, K.M.S. Ameer Hamsa, T.S. Balasubramanian, M. Manickaraja, S. Rajapackiam and G. Arumugam, Tuticorin Research Centre of CMFRI, Tuticorin - 628 001, India.

as the *Stolephorus*, silverbellies, rays, shark fins, air bladders, sardines, seerfish and carangids. These dry fish are marketed through the major dryfish markets available at Kovilpatty and Madras. Anchovies and rays are marketed in Kerala and Sri Lanka.

Production details

The chief fisheries are the pelagic sardines, seerfish, tuna, mackerel, sharks, carangids, barracudas, wolf herring, full and half beaks, the demersal perches such as the sweetlips, groupers, rock-cods, snappers, goatfishes, croakers, rays, skates, coral fishes, threadfin breams, breams, silverbellies and lizard fishes, the shellfishes like chanks, squids, cuttlefishes, prawns, crabs and lobsters. Most of these resources are being commercially exploited by mechanised trawlers.

The medium sized mechanised trawlers are the only fishing craft being employed from this fisheries harbour as the other types of vessels are operated from the neighbouring traditional beach landing centres.

Initially (1911-'15) before the introduction of mechanised trawlers the fish production was to the tune of a mere 296.3 t/y. The catch increased to 1,213.6 t/y in 1965-'66. Later the mechanised trawling, new synthetic gear material, good berthing facility, ice for preservation and easy availability of fuel during early 1970's brought about a significant increase in the quality and quantity of landings and on an average 240 t of prawns, 1,650 t of fish were landed by mechanised trawlers.

Current assessment of fishery resources shows that on an average 22,453 t are being landed by the trawlers and the deepsea trawlers land about 1,720 t/y. The trawlers are operated not only for prawns but also for fish with fish trawlnets and the area of operation extends from 50 to 100 m and occasionally upto 300 m.

The production details in respect of the major resources are given in Tables 1 to 8. The production of prawn during the ten year period (1986-'96) ranged from 103.4 to 775.2 t per annum with an annual average of 353.0 t. The green tiger prawn *Penaeus semisulcatus* was the dominant species with an annual composition ranging from 18.5 % in 1994-'95 to 80.7 % in 1992-'93 with an annual average percentage of 48.5. The estimated landing of this species ranged from 49.5 t in 1986-'87 to 298.6 t in 1993-'94 with an annual average of 171.1 t, the CPUE ranging from 4.7 to 9.9 kg (Table 1).

TABLE 1. *Year-wise landing of prawns at Tuticorin Fisheries Harbour during 1986-'96*

Year	Effort (No. of units)	Total prawn landing (t)	Landing of catch (t)	*P. semisulcatus*	
				C/E	%
1986-'87	10,640	103.8	49.5	4.7	47.7
1987-'88	29,382	348.5	179.9	6.1	51.6
1988-'89	18,366	288.6	139.6	7.6	48.4
1989-'90	24,317	284.5	192.4	7.9	67.6
1990-'91	17,998	226.3	171.3	9.5	75.7
1991-'92	22,911	641.1	198.4	8.7	30.9
1992-'93	29,466	304.3	245.7	8.3	80.7
1993-'94	30,129	393.8	298.6	9.9	75.8
1994-'95	27,199	775.2	143.1	5.3	18.5
1995-'96	11,335	164.3	92.4	8.2	56.2
Average	22,174	352.94	171.09	7.7	55.31

with an average of 7.7 kg/unit. The estimated annual landing of lobsters ranged from 36.8 to 50.9 t. The landing was constituted by three species namely, *Panulirus ornatus*, *P. homarus* and *P. versicolor* and one species of sand lobster, namely, *Thenus orientalis*. Among the spiny lobsters *P. ornatus* was the dominant species constituting 64.1 to 75.8. % *P. versicolor* and *T. orientalis* constituted only negligible proportions (Table 2).

TABLE 2. *Landing of lobsters at Tuticorin Fisheries Harbour during 1993-'95*

Lobsters	1993-'94 (t)	1994-'95 (t)	Average (t)
P. ornatus	27.9	32.6	30.2
%	75.8	64.1	(69.0)
P. homarus	8.5	18.2	13.4
%	22.6	35.8	(31.0)
P. versicolor	–	0.01	negligible
%	–	–	–
Thenus orientalis	0.6	0.06	negligible
%	1.6	0.1	–
Total Catch	37.0	50.9	43.6

The estimated landing of *Stolephorus* spp. ranged from 55.8 to 575.5 t constituting on an average 4.2 % of the total fish catches landed at

Tuticorin Fisheries Harbour. The CPUE in respect of *Stolephorus* spp. ranged from 3.5 to 21.5 kg (Table 3 and 4).

TABLE 3. *Year-wise landing of* Stolephorus *at Tuticorin Fisheries Harbour caught with trawlnet*

Year	Effort	Total fish catch (t)	Resource group (t)	Percentage	CPUE (kg)
1986-'87	15,795	4,066.7	55.8	1.4	3.5
1987-'88	14,362	5,232.5	166.2	3.2	11.6
1988-'89	19,814	5,959.5	677.6	6.3	19.0
1989-'90	29,096	4,055.5	550.6	13.6	18.9
1990-'91	26,732	1,187.5	575.5	4.8	21.5
1991-'92	24,280	15,352.5	214.4	1.4	8.8
Total	13,0079	35,854.2	2,240.1	30.7	83.3
Average	21,680	5975.7	373.35	5.12	13.88

TABLE 4. *Catch (in tonnes) and relative abundance (in percentage in brackets) of* Stolephorus *spp. caught in trawlnet at Tuticorin Fisheries Harbour*

Year	*S.indicus*	*S.bataviensis*	*S. devisi*	Total
1986-'87	29.0 (52.0)	26.8 (48.0)	- -	55.8 (2.8)
1987-'88	68.0 (40.9)	98.1 (59.0)	0.2 (0.1)	166.2 (8.6)
1988-'89	62.0 (16.4)	179.8 (47.6)	135.9 (36.0)	377.6 (19.5)
1989-'90	120.3 (20.9)	455.2 (79.1)	- -	550.6(28.4)
1990-'91	312.0 (56.7)	238.3 (43.3)	- -	575.5 (29.7)
1991-'92	140.4 (65.5)	71.3 (33.3)	2.6 (1.2)	214.4 (11.0)
Average	122.0 (42.07)	178.2 (51.7)	23.1 (6.2)	323.3 (16.7)

The landing of elasmobranchs showed an increasing trend every year. More than 5 species of sharks and 6 species of rays are landed by the trawlers. Skates are also obtained in small quantities. The estimated landing of elasmobranchs ranged from 304.2 to 1,252.6 t. (Table 5) while

TABLE 5. *Catch (in tonnes) species composition of sharks, rays and skates in the trawlnet at Tuticorin Fisheries Harbour*

Species	Year						Average
	1989-'90	1990-'91	1991-'92	1992-'93	1993-'94	1994-'95	
Sharks							
Carcharhinus sorrah	7.8	22.1	15.3	22.8	31.5	28.6	21.4
Rhizoprionodon actus	11.4	27.2	18.6	28.6	16.1	84.1	32.7
Scoliodon laticaudus	4.1	4.2	3.7	7.5	15.4	27.2	10.3
Sphyraena spp.	2.3	3.1	4.6	11.9	9.5	12.7	7.4
Loxodon macrorhinus	2.4	-	-	1.1	2.6	5.6	2.0
Other sharks	8.8	6.0	0.9	2.5	17.7	26.7	10.5
Total Catch	36.8	62.6	43.1	74.4	92.8	184.9	84.3
Rays							
Himantura bleekeri	88.4	74.1	72.4	71.0	117.0	290.3	118.9
H. uarnak	31.3	35.2	58.4	60.5	110.5	317.6	102.3
H. imbricata	8.7	3.3	3.8	2.2	3.9	18.1	6.7
Hypolophus sephan	24.4	28.3	27.3	48.7	12.5	25.7	27.8
Aetobatus narinari	25.2	20.0	30.2	3.1	12.7	111.3	33.8
A. flagellum	16.2	22.7	38.2	6.3	22.0	49.0	25.7
Dasyatis kuhlli	26.3	14.1	22.7	29.5	54.0	68.6	35.9
Rhinoptera javanica	11.7	7.1	5.5	-	21.1	11.9	9.5
Gymnura poecilura	7.3	1.8	6.0	-	16.4	21.5	8.9
Other rays	18.1	2.6	31.7	45.7	55.4	74.3	38.0
Total Catch	257.7	209.4	296.2	267.1	425.5	988.3	407.5
Skates							
Rhynchobatus djiddensis	6.1	21.4	15.7	8.3	15.2	31.1	16.3
Rhina ancylostoma	3.0	15.2	4.7	10.5	6.3	46.2	14.3
Other skates	0.4	1.9	0.6	7.0	1.6	3.1	2.4
Total catch	9.5	38.5	21.0	25.8	23.1	80.4	33.0
Total elasmobranch catch	304.0	310.5	360.3	367.2	541.1	1253.6	524.8
Total fish catch	8,643.3	11,871.5	15,434.2	14,831.9	17,278.6	22,453.0	15,085.4
Total units	31,764	26,732	24,280	31,069	32,107	33,278	29,872

the average catch exclusively from the deep sea areas recorded 108.5t (Table 5a) during 1993-'95.

TABLE 5a *Catch (in tonnes) and species composition of elasmobranchs caught in trawlnet from deep sea areas*

Species	Year		Average
	1993 - '94	1994 - '95	
Echinorhinus brucus	126.7	70.1	98.4
Centrophorus molucaensis	13.8	17.6	7.8
Other sharks	4.7	–	2.3
Total elasmobranchs	145.2	87.7	108.5
Total units	4.254	1.668	2,961
Total fish catch	1,719.5	1,280.5	15,000.0

The landings and species composition of major groups of fishes in different years are given in Tables 6-8. The best fishing ground for threadfin breams has been observed to be the ground off Manapad. However, as the trawlers carry out the fishing operation mainly to exploit the prawn resources particularly during June-October this group remains under-exploited by mechanised trawlers. Sciaenids formed one of the important resources exploited by mechanised trawlers.

Marketing infrastructure

The catches landed by the mechanised trawlers at Tuticorin Fisheries Harbour are auctioned soon after the landings. A spacious auction shed is available for this purpose. The merchants purchase the fish/prawns and immediately transport them to different areas by mini vans and trucks. As an ice plant is in operation in the fisheries harbour itself the merchants get the required quantities of the ice to preserve the catches. Merchants from the neighbouring state, Kerala also come and purchase fish and prawns and transport them to Kerala. Small quantities of the trawler catch are also purchased by a few merchants for selling in the local market.

The maximum price fetched per kg by various groups are : Rs. 450/- for prawns; Rs. 1,250/- for lobsters; Rs. 65/- for lethrinids; Rs.55/- for lutianids; Rs. 60/- for serranids; Rs. 52/- for elasmobranchs; Rs. 30/- for silverbellies; Rs. 18/- for threadfin breams; Rs. 30/- for both sciaenids and goat fishes, Rs. 25/- for carangids, Rs. 20-30/- for barracudas, Rs. 40-100/- for seer fish and Rs. 20-30/- for mackerels. The shark fins are exported to Japan and other places. In addition to these oil is also being extracted locally from the liver of sharks and rays.

Potential yield

The total annual stock of silverbellies is 7,634 t with an average catch of 5,191 t from the Gulf of Mannar. The present fishing pressure has not reached a level that gives maximum sustainable yield and hence there is scope to step up the yield by incrasing the effort. It has been observed that the present mesh size of trawl cod end is the optimum and does not lead to overfishing of the resource.

Using the data on catch per unit and other parameters in the prawn fishery for the past several years the estimation of the MSY indicates that increasing effort beyond the optimum level is not likely to increase the yield further.

The perch fishery resource indicates that *Scolopsis bimaculatus* and *Lethrinus nebulosus* are underexploited as in the case of the barracuda *Sphyraena obtusata* and the carangid *Selaroides leptolepis* indicating a possibility for an increase in the effort for the exploitation and enhanced production of these resources. Similar studies on other important resources are warranted areas.

Management for sustained development

Except the prawn and seerfish resources all other resources so far studied indicate that there is scope for the increase in the production by increasing the effort of the trawlnet. However, the economics involved in increasing the effort further and the quantum of the yield realised in relation to the return obtained by the fishermen with due consideration to the overall expenditure towards the increased effort input have to be studied in detail to arrive at concrete suggestions for better management of the exloited fishery resources of Tuticorin.

TABLE 6. *Catch and species composition of bony fishes (in tonnes) caught in trawlnet at Tuticorin Fisheries Harbour*

Species	Year						Average
	1989-'90	1990-'91	1991-'92	1992-'93	1993-'94	1994-'95	
Letirinids							
Lethrinus nebulosus	668.4	923.6	818.4	151.4	687.7	875.5	915.5
L. miniatus	107.1	79.6	52.7	53.8	63.3	85.8	73.7
L. ornatus	–	–	–	1.4	3.5	3.6	1.4
Lethrinus spp.	–	–	–	2.1	5.3	5.4	2.1
Total	775.5	1,003.2	871.1	208.7	759.8	970.3	992.8
Lutjanids							
Lutjanus rivulatus	56.3	82.7	128.6	160.0	96.9	118.3	107.1
L. fulviflamma	18.6	35.1	34.3	108.6	42.5	110.2	58.2
L. vaigiensis	67.4	7.1	3.6	6.1	11.4	31.1	11.1
L. malabaricus	22.5	22.8	26.7	4.2	10.7	48.0	11.1
Lutjanus spp.	13.8	12.8	5.4	–	4.0	24.6	22.5
Total	118.5	160.6	195.6	278.9	165.5	332.2	210.0
Epinephelids							
Epinephelus tauvina	33.7	28.7	38.4	121.9	99.3	187.3	84.9
E. undulosus	44.3	32.2	56.9	151.4	142.9	221.6	108.2
E. malabaricus	26.6	28.4	68.7	29.7	21.5	60.0	39.2
Epinephelus spp.	44.5	68.2	130.2	44.1	40.7	54.6	63.7
Total	149.1	157.5	294.2	347.1	304.4	523.5	296.0
Other perches							
Scolopsis bimaculatus	256.8	456.4	438.8	335.6	282.8	589.6	393.3
Diagramma spp.	117.7	103.3	176.7	85.8	60.5	120.2	110.7
Siganus spp.	38.7	49.4	19.4	15.6	14.0	11.4	24.7
Grand total for perches	1,456.3	1,930.4	1,995.8	1,271.7	1,587.0	2,547.2	2,027.5
Goat fishes							
Parupeneus indicus	210.7	217.6	362.9	257.8	233.7	242.7	254.2
P. cinnabarinus	4.1	15.3	7.2	12.3	16.0	14.8	11.6
Upeneus sulphureus	85.7	130.7	220.0	125.0	67.2	101.1	121.6
U. vittatus	120.3	104.7	215.2	116.8	67.4	91.8	119.4
U. sundaicus	86.1	80.1	185.3	128.6	139.4	104.7	120.8
Upeneus spp.	5.1	16.8	25.5	10.0	26.6	36.0	20.0
Total	512.0	565.8	1,016.1	650.5	550.3	591.1	647.6
Silverbellies							
Leiognathus dussumieri	397.8	412.5	497.8	524.6	624.6	874.1	555.2
L. berbis	215.7	159.5	475.5	229.2	202.4	293.4	262.6
L. bindus	17.9	90.0	145.3	404.4	189.1	258.5	184.2
L. daura	–	126.1	116.6	111.0	119..0	112.7	97.6
L. brevirostris	112.9	65.3	45.8	31.6	25.2	27.3	51.4
L. splendens	22.2	19.9	48.7	49.3	45.6	55.7	40.3
L. equulus	19.5	17.5	42.6	43.1	39.8	48.7	35.2
Gazza minuta	316.7	332.1	404.0	425.6	681.7	724.2	480.7
Secutor insidiator	110.1	246.4	356.1	465.8	327.6	374.9	313.6
S. ruconius	53.8	143.6	225.8	250.9	131.4	120.9	154.4
Leiognathus spp.	13.9	12.5	30.4	30.8	28.5	34.8	25.2
Total	1,280.5	1,625.4	2,388.6	2,566.3	2,414.9	2,925.2	2,200.4

Species	Year 1989-'90	1990-'91	1991-'92	1992-'93	1993-'94	1994-'95	Average
Threadfin breams							
Nemipterus delagoae	482.4	942.5	573.6	1,046.3	1,210.8	2,137.9	1,065.6
N. japonicus	31.4	16.5	61.5	87.6	38.1	82.7	53.0
Nemipterus spp.	–	–	–	10.2	4.0	6.6	3.5
Total	513.8	959.0	635.1	1,144.1	1,252.9	2,227.2	1,122.1
Sciaenids							
Otolithes ruber	127.8	69.1	98.8	67.3	245.3	320.2	154.8
Johnius maculatus	117.4	181.2	164.4	63.3	220.7	48.5	132.6
J. dussumieri	27.4	37.8	19.5	10.9	11.3	43.8	25.1
Johnius spp.	–	18.8	4.4	1.8	3.2	16.6	7.5
Johnieops aneus	–	–	17.6	4.8	8.5	8.0	6.5
Protonibea diacanthus	6.6	17.0	12.8	7.7	11.6	43.0	16.5
Total	279.2	323.9	317.5	155.8	500.6	480.1	343.0

TABLE 7. *Effort in boat days and landings of mackerel, seerfish, barracuda and carangids by trawlnet at Tuticorin Fisheries Harbour during 1990-'96*

Year	Effort	Mackerel	Seerfish	Barracuda	Carangids	Overall fish catch
1990-'91	26,732	147.8	176.5	442.3	1,006.5	11,725.8
1991-'92	24,382	192.3	67.2	764.1	1,997.1	15,355.0
1992-'93	31,069	122.9	189.6	681.4	1,475.3	14,831.9
1993-94	32,107	150.4	283.6	632.2	2,254.2	17,278.5
1994-95	33,278	124.6	296.2	1,721.3	1,957.9	22,453.0
1995-'96	31,231	237.7	457.8	1,740.6	2,892.8	24,443.8
Average	29,799.8	162.6	245.1	996.9	1,930.6	17,681.3

TABLE 8 *Species composition and estimated landings of all fishes landed at Tuticorin Fisheries Harbour (1994-'95) (in tonnes)*

Species	Catch (tonnes)
Lethrinids	971.2
Lutjanids	332.2
Serranids	527.1
Silverbellies	2,925.2
Nemipterus spp.	2,227.2
Shark	186.0
Rays	988.2
Skates	80.4
Upeneoides	623.4
Sciaenids	590.1
Scolopsis bimaculatus	589.6
Siganus spp.	11.3
Sphyraena spp.	1,721.3
Stolephorus spp.	568.3
Saurida spp.	809.8
Sillago spp.	186.0
Cat fish	113.0
Chirocentrus	103.5
Scomberoides	15.8
Hilsa spp.	383.1
Thrysa spp.	642.6
Red baits	308.8
Eels	36.8
Mackerls	124.3
Squid	1,687.6
Cuttle fish	595.3
Polynemids	109.1
Pomfrets	17.7
Gerres	53.7
Caranx caranx	422.8
Selaroides leptolepis	588.5
Decapterus spp.	124.1
Megalaspis cordyla	121.8
Other carangids	700.7
Soleidae	12.4
Cynoglossus spp.	8.7
Psettodes erumei	16.2
Other fishes	3,154.0
Total	22,677.8