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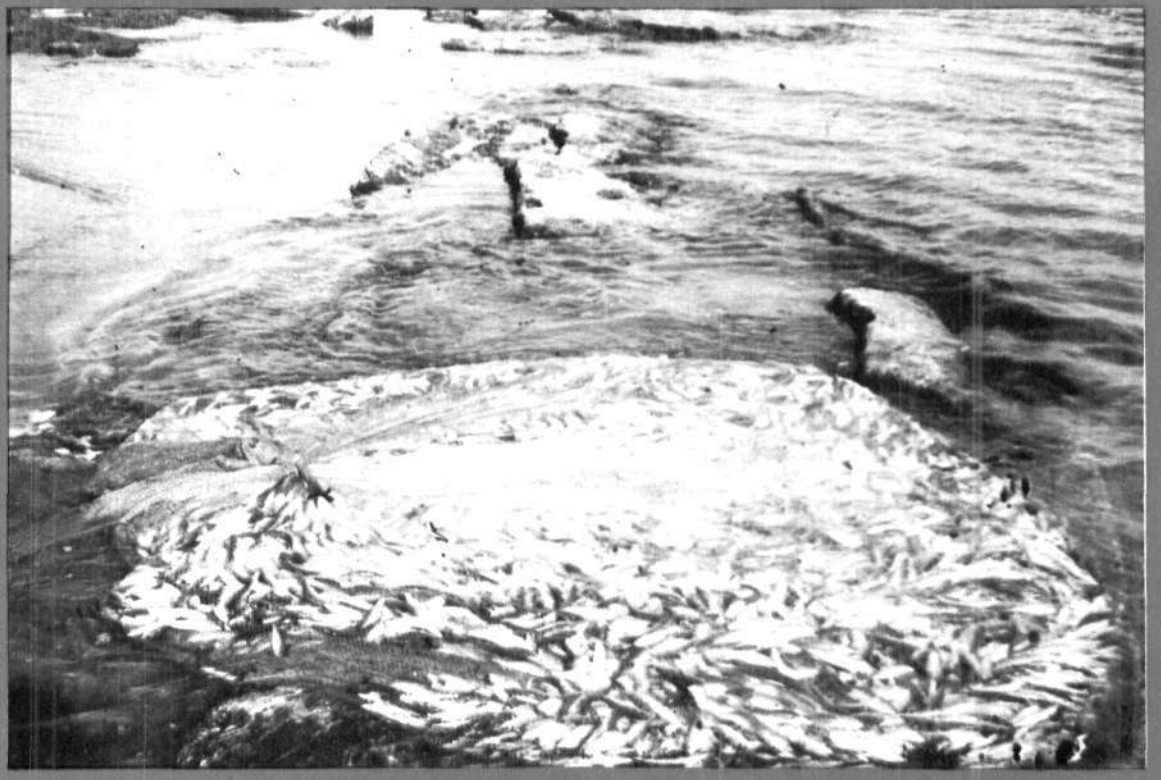

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PRESENT STATUS OF MARINE FISHERIES OF TAMIL NADU AND PONDICHERRY

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Introduction

Tamil Nadu , with a very long coast line of 1,000 km along the southeast coast of India, Cape in the south and a short distance on the southwest coast of India has age old tradition of fishing and is making considerable progress in marine fish production and supports important fisheries. Fringed with a continental shelf of about 35, 000 sq. km and an estimated offshore region of 22 lakh hectares, the coastal stretch affords excellent scope for fishing operations throughout the year. The fishery resources in the coastal waters have been traditionally exploited with a variety of artisanal gears and recently large strides in the progressive expansion of the fleet of mechanised vessels mostly trawlers have been made by Tamil Nadu in marine fisheries sector exploiting the rich ground fish resources along the coast.

The exploited fisheries of Tamil Nadu and Pondicherry during the recent five year period 1985-'89 have been studied. On that basis, the contribution of the mechanised and artisanal fisheries sectors, share of pelagic and demersal groups in the fish production, the trend of districtwise fish landings, the resources of non-conventional fisheries, the present status of marine products exports and the recent scenario of mechanisation of country craft have been dealt with in this report.

FISH PRODUCTION IN TAMIL NADU

Marine fish landings by the artisanal fisheries sector take place at 352 landing centres along the coast while at the nine fisheries harbours, mechanised vessels, especially commercial trawlers land their catches. The annual average estimated marine fish production of Tamil Nadu during the period 1980-'89 was 2.6 lakh tonnes contributing to 16% of the total all India fish cateh. The catch data indicate that in the period 1985-'89 there is an increase of 10% in all fish catch compared to the preceding five year period, 1980-'84 (Table 1).

TABLE 1. *Marine fish landings in Tamil Nadu during the period 1980-'89 compared to all India catch (in tonnes)*

year	All India	Tamil Nadu	Percentages
1980	1,249,837	217,394	17.4
1981	1,378,457	221,296	16.0
1982	1,420,624	245,961	17.3
1983	1,548,475	280,739	18.1
1984	1.630,678	252,120	15.5
1985	1,534,726	220,551	14.4
1986	1,693,377	242,041	14.3
1987	1,662,550	303,633	18.3
1988	1,830,817	295,664	16.4
1989	2,230,225	281,300	12.6

The average landings in respect of the major groups caught during the period 1985-'89 reveals that silverbellies are the main constituent comprising 15.9% of the catch followed by other sardines (11.9%), perches (6%) and prawns (5.9%) in addition to the potential resources of whitebaits and carangids (Table 2).

Fishermen population and distribution of fishing craft

Of the 422 fishing villages located along the eight maritime districts of Tamil Nadu, fish landings take place in 352 centres. Ramanathapuram District ranks first having 21 % of the total fish landing centres followed by Thanjavoor (19%), Chengalpet (18%) and South Arcot (14%)districts. The fishermen population of Tamil Nadu stood at 3.96 lakhs as per the estimate of C. M. F. R. I. in 1980. Since then an increase of 14% in the fishermen population with corresponding increase of 6% among the active fishermen could be observed in 1986 *(Tamil Nadu Fisheries Statistics, 1992, Dept. of Fisheries, Madras).*

The most common craft used for the artisanal fisheries of the state *viz.*, the catamaran has shown a 3% rise in their number. New

TABLE 2. *Landings of major groups of fishes in Tamil Nadu during the period, 1985-'89 (in tonnes)*

Sl. No.	Groups	1985	1986	1987	1988	1989	Average
1.	Elasmobranchs	8,607	10,355	19,566	14,543	12,587	13,130
2.	Catfishes	2,055	1,676	2,324	2,096	1,917	2,014
3.	Other sardines	20,945	30,241	46,366	33,867	26,151	31,514
4.	Whitebaits	8,233	13,739	12,673	26,504	12,209	14,672
5.	Perches	12,100	13,031	18,463	16,804	17,826	15,645
6.	Croakers	7,840	7,174	11,689	11,717	12,321	10,418
7.	Ribbonfishes	7,892	20,402	9,704	2,863	2,717	8,716
8.	Carangids	13,327	8,560	13,038	16,566	17,198	13,738
9.	Silverbellies	37,407	44,515	46,276	46,888	35,402	42,098
10.	Pomfrets	338	932	440	1,456	1,459	1,125
11.	Mackerel	6,080	10,259	13,292	8,958	9,629	9,643
12.	Seerfishes	3,309	3,078	3,373	4,482	3,610	3,570
13.	Tunnies	1,336	2,271	3,526	3,261	3,610	2,801
14.	Penaeid prawns	11,304	15,640	17,409	16,461	16,886	15,540
15.	Cephalopods	4,441	3,905	4,050	4,208	5,535	4,428
16.	Others	55,337	56,263	80,444	84,990	102,243	75,855
	Total	200,551	242,041	303,633	295,664	281,300	264,638

mechanised vessels mainly trawlers have also been added prgressively in recent years. A comparison of the distribution of mechanised vessels along the various maritime districts of Tamil Nadu during 1980 and 1986 shows maximum cuncentration of vessels in Ramanathapuram district followed by Thanjavoor District (Table 3). Since 1980, a twofold increase in the number of artisanal gillnets have also taken place due to the large introduction of *Pannu valai* and *Mani valai* along the coast.

TABLE 3. *Distribution of mechanised vessels along the maritime districts of Tamil Nadu during 1980 and 1986 (in percentage)*

Sl. No.	Districts	1980	1986
1.	Chengalpet	—	—
2.	Madras	4.0	11.2
3.	South Arcot	11.4	6.8
4.	Thanjavoor	21.3	25.1
5.	Pudukkottai	1.4	13.4
6.	Ramanathapuram	38.4	26.2
7.	Tirunelveli	4.1	6.9
8.	Kanyakumari	19.4	10.4

Mechanised and non -mechanised catch trend

The average estimated contributions by the mechanised and artisanal sectors in the marine fish production of the state during the period 1985-'89 are 1.4 and 1.2 lakh tonnes respectively. The higher returns from the mechanised sector during 1985-'89 over the non-mechanised one as compared to the previous five year period 1980-'84 is an important feature observed in the present study (Table 4). The upward trend in the catches of mechanised sector could be attributed to the recent increase in the number of mechanised boats and also the fitting of outboard engines for the conventional craft, wooden canoes and catamarans in different areas enabling extension of fishing areas.

The catch trend of various groups exploited by both the sectors during the period 1985-'89 are given in Tables 5 and 6. Silverbellies followed by prawns, perches (mainly threadfin breams) and croakers formed the important ground fishes in the mechanised vessels while other sardines, white-baits and mackerel consti-

TABLE 4. *Mechanised and non-mechanised landings of Tamil Nadu during the period 1980-'89 (in tonnes)*

Years	Mechanised catch	Non-mechanised catch	Total
1980	94,131	123,263	217,394
1981	106,664	114,632	221,296
1982	127,542	118,419	245,961
1983	146,225	134,514	280,739
1984	116,190	135,930	252,120
1985	95,549	105,002	200,551
1986	117,898	124,143	242,041
1987	173,747	129,886	303,633
1988	168,564	127,100	295,664
1989	164,481	116,819	281,300

tuted the main groups netted by the non-mechanised fishing units.

Pelagic and demrsal groups of fishes

The percentaage contribution of pelagic and demersal fisheries to the total fish production of the state during the ten year period 1980-'89 indicates that the average share of the pelagic fishes during 1985-'89 was 48.8% as against 43% recorded during the preceding five year period (Table 7). The total pelagic fish exploited during 1985-'89 showed an increase of 24% than 1980-'84 period.

The presence of a rich potential pelagic resource available along the Tamil Nadu coast is confirmed by the fact that during the period 1985-'89 a major part or nearly 60% of the

TABLE 5. *Major groups of the mechanised fish landings of Tamil Nadu during 1985-'89 (in tonnes)*

Sl. No.	Groups	1985	1986	1987	1988	1989	Average
1.	Elasmobranchs	5,003	8,163	13,364	11,909	10,412	9,770
2.	Catfishes	611	841	1,398	1,263	1,190	1,061
3.	Other sardines	3,139	8,024	21,610	9,867	8,434	10,215
4.	Whitebaits	2,009	2,385	2,720	2,739	2,575	2,485
5.	Others clupeoid fishes	4,553	6,453	14,414	14,085	15,333	10,968
6.	Lizardfishes	1,917	1,784	4,008	3,119	3,616	2,889
7.	Threadfin breams	2,607	3,385	6,380	4,716	7,575	4,933
8.	Other percoid fishes	2,739	3,594	5,474	5,142	6,113	4,612
9.	Croakers	4,533	4,865	9,323	9,560	9,620	7,580
10.	Ribbonfishes	444	993	1,478	629	1,552	1,019
11.	Carangids	2,482	2,251	5,965	7,781	9,073	5,510
12.	Silverbellies	35,445	41,791	44,077	43,702	33,116	39,626
13.	Pomfrets	148	396	1,025	1,219	1,097	777
14.	Mackerel	315	82	1,036	831	1,162	685
15.	Seerfishes	1,758	1,158	1,623	1,946	1,885	1,674
16.	Tunnies	775	1,177	1,935	1,573	1,953	1,483
17.	Penaeid prawns	9,594	11,877	13,981	13,994	13,780	12,645
18.	Cephalopods	1,472	2,129	3,182	3,301	3,108	2,638
19.	Others	16,005	16,550	20,754	31,188	32,887	23,478
	Total	95,549	117,898	173,747	168,564	164,481	144,048

TABLE 6. *Groups of fishes contributed to the non-mechanised landings of Tamil Nadu during 1985-'89 (in tonnes)*

Sl. No.	Groups	1985	1986	1987	1988	1989	Average
1.	Elasmobranchs	3,604	2,192	6,202	2,634	2,175	3,361
2.	Catfishes	1,444	835	926	833	727	953
3.	Oil sardine	2,872	6,033	862	1,545	11,147	4,492
4.	Other sardines	17,806	22,217	24,756	24,000	17,717	21,299
5.	Whitebaits	6,224	11,354	9,953	23,765	9,634	12,186
6.	Others clupeoid fishes	12,276	9,274	16,866	10,756	12,420	12,318
7.	Lizard fishes	46	49	100	73	116	77
8.	Threadfin breams	176	618	395	340	230	352
9.	Other percoid fishes	6,578	5,434	6,214	6,606	3,908	5,748
10.	Croakers	3,307	2,309	2,366	2,157	2,701	2,568
11.	Ribbonfishes	7,448	19,409	8,226	2,234	1,165	7,696
12.	Carangids	10,845	6,309	7,073	8,785	8,125	8,227
13.	Silverbellies	1,962	2,724	2,199	3,186	2,286	2,471
14.	Pomfrets	190	536	415	237	362	348
15.	Mackerel	5,765	10,177	12,256	8,127	8,467	8,958
16.	Seerfishes	1,551	1,920	1,750	2,536	1,725	1,896
17.	Tunnies	561	1,094	1,591	1,688	1,657	1,318
18.	Penaeid prawns	1,710	3,763	3,428	2,467	3,106	2,895
19.	Cephalopods	2,969	1,776	868	907	2,427	1,789
20.	Others	17,668	16,120	23,440	24,224	26,724	21,638
	Total	105,002	124,143	129,886	127,100	116,819	120,590

TABLE 7. *Pelagic and demersal fish catches of Tamil Nadu (in tonnes) during 1980-'89 (percentage in parenthesis)*

Years	Pelagic		Demersal		Total
1980	99,993	(46.0)	117,401	(54.0)	217,394
1981	96,915	(43.8)	124,381	(56.2)	221,296
1982	85,544	(34.8)	160,417	(65.2)	245,961
1983	113,946	(40.6)	166,793	(59.4)	280,739
1984	125,012	(49.6)	127,108	(50.4)	252,120
1985	92,428	(46.0)	108,123	(54.0)	200,551
1986	123,332	(51.0)	118,709	(49.0)	242,041
1987	150,462	(49.6)	153,171	(50.4)	303,633
1988	137,057	(46.4)	158,607	(53.6)	295,664
1989	143,032	(50.8)	138,268	(49.2)	281,300

production obtained along the geographical division of India comprising Andhra Pradesh, Tamil Nadu and Pondicherry was from Tamil Nadu which accounted for 52% of the total pelagic fish catches along the east coast of India.

Detailed species composition of the pleagic and demersal groups which contributed to the marine fish production of Tamil Nadu during the five year period 1985-'89 is given in Tables 8 and 9. Nearly 55% of the pelagic resources was comprised of clupeoid fishes constituting mainly other sardines (24%) whitebaits (11%) carangids (11%), followed by mackerel and ribbonfishes (7% each). Seerfishes, flyingfishes, tunnies and barracudas were the other important pelagic fishes

TABLE 8. *Major groups of pelagic fishery resources of Tamil Nadu during 1985-'89 (in tonnes)*

Sl. No.	Groups	1985	1986	1987	1988	1989	Average
1.	**Clupeoid fishes**						
	Wolf herring	2,019	3,076	3,544	3,641	3,706	3,197
	Oil sardine	2,896	6,105	876	2,066	12,726	4,934
	Other sardines	20,945	30,241	46,366	33,867	26,151	31,514
	Hilsa shads	251	308	272	206	22	212
	Other shads	2,349	2,094	4,351	2,187	930	2,382
	Whitebaits	8,233	13,739	12,673	26,504	12,209	14,672
	Other clupeoid fishes	12,186	10,177	23,099	18,286	21,509	17,048
2.	Halfbeaks and Fullbeaks	711	670	616	1,648	953	920
3.	Flyingfishes	605	1,263	989	3,064	11,478	3,480
4.	Ribbonfishes	7,892	20,402	9,704	2,863	2,717	8,716
5.	Carangids	13,327	8,560	13,038	16,566	17,198	13,738
6.	Mackerel	6,080	10,259	13,292	8,958	9,599	9,638
7.	Seerfishes	3,309	3,078	3,373	4,482	3,610	3,570
8.	Tunnies	1,336	2,271	3,526	3,261	3,610	2,801
9.	Billfishes	261	154	103	225	70	163
10.	Barracudas	1,309	2,125	3,131	3,595	4,253	2,883
11.	Mullets	429	232	571	412	324	394
12.	Others	8,290	8,578	10,938	5,226	11,967	9,000
	Total	92,428	123,332	150,462	137,057	143,032	129,262

exploited apart from the recent unconventional fishery of oil sardine.

Silverbellies, as a dominant group contrbuted (31%) among the demersal fish catches followed by perches and prawns which formed (12%) each. Other groups in the order of abundance were elasmobranches (10%), croakers (7%) and goatfishes (4%). An interesting development is that as one of the ground fish resouces, the goatfishes have attained a considerable increase of 72% in the catch during the present period than in 1980-'84.

Districtwise marine fish landings

The formation of additional two coastal districts due to the recent bifurcation of districts by the Government of Tamil Nadu in 1991 and the coastal areas covered in the present study in conformity before the bifurcation are indicated below:

Sl. No.	Present coastal districts	District prior to bifurcation
1.	Chengai M.G.R.	1. Chengalpet
2.	Madras	2. Madras
3.	South Arcot	3. South Arcot
4.	Nagapattinam Quaid-e-Milleth	4. Thanjavoor
5.	Thanjavoor	
6.	Pudukottai	5. Pudukottai
7.	Ramanathapuram	6. Ramanathapuram
8.	Nellai Kattabomman	7. Tirunelveli
9.	Chidamabaranar	
10.	Kanyakumari	8. Kanyakumari

TABLE 9. *Major groups of demersal fishery resources of Tamil Nadu durtng1985-'89 (in tonnes)*

Sl. No.	Groups	1985	1986	1987	1988	1989	Average
1.	Elasmobranchs	8,607	10,355	19,566	14,543	12,587	13,132
2.	Eels	151	148	223	100	155	155
3.	Catfishes	2,055	1,676	2,324	2,096	1,917	2,014
4.	Lizardfishes	1,963	1,833	4,108	3,192	3,732	2,966
5.	Perches	12,100	13,031	18,463	16,804	17,826	15,645
6.	Goatfishes	2,171	2,174	3,795	11,228	8,927	5,659
7.	Threadfin breams	397	465	706	440	607	523
8.	Croakers	7,840	7,174	11,689	11,717	12,321	10,148
9.	Silverbellies	37,407	44,515	46,276	46,888	35,402	42,097
10.	Big-jawed jumper	611	470	329	714	234	472
11.	Pomfrets	338	932	1,440	1,456	1,459	1,125
12.	Flatfishes	1,536	1,526	1,856	2,280	2,789	1,997
13	Penaeid prawns	11,304	15,640	18,185	16,461	16,886	15,695
14.	Non-penaeid prawns	165	202	34	432	52	177
15.	Lobsters	442	324	536	132	164	320
16.	Crabs and other crustaceans	6,862	6,351	8,447	8,042	6,178	7,182
17.	Cephalopods	4,441	3,905	4,050	4,208	5,535	4,428
18.	Others	9,733	7,988	11,114	17,874	11,497	11,641
	Total	108,123	118,709	153,171	158,607	138,268	135,376

From the Tamil Nadu coast, during 1985-'89, 20% of the fish was caught along Thanjavoor district followed by Ramanathapuram (18%), Kanyakumari (16%) and Tirunelveli (15%) districts (Table 10). Contributing to 24% and 23%, Thanjavoor and Ramanathapuram districts dominated in the mechanised fish landings followed by Tirunelveli (17%) and Pudukottai (14%). In the case of fish landings by the traditional gear, Kanyakumari District ranks first contributing to 30% of the marine fish catch by non-mechanised craft followed by Thanjavoor (15%), Chengalpet (14%) and South Arcot and Tirunelveli districts (11% each).

The total fish production obtained along various maritime districts of Tamil Nadu in diffferent quarters of the period 1985-'89 indi-

TABLE 10. *Districtwise mechanised and non-mechanised fish landings of Tamil Nadu during 1985-'89 (in tonnes)*

Sl. No.	Districts	Mechanised	Non-mechanised	Total
1.	Chengalpet	—	85,159	85,159
2.	Madras	77,160	16,400	93,560
3.	South Arcot	48,890	68,699	117,589
4.	Thanjavoor	169,804	93,095	262,899
5.	Pudukottai	101,612	22,784	124,396
6.	Ramanatha-puram	167,705	65,583	233,288
7.	Tirunelveli	124,567	68,416	192,983
8.	Kanyakumari	30,501	182,814	213,315
	Total	720,239	602,950	1,323,189

cates that the third quarter is the most productive in the state followed by fourth quarter (Table 11).

TABLE 11. *Districtwise quarterwise fish landings of Tamil Nadu during 1985-'89 (in tonnes)*

Sl. No.	Districts	I Q	II Q	III Q	IV Q	Total
1.	Chengalpet	21,235	24,825	20,633	18,466	85,159
2.	Madras	21,937	20,661	26,804	24,158	93,560
3.	South Arcot	22,244	29,092	39,761	26,492	117,589
4.	Thanjavoor	57,912	79,713	64,542	60,732	262,899
5.	Pudukottai	34,779	29,807	27,101	32,709	124,396
6.	Ramanatha-puram	55,462	63,156	61,682	52,988	233,288
7.	Tirunelveli	47,627	36,438	55,670	53,248	192,983
8.	Kanyakumari	28,380	29,283	83,147	72,505	213,315
	Total	289,576	312,975	379,340	341,298	1,323,189

Introduction of new non-mechanised gears

Various developements have taken place recently with the designing and use of different types of non-mechanised gear to suit various modes of operation. Synthetic materials like nylon and high density polypropylene (HDP) are increasingly used for the fabrication of different types of nets during the past two decades and a number of gears have been modified to fecilitate better catches. As a result, the gill-nets, *Pannu valai* and *Mani valai* and the bag-net, *Eda valai* are extensively operated along the coast in recent times to exploit mainly pelagic fishery resources.

The *Pannu valai*, a monofilament gill-net with a mesh size of 2.4 cm is actually a modification of the erstwhile *Ara valai*, in which the synthetic material used is polyfilament. This change envisages reduced weight to *Pannu valai* enabling easy manoeuvring with much efficiency. Another recent innovation among the non-mechanised gear is the three-walled gill-net popularly called Trammel net or FAO net, locally termed as *Mani valai*, *Disco valai* or *Silangai valai*. This net designed for setting at the bottom is found to be very efficient in getting good catches of prawns. The net is fabricated in such a way that it has a fine net of smaller meshes hung loosely between vertical walls of coarser net of much larger meshes (13.5 cm) so that the fishes passing through the outer wall carry some part of the finer net through the wall of the other side and are entangled in the pocket thus formed. There is gilling of larger fishes in the outer wall of the net. Of the total prawns caught by the artisanal gears along the Tamil Nadu coast, nearly 70% are netted by the Trammel nets. Recent reports indicate that during the period 1991-'92, nearly 36% of this net is operated along the coastal district of Thanjavoor followed by Kanyakumari and South Arcot districts recording 21% each (Tamil Nadu Fisheries Statistics, 1992, Government of Tamil Nadu). The bag-net, *Eda valai* is also extensively operated along the coast to tap the pelagic resources like oil sardine, mackerel, scads and mullets.

Among the traditional gear, the sardine gill-net, *Kavala valai* or *Chooda valai* as it is called, has retained its efficiency for more than four decades as has been indicated from its continuous and extensive operation along the Tamil Nadu coast. Recently, the fabrication of the sardine gill-net by using monofilament instead of polyfilament has been reported especially along the Madras and Chengalpet districts. This change enables reduction of the weight of the net and at the same time retaining its efficiency.

Non-conventional resource

The Indian oil sardine, *Sardinella longiceps* has become one of the important exploited fishery resources along the Tamil Nadu coast in recent years contributing on an average 8,940 t annaully during the period 1985-'89. With considerable annual fluctuations, the oil sardine fishery has exhibited a steep increase from 2,896 t in 1985 to 12,726 t in 1989 contributing to 5% of the total marine fish production of the year. Recently the record catch of 31,689 t of oil sardine in 1990 along the Tamil Nadu coast comprising about 10.4% of the total fish landings of the state suggests the potentiality of this non-conventional resource available for exploitation.

The catch trend of the oil sardine reveals that the northern maritime districts viz., Chengalpet, Madras and South Arcot recorded maximum resources contributing on an average 60% to the total oil sardine production of the state during 1985-'89. Best catches were obtained during the third and fourth quarters of the period though sizable quantities were also caught in the second quarter during some years (*Mar. Fish. Infor. Serv, T&E Ser.*, No.**115**,1992). Nearly 90% of the exploited oil sardine resource during 1985-'89 was realised by the bag-net, *Eda valai*, though the sardine gill-net also netted the species to a small extent. The design and fabrication of a two-boat high opening bottom trawl for pair trawling introduced in 1980-'81 in Palk Bay zone with

Mandapam, Pamban and Rameswaram as bases of operation has yielded consdierable quantities of oil sardine in recent years especially during January-February period (*Mar. Fish. Infor. Serv., T & E Ser., No.* **117**, 1992).

Introduction of outboard engines

Among the artisanal fishing craft operating along the Tamil Nadu coast, nearly 75% comprises catamarans. Recently considerable progress has been achieved in the mortorisation of the traditional catamaran by fitting the outboard engines mainly for the purpose of propulsion of the craft. The outboard engines were first introduced a decade ago along the southern district of Kanyakumari to begin with, which later became popular in the adjoining Tirunelveli District. Outboard engine fitted catamarans made their appearance along the northern maritime districts of Chengalpet and South Arcot only in 1990, which have increased in good numbers later and at present nearly 500 such units operate along the above coastal districts comprising 5% of the total catamaran craft. No outboard engines have been so far introduced at present along the Madras District (*Mar. Fish. Infor. Serv., T & E Ser., No.* **116**, 1992).

Steps have been initiated recently by the Government of Tamil Nadu to help the fishermen to purchase the outboard engines by granting a subsidy of 20% cost of the engine and the beneficiary fishermen secure the balance of 80% as loan from commercial banks. According to recent reports, the Government under centrally sponsored scheme between State and Centre have sanctioned 3 million rupees for the supply of 400 outboard engines during the period 1991-92', out of which more than 50% have already been disbursed for the distribution of 249 outboard and 10 inboard engines. The outboard engine fitted catamarans are expected to increase in their numbers considerably in future with the expansion of artisanal fisheries sector along Tamil Nadu coast.

Export of marine products from Tamil Nadu

The marine products exported from Tamil Nadu include mainly frozen items of shrimps, lobsters, cuttlefish, crab meat and fishes besides dried fishes, live crabs, *bech-de-mer* and shark fins. During the period 1985-'89, Tamil Nadu contributed 17% of the total marine products exported from India realising 15% of the total export value (Table 12).

TABLE 12. *Export of marine products of India and Tamil Nadu during the period 1980-'89**

Years	India		Tamil Nadu	
	Quantity in tonnes	Value in lakhs (Rs)	Quantity in tonnes	Value in lakhs (Rs)
1980	74,542	21,887.56	6,543	2,129.14
1981	75,375	28,671.28	5,879	2,977.41
1982	75,136	34,224.29	6,375	2,878.43
1983	86,169	36,232.31	13,236	4,028.14
1984	89,912	38,549.83	19,271	4,994.81
1985	80,588	37,566.83	17,148	5,465.28
1986	89,283	46,268.41	17,017	6,464.96
1987	89,125	48,955.40	14,772	6,366.57
1988	99,306	58,338.19	14,808	9,456.04
1989	103,552	61,555.00	14,649	9,582.98

*Source: Tamil Nadu Fisheries Statistics, Government of Tamil Nadu, Dept. of Fisheries, Madras, 1992.

There was an increase of 15% and 58% respectively in total quantity exported and the value realised in India during 1985-'89 than the previous five year period 1980-'84, whereas Tamil Nadu accounted an increase of 53% and 120% respectively. Recent report indicates that there is an increase of 27% in the value of marine products exported from Tamil Nadu during 1991-'92 corresponding to the previous year 1990-'91. It has been estimated that of the 22,780 lakhs of rupees of worth of marine products exported from Tamil Nadu during 1991-'92, the major items included frozen shrimp (68%) followed by frozen cuttlefish (7%), lobsters (4%) and shark fins (1%) in the order of magnitude besides other groups such as frozen fish, live crab, crab meat and *bech-de-mer*.

Culture fisheries — present status and scope

Tamilnadu is blessed with congenial ecosystems like bays, lagoons, estuaries, mangroves and brackishwater lakes having distinct biological and environmental features constituting ideal conditions for mariculture practices. Immense strides have been made in recent years by C. M. F. R. I and various technologies have been developed for the culture of finfish and shellfish along the Tamil Nadu coast. Among 1.7 million hectares of estuarine and brackish water coastal areas available for fish farming in India, a potential area of 0.080 million hectares are available along the Tamil Nadu coast for the culture of prawns and fishes. The potential inshore area in less than 18 m depth avilable for

near-sea farming along the Tamil Nadu coast is estimated to be 9 million hectares.

Traditionally the milk fish, *Chanos chanos* and the mullets *Mugil* spp. form two major cultivable species. Prawn culture has attained great importance in recent years. Among these, *Penaeus indicus* and *P. monodon* are dominant species cultured because of their fast growth, large size and high economic value. The breeding and seed production of a number of commercially important marine prawns by hatchery methods are major achievements of CMFRI in recent years. The seed of economically important species of penaeid prawns like *Penaeus semisulcatus*, *P. latisulcatus* and *P. canaliculatus* have been produced for the first time. The Institute has also undertaken a programme of sea ranching of the seed of the *Penaeus semisulcatus* in the coastal waters of Mandapam.

Among the molluscs, the culture of mussels, *Perna viridis* and *P. indica* by raft culture in the open sea has high production potential along the Tamil Nadu coast. The edible oyster, *Crassostrea madrasensis* is extensively distributed in Tamil Nadu and the species could be cultured by rack and ren method developed by C M F R I at Tuticorin. The Institute has also evolved hatchery techniques for mass production of oyster seed in laboratory which could be used in stocking oyster farms.

The development of technology by C M F R I at Tuticorin for the production of cultured pearls using the Indian pearl oyster, *Pinctada fucata* is a great breakthrough and have paved the way for the setting up of cultured pearl industry in India. Using the technology, the Tamilnadu Fisheries Development Corporation has produced cultured pearls on a commercial scale. The C M F R I has also evolved methods for the hatchery production of pearl oyster seed which could be reared in favourable conditions and grown to suitable size for nucleus implantation and cultured pearl production. With the development of culture as well as hatchery methods for the green mussel *Perna viridis* and the clams, *Meretrix casta*, *M. meretrix* and *Anadara granosa* by C M F R I, culture of these bivalves could be started in localities of coastal Tamil Nadu.

The southern coast of Tamil Nadu from Mandapam to Kanyakumari supports luxuriant growth of economically important sea weeds like agarophytes, *Gelidiella acerosa* and *Gracilaria edulis* and the total standing crop of sea weeds along the coast is estimated to be 22,000 t (wet). The sea weed based industries in India mostly depend on raw materials from this area (*Mar. Fish. Infor. Serv., T & E Ser.*, No, **96**, 1986).

Estuarine regions of Athankarai, Ennore and Buckingham canal along Tamil Nadu coast have extensive subfossil deposits of shells which are exploited and supplied to lime industries. Recent surveys conducted by C M F R I along the Valinokkam Bay and adjoining area of Ramanathapuram District have indicated immense potentialities of the culture of pearl oysters, clams, sea cucumbers, green mussels, finfishes, prawns and sea weeds (*Mar. Fish. Infor. Serv., T&E Ser.*, No **117**, 1992).

FISH PRODUCTION IN PONDICHERRY

The Union Territory of Pondicherry comprises four maritime regions *viz.*, Pondicherry, Karaikal, Mahe and Yenam covering a coast line of about 45 km with 675 sq.km of inshore waters and having 24 fish landing centres. An estimated annual average of about 13,900 t of marine fishes have been caught along the Union Territory comprising Pondicherry and Karaikal during the period 1985-'89 indicating a 13% increase in fish production than the previous five year period 1980-'84.

Studies on the trend of marine fish landings by the mechanised and artisanal fisheries sectors along Pondicherry and Karaikal during the decade 1980-'89 suggest only marginal increase in mechanised landings in the second five year period 1985-'89 whereas 18% increase could be noted in the case of non-mechanised catches (Table 13).

TABLE 13. *Marine fish landings from mechanised and non-mechanised units in Pondicherry and Karaikal during 1980-'89 (in tonnes)*

Years	Mechanised catch	Non-mechanised catch	Total
1980	2,959	6,431	9,390
1981	3,781	6,974	10,755
1982	4,098	7,960	12,058
1983	5,348	9,306	14,654
1984	4,878	10,063	14,941
1985	5,333	11,147	16,480
1986	5,447	8,814	14,261
1987	2,311	11,145	13,456
1988	3,998	9,006	13,004
1989	4,229	8,131	12,360

TABLE 14. *Different groups of fishes contributed in mechanised and non-mechanised fish landings in Pondicherry during 1985-'89 (in tonnes)*

	Groups	1985		1986		1987		1988		1989		Total		Average
		Mech.	Non mech.	Mech.	Non mech.	Mech.	Non mech.	Mech.	Non mech.	Mech.	Non mech.	Mech.	Non mech.	
1.	Elasmobranchs	232	197	101	61	152	92	225	77	134	32	844	459	261
2.	Catfishes	3	36	21	1,020	27	4	26	7	—	—	77	1,067	229
3.	Oil sardine	3	1,371	4	1,813	—	735	—	191	32	2,808	39	6,918	1,391
4.	Whitebaits	405	29	633	131	17	269	58	260	124	1,119	1237	1,808	609
5.	Other sardines	6	3,173	—	1,112	2	2,284	23	1,495	67	49	98	8,113	1,642
6.	Other clupeoid fishes	209	1,366	259	888	96	1,262	101	867	217	648	882	5,031	1,182
7.	Lizard fishes	156	8	241	8	147	99	58	1	96	2	698	118	163
8.	Threadfin breams	715	91	516	45	21	55	309	42	180	45	1,741	278	404
9.	Other percoid fishes	428	194	191	143	278	431	145	109	64	134	1,106	1,011	423
10.	Croakers	182	281	296	153	142	331	169	245	126	80	915	1,090	401
11.	Ribbonfishes	16	22	70	53	6	104	102	1,985	26	65	220	2,229	490
12.	Carangids	123	996	129	446	46	601	103	840	98	478	499	3,361	772
13.	Silverbellies	1,235	124	870	225	319	552	255	74	374	115	3,053	1,090	829
14.	Pomfrets	_	32	13	22	_	50	17	28	_	41	30	173	41
15.	Mackerel	5	1,244	4	1,498	11	2,192	23	559	17	1136	60	6,629	1,337
16.	Seerfishes	102	32	74	38	47	97	17	59	17	65	257	291	110
17.	Tunnies	38	_	124	2	_	72	119	44	33	101	314	219	107
18.	Penaeid prawns	470	284	439	108	216	292	270	119	412	30	1,807	833	528
19.	Cephalopods	43	_	43	_	27	40	27	1	97	15	237	56	59
20.	Others	962	1,667	1,419	1,048	757	1,583	1,951	2,003	2,115	1,168	7,204	7,469	2,934
	Total	5,333	11,147	5,447	8,814	2,311	11,145	3,998	9,006	4,229	8,131	21,318	48,243	13,912

Trawl nets and gill-nets are the main mechanised gears employed in this region while the non-mechanised gill-nets, *Kavala valai*, *Mani valai* and the bag-net *Eda valai* are operated by the artisanal catamarans.

Catch estimates of annual fish production along this coast reveal a declining trend over the years, 1985-'89 which is attributed mainly to the lesser returns by the mechanised sector especially in 1987 and 1988 accounting for only 11% and 19% of the total mechanised landings during 1985-'89 period. Moreover, the years 1986 and 1989 also witnessed reduction in catches from the traditional fisheries sector.

The major groups contributing to the mechanised landings are silverbellies (14%), perches (8%) and prawns (8%). Other sardines (17%), mackerel (14%), carangids (7%) and ribbonfishes (5%) are the predominant groups caught by the non-mechanised fishing units during the period. Fish production realised by the artisanal gears indicated an increase of as much as 126% than the mechanised sector during the five year period 1985-'89 (Table 14).

As a non-conventional resource, oil sardine has become one of the important fishery resources along this coast also as it is the case along the adjoining Tamil Nadu. Thus, as against a meagre 920 t obtained during 1980-'84 period, the oil sardine production has risen to about 6,900 t during the subsequent period 1985-'89 contributing to 14% of the total non-mechanised fish landings with a maximum yield obtained by the bag-net, *Eda valai*.

The pelagic and demersal constituents of the marine fish landings in Pondicherry and Karaikal during the ten year period 1980-'89 are shown in Table 15. The data suggest that during the recent five year period, 1985-'89, the average percentages of the above two groups are 68% and 32% respectively as against 59% and 41% recorded during 1980-'84, confirming a clear rise in the pelagic fish production along the coast which is mainly due to the unprecedented heavy landings of oil sardine in recent years.

The total fishermen population of Pondicherry in 1980 is estimated at about 25,000 of which 22% were engaged in actual fishing. It is estimated that there are 176 mechanised boats owned by the fishermen at Pondicherry and among the non-mechannised craft 91% comprises catamarans.

TABLE 15. *Percentages of pelagic and demersal groups in the marine fish landings in Pondicherry during 1980-'89 in tonnes)*

Years	Pelagic	Demersal
1980	59.0	41.0
1981	59.7	40.3
1982	57.0	43.0
1983	56.4	43.6
1984	60.5	39.5
1985	61.3	38.7
1986	56.6	43.4
1987	70.6	29.4
1988	75.8	24.2
1989	75.8	24.2

It has been observed that only a small number of outboard engine fitted units was introduced in Pondicherry recently and these are only small wodden crafts of 7-8 m length operating mainly gill-nets. But with the change of scenario by the extensive use of outboard engine fitted catamarans along the Tamilnadu coast, it appears that steps are underway to procure the engines by the fishermen in most of the fish landing centres of Pondicherry. In an earlier investigation it has been suggested that motorisation of country craft may be encouraged along the Pondicherry coast to get additional contributions from them as the potential fishery resources of the coast is about 20,000 t (*Special Publication*, **34**, C. M. F. R. I., Cochin, 1987).

Conclusions

Contributing to an annual average of 16% during the decade, 1980-'89, Tamil Nadu occupies fourth place in the marine fish production of India. The annual average exploited marine fishery resources of the state during the period 1985-'89 is estimated to be 2.6 lakh tonnes indicating an increase by 9% over the preceding five year period. The recent five year period has also witnessed substantial increase in mechanisation/motorisation by way of introducing additional commercial trawlers and outboard engine fitted country craft especially, catamarans. Comparative catch trend of the pelagic and demersal fish groups exploited along the coast reveals an increase in production of 46% by the former during the period and contributing to 52% of the total exploited fishery resources along the east coast of India. This increase in the pelagic fish production has been made possible by the large

scale introduction of artisanal gears such as *Mani valai, Pannu valai* and *Eda valai* and also due to the motorisation of country crafts. Moreover, the non-conventional resource, oil sardine has also supported a substantial fishery along the Tamil Nadu coast by way of increasing the pelagic fishery potential.

At present the area upto 50 m depth is intensively exploited along Tamil Nadu and the potential yield from 0-50 m depth region has been estimated to be 3.25 lakh tonnes (Alagaraja, K. 1986. *Proc. Sym. Coastal Aquaculture*, pt 4. Mar. Biol. Ass. India). and therefore the yield can be increased by another 65,000 t. As the region 0-50 m depth is heavily exploited, there may not be any other group of fishes remaining unexploited in this area except the under exploited resources such as white baits. Hence, the additional production should come from such resources and mostly from beyond 50 m depth zone where fishing effort is very much restricted. The production of most of the exploited groups like other sardines, whitebaits, perches, carangids, silverbellies, mackerel and penaeid prawns have shown substantial increase during the period 1985-'89 with a marginal reduction in the yield of croakers and ribbonfishes which has been compensated by the non-conventional resource of oil sardine, thus enabling a 9% increase in the total fish production during 1985-'89.

Since the major portion among the non-mechanised units are gill-netters, it is hightime that their operational efficiency is increased to get higher catches. This could be possible only by powering the country craft with outboard engines to facilitate mobility and fishing efficiency. Steps are taken by the Government of Tamil Nadu to distribute nearly 400 outboard engines during the period 1991-'92 along the coast. The number is expected to increase considerably in the years to come along with the addition of commercial trawlers with the result that the yield from the mechanised and motorised fisheries sector is expected to enhance further along the Tamil Nadu coast.

A considerable increase has been noted in the earnings of foreign exchange in recent years by exporting marine products from Tamil Nadu accounting 15% of total value of marine products exported from India during 1985-'89. The state is unique in the availability of sea cucumbers which could be cultured and has immense export potentiality as there is good demand for *bech-de-mer*. Congenial ecosystems are available along the coastal Tamil Nadu for culture of prawns, molluscs, sea cucumbers and sea weeds. The development of technology for producing cultured pearls using the Indian pearl oyster has enabled setting up of cultured pearl industry.

The sacred chank, *Xancus pyrum* is an important shellfish resource distributed in Tuticorin and Mandapam-Rameswaram areas. The resource is under the control of the Fisheries Department of Tamil Nadu which permit fishermen by granting license to catch the chanks by skin-diving. The annual production (during 1991-'92) is 1.7 million chanks. There is increasing demand for chanks for worship and for preparation of bangles. Good scope exists for augmenting production by using hatchery methods. No serious problems to marine and brackishwater environments due to pollutants have been recorded so far along the coast. With the adoption of appropriate stratagies in capture fisheries and by conducting mariculture of edible marine organisms, the fish production of Tamil Nadu could substantially be raised not only by realisation of the potential production of 3.25 lakh tonnes from capture fisheries (*Special Publication*, No. **34**, CMFRI, Cochin, 1987) but also through increase in culture production.

Although the marine fish production along the Pondicherry coast has registered 11% increase during 1985-'89, gradual reduction in total landings over the years could be noted which is caused mainly due to the reduction of catches especially during the years 1986, 1988-'89 and 1987-'88 by both non-mechanised and mechanised fishery sectors. Considerable recovery in the landings has been noted in 1990 when total fish production was 15,520 t, but showed a steep fall to 10,477 t in 1991. Increase in the pelagic fish production of Pondicherry was mainly due to the large catches of oil sardine in recent years along the coast. Though the outboard engine fitted country crafts are few in number at present, efforts are underway to popularise them in future. These motorised crafts can play a vital role in the coming years to augment the fish production from the present level since a potential yield of 20,000 t could be harvested along the Pondicherry coast.