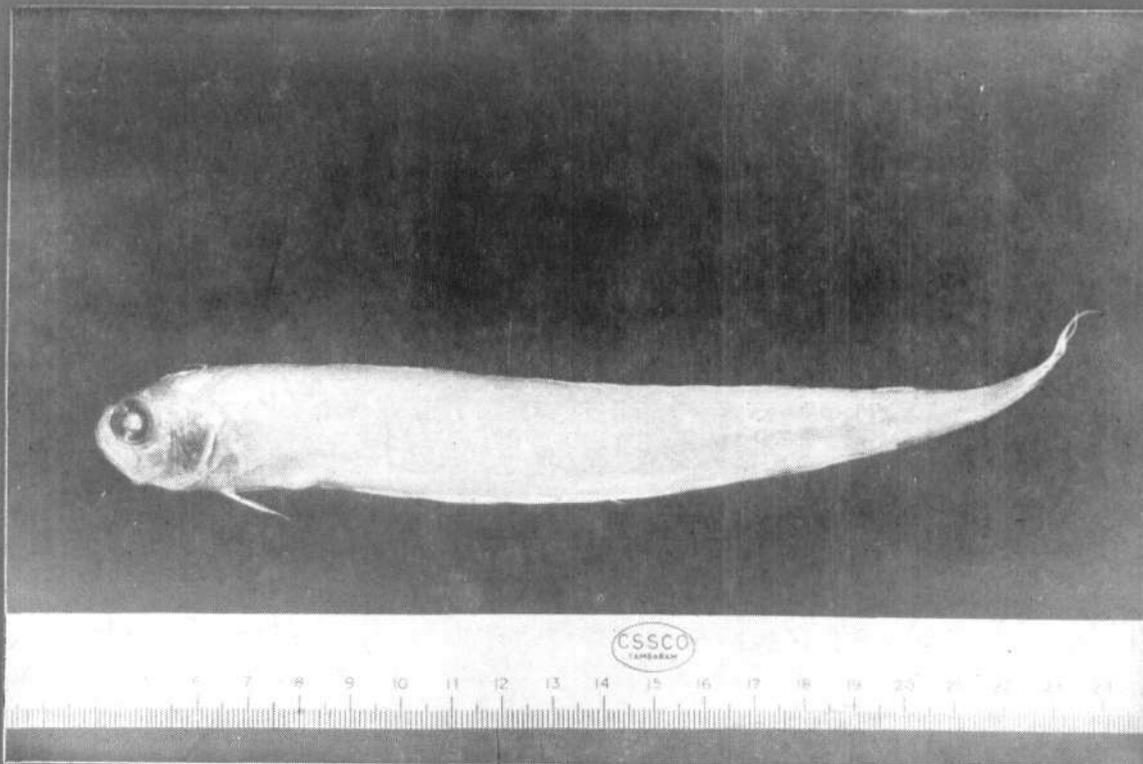




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केन्द्रीय समुद्री मात्स्यकी CENTRAL MARINE FISHERIES
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भारतीय कृषि अनुसंधान परिषद
INDIAN COUNCIL OF AGRICULTURAL RESEARCH

THE PRESENT STATUS OF SMALL SCALE TRADITIONAL FISHERY AT TUTICORIN

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Introduction

Tuticorin enjoys an unique position along the Gulf of Mannar in the east coast of India in view of the facilities available for the development and exploitation of the marine fisheries of the region. A good fishing harbour affords facilities for smaller trawlers in the mechanised fishing sector. Large industrial fishery trawlers get facilities in the major harbour. Even with the increasing emphasis on mechanised industrial fishing, the traditional fisheries flourished at Tuticorin and play a great role in the economic well being of the coastal population in the sense, that regular fishing with multiplicity of gears is conducted all round the year. Good marketing and curing facilities add great importance for expansion of the indigenous fishery. Traditional fisheries contribute between 4,500 and 7,450 tonnes (average 6,351 tonnes) of fish every year to the economy of Tuticorin. Production statistics show that the inshore waters, where the traditional fishermen fish, are highly productive. Several varieties of fish like sardines, perches, anchovies, seer fish and tuna are abundant in the inshore waters of Tuticorin. There is a well established traditional system of craft and gears suited for the local conditions.



Fig. 1. Tuticorin type boats at Tuticorin North fish landing centre.

Over the last several years significant developments have taken place in the fisheries of the region by the introduction of advanced gears for fishing in inshore waters. Many commercial establishments engaged in fish trade are interested in the qualitative and quantitative seasonal changes in the fisheries. This account is a positive attempt to highlight the changing pattern of the traditional fishery over the last few years and gives a comprehensive coverage of the gear-wise, species-wise and season-wise fish landings by the small scale traditional sector from 1979 to 1985 based on regular sampling of the commercial catch at Tuticorin fish landing centres.

Annual production

There have been ups and downs in the annual trend of fisheries (Table 1). Total annual catch varied from 4,512.0 tonnes in 1982 to 7,457.4 tonnes in 1980. Steadily high estimated landings were recorded during the 1983-'85 period. Average annual catch for the period 1979-'85 came to 6,351.2 tonnes. Annual catch dipped below the average catch only in three years; in 1979, 1981 and 1982. The sardine gill net was the most important gear in the traditional fishery and contributed well over 70% of the annual average fish catch

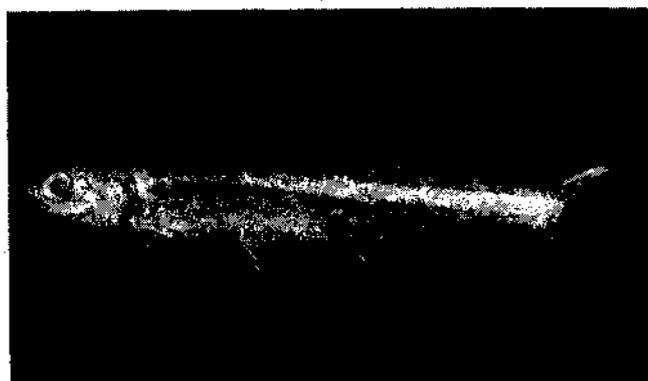


Fig. 2. *Stolephorus indicus*.

Table 1. Gear-wise effort, catch (tonne) and catch per unit effort (kg) annual average catch (tonne) for the period 1979-'85

Gears	Effort, catch & C/E	1979	1980	1981	1982	1983	1984	1985	Annual average (tonne)	Total
Chala valai	E	59,012	52,018	50,163	48,905	57,954	49,703	50,636	52,627	3,68,391
	C	4,70.70	4,712.2	4,004.1	3,252.7	5,104.4	4,755.4	5,230.0	4,538.0	31,765.8
	C/E	79.8	90.6	79.8	66.5	88.1	95.7	103.3	86.3	603.8
Paru valai	E	1,679	3,874	3,964	4,049	3,057	3,395	2,541	3,223	22,559
	C	146.8	629.0	594.7	425.9	322.7	385.5	289.6	399.2	2,794.2
	C/E	87.4	162.4	150.0	105.2	105.6	113.5	114.0	119.7	838.1
Podi valai	E	1,772	1,791	531	1,119	1,080	1,395	3,700	1,627	11,388
	C	111.9	103.3	23.3	31.7	41.06	62.0	294.3	95.4	668.1
	C/E	63.2	57.7	43.9	28.3	38.5	44.4	79.5	50.8	355.5
Hand line	E	2,301	3,811	4,409	3,730	5,275	43,34	5,163	4,146	29,023
	C	299.7	325.9	297.5	240.6	378.2	253.9	365.7	308.8	2,161.5
	C/E	130.2	85.5	67.5	64.5	71.7	58.6	70.8	78.4	548.8
Long line	E	3,502	4,682	1,414	2,341	3,790	6,655	8,209	4,270	30,593
	C	383.3	650.4	133.0	165.5	309.5	634.6	693.6	424.3	2,969.9
	C/E	109.4	138.9	94.0	70.7	81.7	95.4	84.5	96.4	674.6
Troll line	E	2,516	3,230	1,729	2,908	2,465	1,904	1,412	2,309	16,164
	C	364.5	315.5	177.4	202.5	144.5	135.4	147.3	212.3	1,487.1
	C/E	144.9	97.7	102.6	69.6	58.6	71.1	104.3	92.7	648.8
Sinki valai	E	972	1,536	856	1,458	819	1,059	1,427	1,161	8,127
	C	48.6	154.5	105.9	115.1	88.6	103.4	120.4	105.2	736.5
	C/E	50.0	100.6	123.8	78.9	108.1	97.7	84.4	91.9	643.5
Thirukkai valai	E	773	3,235	925	705	2,380	2,166	2,422	1,800	12,606
	C	168.8	457.1	126.3	74.1	290.6	173.7	247.8	219.8	1,538.4
	C/E	218.4	141.3	136.6	105.0	122.1	80.2	102.3	129.4	905.9
Shore seine	E	31	65	20	53	121	00	66	51	356
	C	5.4	6.3	0.9	3.2	11.9	00	7.5	5.0	35.2
	C/E	173.2	97.4	43.9	61.3	98.2	00	113.8	84.0	587.8
Thallu madi	E	2,979	2,885	356	52	628	4,069	695	1,666	11,664
	C	28.4	99.5	7.5	0.7	20.6	98.7	42.6	42.6	298.0
	C/E	9.5	34.5	21.0	13.5	32.7	24.3	61.3	28.1	196.8
Other gears (Explosives)	E		28		00	00	00	00	4	28
	C		3.7		00	00	00	00	0.5	3.7
	C/E		131.0		00	00	00	00	18.7	131.0
Annual total catch (tonne)		6,464.4	7,457.4	5,470.6	4,512.0	6,712.6	6,602.6	7,438.8	6,351.2	44,458.4

Note: E = Effort, C = Total catch in tonne, C/E = Catch per unit, Effort in kg.

by all the gears combined together. Next important was the long line (hook & line) locally called *Ayiramkal thoondil*. On an average 52,627 sardine gill net units were operated every year. Catch per unit

was higher for the drift net of larger mesh size called *Thirukkai valai* because of the greater weight of the skates and rays caught in this net. Table 1 gives the relative efficiency of each type of gear in the form of

catch per unit. The fishery by detonation of explosive charge was less common at Tuticorin and was practiced in 1980 only.

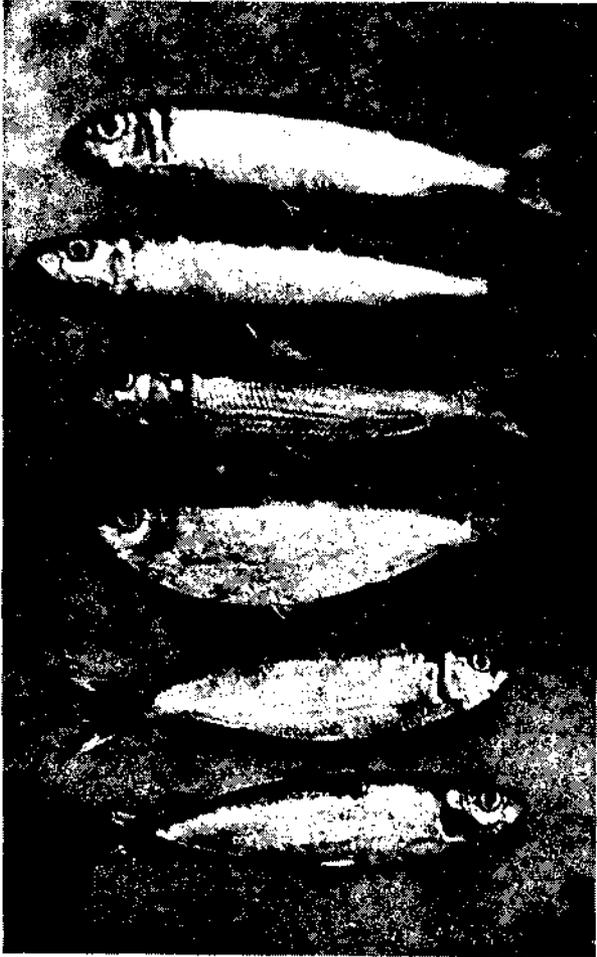


Fig. 3. Sardines at Tuticorin: from bottom *Sardinella gibbosa*, *S. dayi*, *S. albella*, *S. longiceps*, *S. sirm*, *S. clupeioides*.

Craft and gear

The all weather craft employed and popularised by the local fishermen is the plank built boat called Tuticorin type boat locally named *Vallam*. These are designed primarily for sailing and used for all type of traditional fishery. Recently mechanisation has enhanced their efficiency. Few catamaran from Kanyakumari also are stationed regularly at Tuticorin and are mostly engaged in line fishing. Regular census was taken every year for the study of the number of crafts employed in the traditional fishery at Tuticorin and the data are as follows:

Year	Tuticorin type boat	Catamaran	Total
1979	357	27	384
1980	421	29	450
1981	484	19	503
1982	490	14	504
1983	482	29	511
1984	492	7	499
1985	510	14	524

Gill nets, drift nets and hooks & line with many variations among them are the principal gears in the traditional fishery. With improvements in material and technology, now-a-days the gill nets and drift nets are made of synthetic fibres, and entire pieces made by machines. Detailed account of the craft and gear employed by the traditional fishery at Tuticorin is given by Freda and Ubaldraj (*Madras J. Fish.*, 4: 77-87, 1971). Eleven types of fishing gears were operated during the course of this study with varying degrees of contribution to the fishery. Their details are given below:

Name of gear	Details (mesh size etc.)
Drift net (<i>Paru valai</i>)	No. 7: 14.0 cm
	No. 8: 16.0 cm
	No. 9: 17.5 cm
	No. 10: 18.5 cm
Drift net (<i>Podi valai</i>)	No. 2: 5.5 cm
	No. 3: 6.0 cm
	No. 4: 7.0 cm
Sardine gill net (<i>Chala valai</i>)	2.5 to 3.0 cm
Hand line (<i>Thoondil</i>)	Hook No. 5 to 14
Long line (<i>Aytramkal thoondil</i>)	Hook No. 5 and 6
Troll line (<i>Odukayiru</i>)	Hook No. 1 and 2
Bottom set net (<i>Thirukkai valai</i>)	
Bottom set net (<i>Stinki valai</i>)	
Shore seine (<i>Karai valai</i>)	
Prawn net (<i>Thallu madi</i>)	
Explosives	

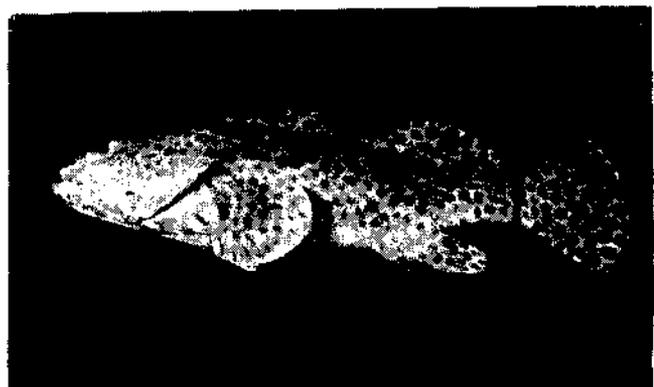


Fig. 4. *Epinephelus malabaricus*.

Table 2. Catch composition of important groups of fish (tonnes) during the year 1979–1985 in Chala valai

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
<i>Sardinella albella</i>	217.8	919.0	650.3	347.1	318.9	478.4	539.6	3,471.1	495.9	10.9	3
<i>Sardinella dayi</i>	931.2	623.9	433.5	219.5	207.9	321.8	359.7	3,097.5	442.5	9.8	4
<i>Sardinella gibbosa</i>	1,526.5	1,713.3	1,233.1	1,488.3	2,647.0	2,105.7	2,334.2	13,048.1	1,864.0	41.1	1
<i>Sardinella sirm</i>	894.3	500.6	1,342.0	821.2	1,502.1	971.3	962.6	6,994.1	999.2	22.0	2
<i>Sardinella clupeioides</i>	12.8	11.7	00	61.1	90.8	13.3	105.2	294.9	42.1	6.9	11
<i>Sardinella longiceps</i>	200.9	529.3	31.9	41.6	16.3	59.6	230.5	1,110.1	158.6	3.5	5
<i>Thrtssocles</i>	326.6	123.7	93.1	82.4	61.5	203.8	201.2	1,092.3	156.0	3.4	6
<i>Letognathus</i>	256.7	113.7	90.4	67.2	40.0	229.0	187.0	984.0	140.6	3.1	7
Carangids	85.5	31.3	12.0	12.9	17.0	50.6	97.4	306.7	43.8	1.0	10
<i>Sphyræna</i>	65.3	65.6	41.4	32.4	23.2	74.0	75.2	377.1	53.9	1.2	8
<i>Therapon</i>	62.6	00	10.8	10.1	17.0	22.3	25.4	148.2	21.2	0.5	14
Seer fish	3.8	00	5.7	9.8	12.2	20.3	7.5	59.3	8.5	0.2	15
<i>Chirocentrus</i>	56.0	35.9	15.4	21.3	78.3	113.0	48.7	368.6	52.7	1.2	9
<i>Sillago</i>	9.7	5.7	24.5	13.4	46.0	46.8	29.9	176.0	25.1	0.6	13
Miscellaneous	57.3	38.5	20.0	24.4	26.2	45.5	25.9	237.8	34.0	0.7	12
Total	4,707.0	4,712.2	4,004.1	3,252.7	5,104.4	4,755.4	5,230.0	31,765.8	4,538.0		

Table 3. Catch composition of important groups of fish (tonnes) during the years 1979–1985 in Paru valai (drift net)

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
Sharks	4.8	44.7	48.0	42.8	46.6	18.8	25.7	231.4	33.1	8.3	5
Skates	00	00	3.4	2.3	00	2.0	00	7.7	1.1	0.3	20
Rays	1.2	6.4	5.6	18.3	8.1	9.4	00	49.0	7.0	1.2	14
Tuna	11.5	76.2	60.9	32.3	40.8	68.2	17.4	307.3	43.9	11.0	2
Seer fish	48.8	231.00	173.1	157.6	64.5	51.3	24.0	750.3	107.2	26.9	1
Carangids	8.7	40.9	53.6	42.4	33.2	52.1	29.0	259.9	37.0	9.3	3
<i>Chorinemus</i>	7.5	16.4	17.3	12.1	5.3	8.5	1.6	68.7	9.8	2.5	10
Cat fish	9.8	45.6	47.3	22.4	12.6	15.2	11.3	164.2	23.5	5.9	7
Lethrinids	13.2	41.0	53.6	20.9	27.6	39.2	55.6	251.1	35.9	9.0	4
<i>Serranus</i>	13.6	10.6	22.9	20.2	36.5	48.6	40.7	193.1	27.6	6.9	6
<i>Lutjanus</i>	1.8	12.0	23.2	9.4	4.0	24.8	35.0	110.2	15.7	3.9	9
<i>Diagramma</i>	2.4	8.9	8.5	5.1	8.6	4.0	3.6	41.1	5.9	1.5	12
<i>Sphyræna</i>	11.2	50.5	28.8	16.8	13.4	18.0	26.9	165.6	23.7	5.9	8
<i>Istiophorus</i>	00	2.3	10.8	3.4	4.0	00	4.6	25.1	3.6	0.9	17
<i>Rachycentron</i>	4.8	15.0	5.0	8.8	4.8	7.0	7.0	52.4	7.5	1.9	11
<i>Lates culcarifer</i>	2.7	7.8	10.0	3.2	2.0	4.8	4.9	35.4	5.0	1.3	13
<i>Polynemus</i>	2.2	7.7	9.9	1.7	2.2	2.3	1.7	27.7	4.0	1.0	16
<i>Elops saurus</i>	00	2.3	7.4	00	00	0.8	00	10.5	1.5	0.4	19
Other perch like fishes	1.8	5.7	2.0	5.6	6.9	8.2	00	30.2	4.3	1.1	15
Miscellaneous	0.8	4.0	3.4	0.6	1.6	2.3	0.6	13.3	1.9	0.5	18
Total	146.8	629.0	594.7	425.9	322.7	385.5	289.6	2,794.2	399.2		

Gear-wise landings

1. Sardine gill net ('Chala valai')

This gear was operated during all the years and contributed to the maximum catch in all the months. Average annual landings came to 4,538 tonnes which was 71.5% of the total fish landings by indigenous gears. Only during 1981 and 1982 the total catch went below the average catch. Catch per unit for the gear came to 86.3 kg. High catch per unit was reported from October to December indicating good fishery during that period. Exceptionally high catch per unit was also noticed during September of 1983 and August, 1985.

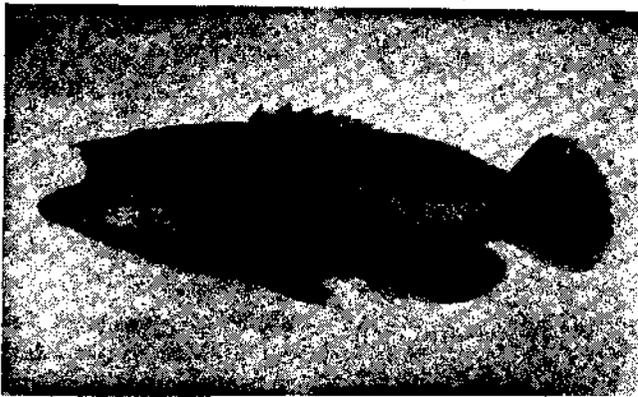


Fig. 5. *Serranus* sp.

Lesser sardine as a group dominated the catch of sardine gill nets. Other species like *Thrissocles*, *Sphyraena*, *Leiognathus*, *Chirocentrus*, carangids and many smaller species of fish were recorded in the sardine gill net catch. *Sardinella gibbosa* was the dominant species forming 41.1% in the catch by the gear.

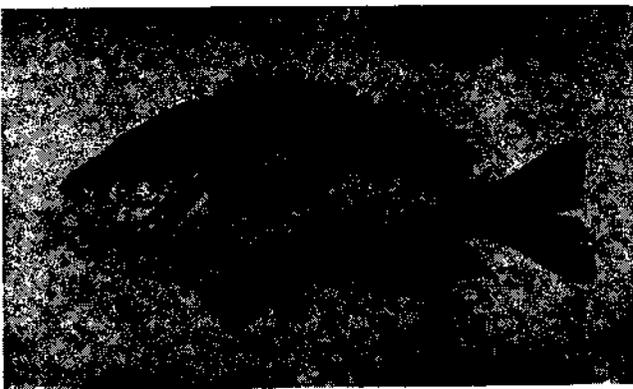


Fig. 6. *Lutiauns rivulatus*

2. Drift net ('Paru valai')

Another important gear for fishing larger fish was the *paru valai* which was operated during all the months. Larger fish especially seer fish, tuna, carangids, perches, *Chorinemus* and barracuda were the main components caught by this net. Seer fish formed 26.9% in the average catch by *paru valai* followed by tuna 11.0% and carangids 9.3%. Annual total catch by this gear came to 399.2 tonnes with the catch per gear rate at 119.7 kg. Largest catch per unit of 162.4 kg was recorded in 1980. Catch per unit trends give no definite period of good fishery for this gear. However, good fish landings by *paru valai* were made during January to April.

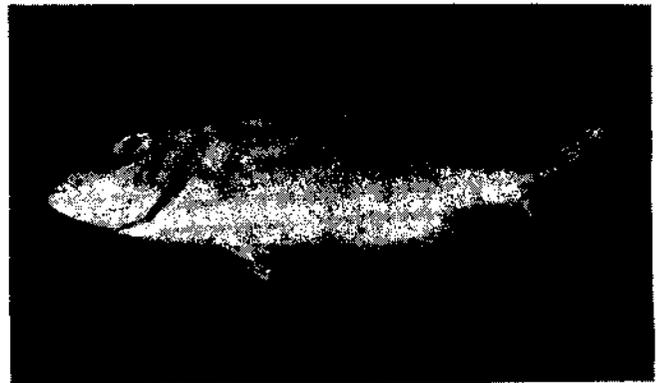


Fig. 7. *Lethrinus nebulosus*.

3. Drift net ('Podi valai')

This is a smaller meshed net operated during all the months to catch medium sized pelagic and demersal species of fish. Annual fish landings by *podi valai* fluctuated from 23.3 tonnes in 1981 to 294.3 tonnes in 1985 with the average catch at 95.4 tonnes. Annual catch per unit also fluctuated from 28.3 kg in 1982 to 79.5 kg in 1985 with the average at 50.8 kg. Medium sized tuna formed 18.4% of the average catch followed by seer fish (16.1%) and *Chirocentrus* (12.4%). Other fishes forming the catch included *Hilsa toll*, perches, carangids and barracuda. There are no uniformly high or low catch by this gear in any of the months and many months recorded good catch per unit rates.

4. Hand line ('Thoondil')

During the period an average of 4,146 hand line units were operated annually, landing 308.8 of fish. The catch per unit was at 78.4 kg. Total fish catch by this gear in a year ranged from 240.6 to 378.8 tonnes. Catch per unit was lowest in 1984 with 58.6 kg and high catch per unit was recorded in 1979

with 130.2 kg of fish. *Nemipterus* formed the dominant group of fish caught with 35.9%. Next important group of fish were lethriniids (20.4%) and *Belone* (10.3%). Carangids, serranids, other perches and balistids were the other important groups of fishes caught by hand lines. Though operated during all the months the period from January to March reported good catch per unit by hand lines.



Fig. 8. *Caranx melampygus*.

5. Long line ('Ayiramkal thoondil')

Tuticorin is famous for a fishery by this gear. On an average 4,370 long line units were operated in a year recording fish catch of 424.3 tonnes. The catch per unit came to 96.4 kg. This gear was operated almost all the months. There was wide fluctuation in the catch by long line units with lowest catch of 133.0 tonnes in 1981 and highest catch of 693.6 tonnes in 1985. Catch per unit was highest in 1980 with 138.9 kg and the month of February recorded high catch per unit of 531.7 kg of fish. Larger perches, sharks and rays, carangids, seer fish and cat fish formed the bulk of the long line catch. *Lethrinus* formed 29.4% of the landings followed by *Serranus* (21.7%) and sharks (15.6%). The months of January, February, August and September recorded good landings by long line units.

6. Troll line ('Odukayiru')

During all the years the troll line was operated at Tuticorin with the number of units ranged from 1,412 in 1985 to 3,230 in 1980. On an average in an year 2,309 units were operated landing 212.4 tonnes of fish. The catch per unit came to 92.7 kg. Highest fish landing by troll line was reported during 1979 with 364.5 tonnes. The catch per unit was 144.9 kg of fish per unit. October 1981 reported a catch per unit of 964.4 kg of fish. Mainly seer fish (57.9%), *Rachycentron* (11.6%) and tuna (10.2%) were

caught by troll line. The months from October to January reported good catch per unit by troll line operations.

7. Lobster net ('Sinki valai')

Operated near coral and shingle bottom areas for lobsters and crabs, this bottom set gill net also catches good quantity of other fishes. On the average 1,161 *sinki valai* units were operated per year and the total catch came to 105.2 tonnes. Average catch per unit came to 91.9 kg which is a fairly high quantity. Total catch varied between 48.6 tonnes in 1979 and 154.5 tonnes in 1980. High catch per unit of 123.8 kg was reported in 1981. Lobster and crabs formed only a low percentage of the catch. Major portion of the *sinki valai* landings was formed by perches, rays, cat fish, carangids and parrot fish. Lethrinids formed 18.7% of the catch, rays (16.8%) and *Diagramma* (16.4%) Lobsters contributed 1.8% of the catch. The months August to October recorded good catch per unit by this gear.

8. Bottom set net ('Thirukkai valai')

Mostly set at the bottom and with large mesh size these nets are operated for bottom dwelling larger fishes. These are operated during particular periods when fishermen feel that they could get good catch especially during the months from May to October. An average of 1,800 *thirukkai valai* units were operated per year landing 219.8 tonnes of fish with the catch per unit of 129.4 kg. Good landings of 457.1 tonnes of fish were reported in 1980 by this gear. Highest catch per unit was in 1979 with 218.4 kg and the lowest was in 1984 at 80.2 kg. Varieties of large sharks, rays and skates were main groups of fishes caught by *thirukkai valai*. Rays formed 69.9%, sharks 15.2% and skates 14.7% of



Fig. 9. *Scomberomorus commerson*.

the catch. Though good catch was reported on different months, May, June, August and September gave better catch per unit by this gear.

9. Shore seine ('Kara valai')

Normally shore seines are not operated at Tuticorin. Shore seine landings from nearby villages are brought to Tuticorin for disposal. Except for 1984, shore seine landings were recorded during all the years. On an average 51 shore seine units were reported with total catch of 5.0 tonnes. Miscellaneous groups of small fish formed the main component in shore seine landings forming 33.2%. Among others *Belone* and *Hemirhamphus* (19.6%), sciaenids (13.4%) and leiognathids (13.1%) formed the catch.

10. Prawn net ('Thallu madi')

This is a specialised gear used to catch prawns. But many varieties of smaller fish are also caught in this gear. In recent years this gear has become popular among the traditional fishermen and on an average 1,666 units per year were operated landing 42.6 tonnes of fish. Good landing of 99.5 tonnes were reported in 1980 with the catch per unit at 34.5 kg. High catch per unit was obtained during 1985 with 61.3 kg. Leiognathids formed the main group of fish caught by this net followed by prawns and sciaenids. Leiognathids formed 43.7% of the catch, prawns 13.5% and sciaenids 10.4%. Other species caught by this net included *Hilsa toli*, crabs and miscellaneous groups. There was no definite season for the operation of this net. However, good catch per unit was reported from February to April.

11. Explosive charges

Some fish were caught by using explosives in 1980. A weak charge of explosives was detonated near coral islands and the fish collected when they came up to the surface immobilized. Clandestinely, it was reported that the system was used several times during the past years and the fish caught were sold along with other fishes. Carangids and perches were usually caught by this method.

Species composition

The traditional fisheries of Tuticorin coast include a large variety of fishes, prawns, lobsters and crabs. The dominant fishery by indigenous crafts and gears is pelagic contributed by lesser sardines, carangids, seer fish and anchovies. Contribution to demersal fisheries is made by sharks and rays, perches and perch-like fishes.

Prawns, lobsters and crabs though, form a small percentage by weight in the marine fisheries are the source of lucrative commerce. Percentage composition of important groups of fishes caught by different gears are given in Table 13. Average month-wise landings of important groups of fishes caught by the traditional fishermen are given in Table 13.

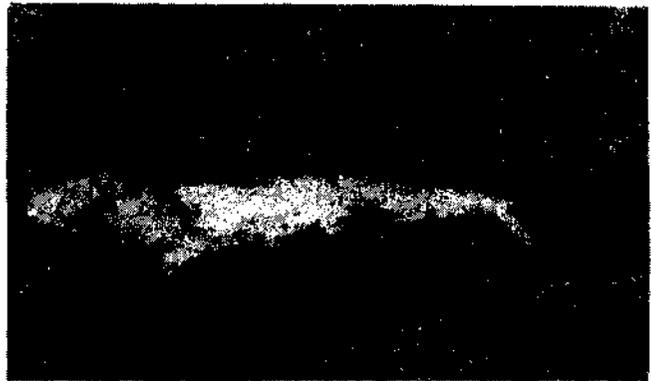


Fig. 10. *Eulamia melanoptera*

Lesser sardines *Sardinella* spp. rank foremost among all the groups of fishes caught by traditional gears. On an average 3,843.7 tonnes of lesser sardines are landed every year forming 60.5% of the annual fish landings. *Sardinella gibbosa* is the important species of lesser sardine caught at Tuticorin followed by *S. sirm*, *S. albella*, *S. dayi* and *S. clupeioides*. Gill nets with mesh size 2.5 to 3.0 cm are used to catch lesser sardines. They are caught during all the months of the year. However, the months September to December recorded increased landings of lesser sardines.

Perches are the important group in the demersal fisheries at Tuticorin caught by traditional fishermen. Mostly contributed by species of *Lethrinus*, *Serranus*, *Lutjanus* and *Diagramma* they form the large and medium sized fishes caught by drift nets and hooks & line. Perches together form 8.2% in the total landings and contribute over 521.1 tonnes of fish annually. Of the perches *Lethrinus nebulosus*, *L. rhodopterus*, *Lutjanus ulviflamma*, *L. rivulatus*, and *Pristipomoides typus* are the important species. Large sized perches popularly called 'Kalava' and 'Koduva' (*Serranus* spp. and *Lates calcarifer*) occur regularly in the Tuticorin fishery. Perches are available throughout the year.

Sharks, rays and skates contribute a total of 147.4, 191.4 and 33.3 tonnes respectively and together form 5.9% in the total landings. Large sharks and rays are caught by *paru valai*, *thirukkai valai* and long line units.

Most of the skates are caught by *thirukkai valai* only. They are caught throughout the year and the quantity varies with the number of units operated during a parti-

cular month. However, June to September are good months for sharks, rays and skates. Fins of sharks and skates are valued in the export trade.

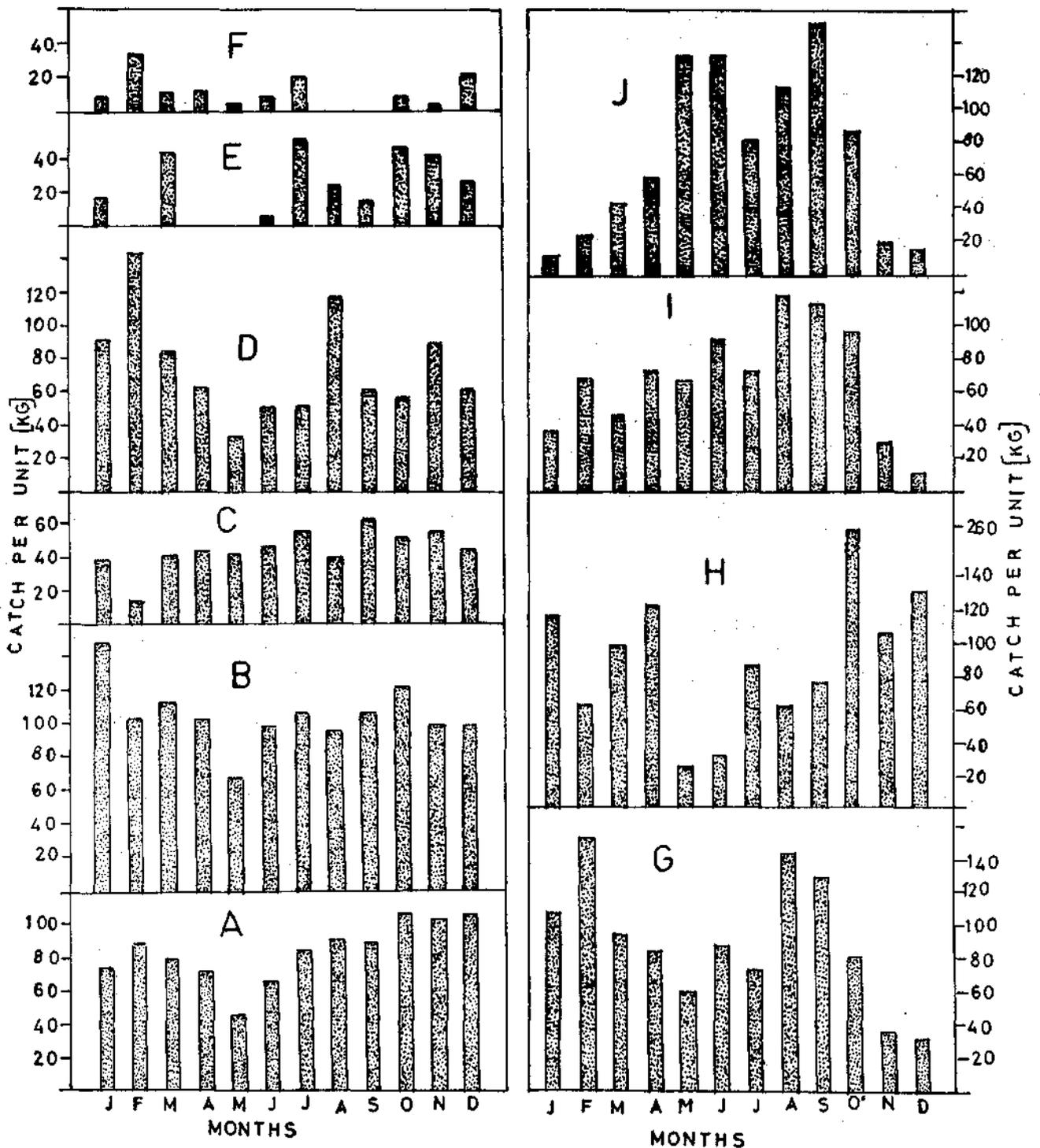


Fig. 11. Seasonal trends in the catch per unit effort by important fishing gears at Tuticorin during 1979-1985: A Chala valai, B Paru valai, C Podi valai, D Hand line, E. Shore seine, F. Thallu madi, G. Long line, H. Troll line, I. Sinki valai, J. Thirukkai valai.

The seer fish *Scomberomorus* spp. are the important quality fish caught at Tuticorin. On an average 266.5 tonnes of seer fish are caught by traditional fishermen. Most of the seer fish are caught by troll line and drift net (*paru valai*). *Scomberomorus guttatus*, *S. commerson* and *S. lineolatum* are the important species in the commercial catch. Total quantity of seer fish landed in an year form 4.2% of the average fish catch. The months from November to January recorded good landings of seer fish.

Carangids are represented by many species in the commercial catches and form 3.0% of the total landings. Small, medium and large specimens of carangids occur in the fishery. In an year an average of 186.0 tonnes of carangids landed by traditional fishing gear and are caught by gill nets, drift nets and hook & lines. Large carangids are caught by drift nets and hook & lines. Highest landings of carangids are reported in July.

Silver bellies (*Leiognathidae*) form an important group caught by sardine gill nets and the prawn net *thallu madl*. On the average 159.9 tonnes of silver bellies are caught every year forming 2.5% in the total catch. They are caught during all the months along with other fishes with increased landings from January to April.

Anchovies form a good portion of fish caught by sardine gill nets. At times they form the major component in the sardine gill net catch. *Thripsocles* spp. and *Illsha* spp. form the major groups among anchovies in the fishery. They contribute 156.4 tonnes annually forming 2.5% in the total catch. Anchovies alongwith leiognathids are much sought after by the industry for reduction into fish meal. January to March are the good months for anchovies at Tuticorin and landings at slightly reduced quantity are recorded till May.

Nemipterus amounts to 110.8 tonnes in the hand line catch and forms 1.7% in the average annual landings. Entire *Nemipterus* catch is by hand lines caught along with other fishes. *Nemipterus bleekeri* is the important species in the fishery. Good landings are reported in November.

The oil sardine *Sardinella longiceps* forms a small fishery at Tuticorin in the traditional sector. Along with lesser sardines and anchovies oil sardines are caught in sardine gill nets. Average annual oil sardine catch comes to 158.6 tonnes. Unlike lesser sardines the oil sardines are not caught every month nor do they occur

every year in good quantity. Not much importance is given to the fishery of oil sardine by the traditional fishermen as it is not relished locally. Almost all the oil sardine caught are marketed at outstation markets especially Kerala.

Sphyraena commonly called barracuda forms a regular fishery at Tuticorin. On the average 100 tonnes of barracuda are landed annually. Smaller sized fish are caught by *podl valai*. Larger barracuda specimens occasionally occur in small numbers in drift nets of different mesh sizes and by troll line. October to December recorded increased landings.

Cat fishes form an important component in the *paru valai* and long line catches. Large cat fishes occur in good numbers in the *paru valai* fishery. On an average 23.5 tonnes of cat fish are landed annually forming 5.9% of the *paru valai* catch. About 14.5 tonnes of cat fishes are landed by long line contributing to 3.4% of the long line catch. Good quantity of cat fish forming 8.8% of its landings are caught in *sinki valai*. Annual landings of cat fish by *sinki valai* came to 9.3 tonnes. March and April are the good months for cat fish catch at Tuticorin.

Tuna and bill fishes are caught regularly by traditional gears. These two fishes occur during the same months. Tunas, mostly *Euthynnus affinis*, are caught in *paru valai*, *podl valai* and troll line. Bill fishes occur in *paru valai* catch. In a year 83.2 tonnes of tunas and 3.6 tonnes of bill fishes are caught by the small scale fishermen. They occur in good numbers during June to September at Tuticorin.

Chirocentrus and *Hilsa toli* among the clupeids are important forms contributing to 64.5 and 15.1 tonnes respectively to the total fish catch. *Chirocentrus* is mainly caught by *vala valai* (mesh size 5.5 to 6.0 cm) and *podl valai*. *Hilsa toli* occurs in the landings of *podl valai* and *thallu madl*. Good numbers of *Chirocentrus* are recorded during August to December and the months of March and April are good for *Hilsa toli* fishery.

Other fishes form a sizable portion in the total catch by the traditional fishermen. There are many species of fishes contributing less than 50 tonnes annually to the total landings. Details about the monthly landings are given in Table 13. Special mention may be made about the fishery of *Chorinemus* spp., *Rachycentron* spp. and belonids. They are considered as important food fishes and are caught in good numbers during certain months.

Table 4. Catch composition of important groups of fishes (tonnes) during the years 1979–1985 in Podi valai (drift net)

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
Sharks	00	6.6	1.2	0.3	1.4	00	6.5	16.0	2.3	2.4	11
Tuna	2.5	9.9	2.2	2.3	7.8	19.2	79.2	123.1	17.6	18.4	1
Seer fish	14.0	23.0	4.1	5.3	8.2	10.9	42.2	107.7	15.4	16.1	2
Carangids	5.7	2.5	1.6	2.1	3.3	6.0	29.9	51.1	7.3	7.6	6
<i>Chorinemus</i>	0.4	0.2	0.3	00	0.3	0.9	4.0	6.1	0.9	0.9	14
Mackerel	18.3	5.6	00	0.1	1.9	0.7	4.1	30.7	4.4	4.6	8
Cat fish	0.4	1.2	00	0.3	00	1.9	6.4	10.2	1.5	1.5	13
Lethrinids	1.2	1.0	1.0	1.4	3.5	4.4	41.9	54.4	7.8	8.1	5
<i>Serranus</i>	1.6	00	00	1.1	0.3	0.9	15.3	19.2	2.7	2.9	10
Lutjanids	00	00	00	00	00	00	5.2	5.2	0.7	0.8	15
<i>Sphyræna</i>	6.2	2.7	1.1	3.3	3.0	3.0	23.1	42.4	6.0	6.3	7
<i>Hilsa toli</i>	21.6	33.6	5.9	3.6	3.0	3.3	4.3	75.3	10.8	11.3	4
<i>Chirocentrus</i>	37.4	10.6	3.8	5.5	6.6	7.7	11.2	82.8	11.8	12.4	3
Sciaenids	0.2	2.1	0.1	00	0.4	0.6	1.2	4.6	0.7	0.7	16
Other perch-like fishes	0.5	2.4	1.2	6.1	0.6	0.5	17.5	28.8	4.0	4.3	9
Miscellaneous	1.9	1.9	0.8	0.3	1.3	2.0	2.3	10.5	1.5	1.6	12
Total	111.9	103.3	23.3	31.7	41.6	62.0	294.3	668.1	95.4		

Table 5. Catch composition of important groups of fish (tonnes) during the year 1979–1985 in Hand (Thoondli line)

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
Sharks	21.6	10.3	0.4	00	00	00	00	32.3	4.6	1.5	10
Lethrinids	67.5	100.7	64.4	17.5	56.4	59.2	76.2	441.9	63.0	20.4	2
<i>Serranus</i>	20.2	40.9	26.0	10.5	59.9	17.5	34.5	209.5	29.9	9.7	4
Lutjanids	8.0	10.2	22.5	4.8	9.1	2.7	14.1	71.4	10.2	3.3	8
<i>Diagramma</i>	18.9	20.3	3.5	1.3	6.8	00	00	50.8	7.3	2.4	9
Carangids	12.3	33.9	37.5	20.6	11.7	11.9	9.7	137.6	19.7	6.4	5
Cat fish	14.4	9.5	0.6	1.2	00	00	00	25.7	3.7	1.2	11
<i>Nemipterus</i>	59.2	73.8	107.4	144.3	182.0	85.0	123.7	775.4	110.8	35.9	1
Balistids	15.7	4.1	0.8	0.3	3.0	39.4	11.8	75.1	10.7	3.5	7
<i>Belone</i>	12.6	15.9	13.2	28.9	36.5	32.2	83.4	222.7	31.8	10.3	3
Other perch-like fishes	46.4	5.5	17.1	4.2	11.0	4.6	7.5	96.3	13.8	4.5	6
Miscellaneous	2.9	0.8	4.1	7.0	1.8	1.4	4.8	22.8	3.3	1.1	12
Total	229.7	325.9	297.5	240.6	378.2	253.9	365.7	2,161.5	308.8		

Table 6. Catch composition of important groups of fish (tonnes) during 1979–1985 in (Ayiramkal thoondil) Long line

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
Sharks	129.2	83.9	2.4	14.0	88.4	65.2	80.6	463.7	66.2	15.6	3
Rays	20.3	52.2	7.9	1.9	6.9	1.7	00	90.9	13.0	3.1	7
Seer fish	0.1	17.2	9.4	0.9	8.8	17.1	16.9	70.4	10.1	2.4	8
Cat fish	00	8.7	6.2	8.5	22.2	41.4	14.5	101.5	14.5	3.4	6
Carangids	39.7	91.4	19.8	34.2	56.7	65.1	41.0	347.9	49.7	11.7	4
<i>Chorinemus</i>	7.4	14.7	00	4.6	7.5	6.6	2.4	43.2	6.2	1.5	9
<i>Lethrinus</i>	111.2	247.9	39.8	21.7	52.0	186.0	214.9	873.4	124.8	29.4	1
<i>Serranus</i>	66.2	83.3	18.6	58.7	44.4	180.7	193.9	645.8	92.3	21.7	2
Lutjanids	8.4	20.9	26.5	5.5	6.0	50.1	111.0	228.4	32.6	7.7	5
<i>Diagramma</i>	00	5.4	0.6	1.1	9.4	8.2	6.5	31.2	4.5	1.1	10
<i>Lates calcarifer</i>	00	1.0	00	1.2	00	8.2	5.7	16.1	2.3	0.5	13
<i>Polynemus</i>	00	13.6	0.9	0.9	1.7	00	00	17.1	2.4	0.6	11
<i>Sphyaena</i>	00	1.5	0.6	00	00	00	00	2.1	0.3	0.1	16
<i>Elops saurus</i>	00	0.8	00	5.5	00	00	00	6.3	0.9	0.2	15
Other perchlike fishes	00	3.4	00	6.2	1.3	3.9	00	14.8	2.1	0.5	14
Miscellaneous	0.8	4.5	0.3	0.6	4.2	0.4	6.3	17.1	2.4	0.6	12
Total	383.3	650.4	133.0	165.5	309.5	634.6	693.6	2,969.9	424.3		

Table 7. Catch composition of important groups of fish (tonnes) during the year 1979–1985 in (Odu kayiru) Troll line

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
Sharks	00	2.6	49.6	1.6	00	00	00	53.8	7.7	3.6	6
Tuna	28.4	47.3	5.4	15.2	7.5	17.2	30.8	151.8	21.7	10.2	3
Seer fish	154.7	181.4	91.8	156.6	108.4	81.2	86.3	860.4	122.9	57.9	1
Carangids	99.5	27.3	2.3	00	00	1.6	00	130.7	18.6	8.8	4
<i>Sphyaena</i>	15.0	34.0	20.4	13.3	15.7	6.4	8.4	113.2	16.2	7.6	5
<i>Rachycentron</i>	66.9	20.7	4.8	15.8	12.9	29.0	21.8	171.9	24.5	11.6	2
Miscellaneous	00	2.2	3.1	00	00	00	00	5.3	0.8	0.4	7
Total	364.5	315.5	177.4	202.5	144.5	135.4	147.3	1,487.1	212.4		

Table 8. Catch composition of important groups of fish (tonnes) during the year 1979–1985 in Sinki valai (Bottom set net)

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
Rays	4.3	7.2	16.3	58.4	7.2	12.7	18.0	124.1	17.7	16.8	2
Seer fish	0.2	4.0	2.7	3.6	2.3	1.7	2.0	16.5	2.4	2.2	11
Carangids	4.0	10.8	8.3	11.0	7.0	2.4	9.9	53.4	7.6	7.3	6
Cat fish	1.7	7.7	7.3	9.4	9.9	11.7	17.4	65.1	9.3	8.8	5
Lethrinids	11.6	57.5	17.0	6.7	12.7	8.7	23.7	137.9	19.7	18.7	1
Serranus	1.7	4.9	15.8	4.2	21.6	29.8	14.5	92.5	13.2	12.6	4
Lutjanids	2.3	1.4	6.8	2.4	1.7	3.8	0.5	18.9	2.7	2.6	10
Diagramma	10.2	30.0	15.6	10.7	16.7	25.4	11.9	120.5	17.2	16.4	3
Rachycentron	1.7	2.0	0.6	1.0	0.2	00	00	5.5	0.8	0.7	14
Callyodon	6.0	9.8	1.9	1.5	1.8	1.3	4.3	26.6	3.8	3.6	7
Soles	00	7.3	1.3	1.4	3.4	2.9	8.3	24.6	3.5	3.3	9
Lobster	1.8	1.8	1.5	0.6	1.6	1.5	4.4	13.2	1.9	1.8	12
Crabs	2.2	00	00	00	00	00	0.5	2.7	0.4	0.4	15
Other fish	0.9	8.5	8.7	3.3	1.5	1.5	0.5	24.9	3.6	3.4	8
Miscellaneous	00	1.6	2.1	0.9	1.0	00	4.5	10.1	1.4	1.4	13
Total	48.6	154.5	105.9	115.1	88.6	103.4	120.4	736.5	105.2		

Table 9. Catch composition of important groups of fish (tonnes) during 1979–1985 in Thirukkai valai (Bottom set net)

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
Sharks	18.8	55.3	18.1	4.5	57.8	26.3	53.7	234.6	33.5	15.2	2
Rays	147.8	321.6	94.7	62.4	172.2	125.7	151.7	1,076.1	153.7	69.9	1
Skates	00	80.2	13.5	7.2	60.6	21.7	42.3	225.5	32.2	14.7	3
Miscellaneous	2.2	00	00	00	00	00	00	2.2	0.3	0.1	4
Total	168.8	457.1	126.3	74.1	290.6	173.6	247.8	1,538.4	219.8		

Table 10. Catch composition of important groups of fish (tonnes) during 1979–1985 in Kara valai (shore seine)

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
Carangids	00	00	0.2	00	2.0	00	00	2.2	0.3	6.3	6
Belonids	0.6	2.4	0.4	1.8	1.7	00	00	6.9	1.0	19.6	2
Leiognathids	0.5	00	00	00	2.2	00	1.9	4.6	0.7	13.1	4
Sciaenids	1.0	0.2	00	00	0.8	00	2.7	4.7	0.7	13.4	3
Thrissocles	00	00	00	00	2.6	00	0.5	3.1	0.4	8.8	5
Stolephorus	00	0.1	00	00	0.8	00	00	0.9	0.1	2.6	7
Prawns	00	0.1	00	00	00	00	0.1	0.2	0.2	0.6	9
Crabs	0.2	0.1	00	00	0.6	00	00	0.9	0.1	2.6	8
Miscellaneous	3.1	3.4	0.3	1.4	1.2	00	2.3	11.7	1.7	33.2	1
Total	5.4	6.3	0.9	3.2	11.9	00	7.5	35.2	5.0		

Table 11. Catch composition of important groups of fish (tonnes) during the year 1979-1985 in Thallu madi (Prawn net)

Fish groups	1979	1980	1981	1982	1983	1984	1985	Total	Average	%	Rank
<i>Leiognathus</i>	17.2	58.0	3.3	00	11.0	17.7	23.1	130.3	18.6	43.7	1
Sciaenids	00	3.6	00	00	2.0	18.3	7.2	31.1	4.4	10.4	3
Carangids	00	00	00	00	00	11.5	00	11.5	1.6	3.9	7
<i>Hilsa toli</i>	00	6.7	00	00	00	23.2	00	29.9	4.3	10.0	4
<i>Stolephorus</i>	00	00	00	00	00	00	4.9	4.9	0.7	1.6	8
Prawns	10.8	11.3	1.4	0.2	2.6	9.8	4.1	40.2	5.7	13.5	2
Crabs	00	13.7	0.6	0.1	00	14.2	00	28.6	4.2	9.6	5
Miscellaneous	0.4	6.2	2.2	0.4	5.0	4.0	3.3	21.5	3.1	7.0	6
Total	28.4	99.5	7.5	0.7	20.6	98.7	42.6	298.0	42.6		

Table 12. Percentage contribution by different gears to the landings of important groups of fish based on average annual landings during the period 1979-1985

Fish groups	Chala valai	Paru valai	Podi valai	Hand line	Long line	Troll line	Sinki valai	Thiru-kkai valai	Shore seine	Thallu madi	Other gears	Annual average catch (tonne)
Sharks	—	22.5	1.6	3.1	44.9	5.2	—	22.7	—	—	—	147.4
Rays	—	3.7	—	—	6.8	—	9.2	80.3	—	—	—	191.4
Skates	—	3.3	—	—	—	—	—	96.7	—	—	—	33.3
Lesser sardine	100	—	—	—	—	—	—	—	—	—	—	3,843.7
Oil sardine	100	—	—	—	—	—	—	—	—	—	—	158.6
<i>Stolephorus</i>	—	—	—	—	—	—	—	—	12.5	87.5	—	0.8
<i>Elops saurus</i>	—	62.5	—	—	37.5	—	—	—	—	—	—	2.4
<i>Hilsa toli</i>	—	—	71.5	—	—	—	—	—	—	28.5	—	15.1
<i>Chirocentrus</i>	81.7	—	18.3	—	—	—	—	—	—	—	—	64.5
<i>Thrissocles</i>	99.7	—	—	—	—	—	—	—	0.3	—	—	156.4
Cat fish	—	44.8	2.9	7.0	27.6	—	17.7	—	—	—	—	52.5
<i>Sphyraena</i>	53.8	23.7	6.0	—	0.3	16.2	—	—	—	—	—	100.1
Carangids	23.5	19.9	3.8	10.6	26.7	10.0	4.1	—	0.2	0.9	0.2	186.0
<i>Chorinemus</i>	—	58.0	5.3	—	36.7	—	—	—	—	—	—	16.9
<i>Lutjanus</i>	—	25.4	1.0	16.5	52.7	—	4.4	—	—	—	—	61.9
<i>Nemipterus</i>	—	—	—	100.0	—	—	—	—	—	—	—	110.8
Leiognathids	88.0	—	—	—	—	—	—	—	0.4	11.6	—	159.9
Sciaenids	—	—	12.0	—	—	—	—	—	12.1	75.9	—	5.8
Mackerel	—	—	100.0	—	—	—	—	—	—	—	—	4.4
Tuna	—	52.8	21.2	—	—	26.0	—	—	—	—	—	83.2
Lethrinids	—	14.3	3.1	25.1	49.7	—	7.8	—	—	—	—	251.2
<i>Serranus</i>	—	16.7	1.6	18.0	55.7	—	8.0	—	—	—	—	165.7
<i>Diagramma</i>	—	16.9	—	20.9	12.9	—	49.0	—	—	—	0.3	35.0
<i>Lates calcarifer</i>	—	68.5	—	—	31.5	—	—	—	—	—	—	7.3
<i>Polynemus</i>	—	62.5	—	—	37.5	—	—	—	—	—	—	6.4
Seer fish	3.2	40.2	5.8	—	3.8	46.1	0.9	—	—	—	—	266.0
<i>Istiophorus</i>	—	100	—	—	—	—	—	—	—	—	—	3.6

Table 12. (Contd.)

Fish groups	Chala valai	Paru valai	Podi valai	Hand line	Long line	Troll line	Sinki valai	Thiru-kkai valai	Shore seine	Thallu madi	Other gears	Annual average catch (tonne)
<i>Rachycentron</i>	—	22.9	—	—	—	74.7	2.4	—	—	—	—	32.8
Belonids	—	—	—	97.0	—	—	—	—	3.0	—	—	32.8
<i>Cullyodon</i>	—	—	—	—	—	—	100.0	—	—	—	—	3.8
Soles	—	—	—	—	—	—	100.0	—	—	—	—	3.5
Balistids	—	—	—	100.0	—	—	—	—	—	—	—	10.7
<i>Therapon</i>	100.0	—	—	—	—	—	—	—	—	—	—	21.2
<i>Sillago sihama</i>	100.0	—	—	—	—	—	—	—	—	—	—	25.1
Lobster	—	—	—	—	—	—	100.0	—	—	—	—	1.9
Prawns	—	—	—	—	—	—	—	—	0.3	99.7	—	5.7
Crabs	—	—	—	—	—	—	8.5	—	2.1	89.4	—	4.7
Other perch-like fishes	—	15.5	14.4	49.6	7.6	—	12.9	—	—	—	—	27.8
Miscellaneous	67.5	3.8	3.0	6.5	4.8	1.6	2.2	0.6	3.4	6.2	—	50.4
Total (tonnes)	4,538.0	399.2	95.4	308.8	424.3	212.4	105.2	219.8	5.0	42.6	0.5	6,351
%	71.5	6.3	1.5	4.8	6.7	3.3	1.6	3.4	0.1	0.7	0.1	

Prawns, lobsters and crabs are considered important in the export oriented trade. On an average 5.7 tonnes of prawns are landed every year by the traditional sector. The prawn net called *thallu madi* is exclusively used in the traditional sector to catch prawns. The months of March and December are considered good for the prawn fishery. Lobsters constitute a good fishery at Tuticorin. They are never abundant in the terms of major fin fishes like sardines but are much valued in the export trade. Per year 1.9 tonnes of lobsters land at Tuticorin exclusively caught by the lobster net *sinki valai*. August and October are the good months for the lobster fishery. Edible crabs form 4.7 tonnes in the commercial fishery by indigenous gears. They are mostly caught by *thallu madi* along with prawns and other fishes. Small quantity of crabs are caught by *sinki valai* also. Major portion of the crab catch comes during the months of January and July.

Remarks

The study has provided a detailed knowledge of the vicissitudes experienced by the traditional small scale fishery at Tuticorin. Year by year analysis of fish production indicates that the fishery by traditional sector is very much stable and improving. The average fish production in this sector is not only fairly high, but also the recent trends show a greater level of yield over and

above the average annual catch. So much so, there is indication that fish production by the traditional sector could be increased by adopting improved fishing techniques. Some improvements in craft and gear have taken place recently and their impact in the fishery are yet to be studied.

For exploiting the near shore pelagic resources the sardine gill net, drift nets and hook & lines are very effective. The traditional fishermen have successfully tapped these resources using different gears. Highly esteemed demersal resources like *Kalava* (*Serranus* spp.), *Koduva* (*Lates* sp.), *Velameen* (*Lethrinus* spp.) and *Kooral* (*Pseudosciaena* spp.) have been fished by long lines and drift nets. Contribution by the demersal fisheries to the total landings is fairly considerable. Bottom set nets are effectively used to fish large quantities of rays and skates.

At present export oriented fisheries like prawns and lobsters are controlled by mechanised trawlers. On a smaller scale they are fished by traditional fishermen using modified indigenous gears. Great strides have been made in this direction. There are indications that the traditional fishery at Tuticorin is poised for greater growth in the near future and the catch is likely to increase.

Table 13. Average month-wise landings of important marine fishes at Tuticorin (in kg) from 1979 to 1985

Name of fish	January	Feb.	March	April	May	June	July	August	September	October	November	December	Total
Sharks	10,015.6	19,027.7	13,939.9	14,370.6	8,510.0	11,492.0	14,060.7	15,187.9	19,733.10	11,130.3	4,040.4	5,891.9	1,47,400
Rays	8,413.7	5,349.3	9,575.7	14,742.6	19,551.9	42,388.7	19,113.1	22,658.0	29,130.7	16,890.0	2,336.0	1,250.3	1,91,400
Skates	232.1	68.4	850.1	960.6	3,605.7	7,508.9	11,217.9	5,209.7	2,168.9	1,104.0	346.7	27.0	333.00
Lesser sardine	2,72,644.3	3,04,648.9	3,38,213.6	2,66,522.0	1,66,418.9	1,99,566.1	3,38,996.4	3,53,778.9	3,67,593.6	4,24,457.6	3,67,537.7	4,43,322.1	38,43,700
Oil sardine	4,057.9	694.3	5,712.7	3,468.0	3,214.8	00	00	13,865.9	25,159.7	30459.4	52,158.7	19,808.7	1,58,600
<i>Stolephorus</i>	00	00	115.7	00	00	17.1	11.4	00	00	00	00	655.7	800
<i>Elops saurus</i>	492.9	141.9	115.7	35.7	00	541.0	150.0	493.7	2500.0	107.1	00	72.0	2,4000
<i>Hilsa toli</i>	721.6	154.3	3,506.1	2,043.7	717.1	665.6	402.6	288.6	745.3	2,489.4	2,420.3	945.4	15,100
<i>Chirocentrus</i>	822.0	244.0	357.0	939.9	430.6	3,587.3	1,435.0	8,691.6	8,838.3	9,674.6	10,543.0	18,936.7	64,050
<i>ThriSSocles</i>	40,166.6	29,832.1	30,505.3	18,887.4	24,848.0	7,442.4	2,566.7	00	1,826.9	77.2	00	247.4	1,56,400
Cat fish	4,523.9	4,915.7	7,940.4	7,976.4	5,279.9	4,286.9	1,096.2	2,702.9	2,928.0	4,852.4	3,299.6	2,697.7	52,500
<i>Sphyraena</i>	9,163.1	6,193.3	8,349.3	13,880.0	2,909.6	4,499.7	5,188.7	4,318.1	6,412.3	14,099.9	10,927.3	14,328.7	1,00,180
Carangids	14,144.6	16,932.4	17,085.0	12,933.6	15,422.6	15,223.7	21,167.6	15,878.1	16,167.9	16,257.1	7,533.4	17,234.0	1,86,000
<i>Chorinemus</i>	2,510.9	725.4	1,070.1	1,730.0	3,325.6	2,536.6	464.1	525.1	497.0	2,230.6	404.6	852.0	16,872
<i>Lutjanus</i>	4,835.4	6,489.7	9,548.9	9,249.0	2,247.9	3,592.0	1,952.6	4,278.3	11,001.6	4,348.9	1,900.7	2,455.0	61,900
<i>Nemipterus</i>	13,073.0	5,454.4	13,253.0	6,283.7	6,784.6	2,036.6	12,029.9	5,386.4	9,352.0	10,052.7	16,492.0	10,601.7	1,10,800
Leiognathids	25,135.7	26,040.0	23,594.5	20,601.9	10,922.7	7,581.0	14,010.0	14,387.0	4,006.7	4,440.3	1,674.0	7,505.3	1,59,899
Sciaenids	29.7	272.6	2,343.0	773.9	70.6	100.3	233.4	93.7	78.6	452.9	315.7	1,035.6	5,800
Mackerel	51.7	00	786.6	707.9	149.9	181.9	295.7	83.0	12.7	367.4	1,536.1	227.1	4,400
Tuna	6,239.7	697.1	1,988.0	4,280.0	3,851.9	14,161.00	10,039.1	9,246.4	12,292.7	7,387.9	4,918.9	8,126.3	83,229
Lethrinids	32,200.4	25,172.4	24,508.3	17,925.0	19,339.4	21,946.1	12,952.6	23,423.0	30,523.3	18,497.3	14,850.2	9,904.0	2,51,242
<i>Serranus</i>	13,307.1	11,734.4	19,338.1	13,357.1	14,023.6	12,074.1	10,798.4	14,727.3	23,970.4	19,712.6	7,452.0	5,203.9	1,65,699
<i>Diagramma</i>	3,660.0	2,484.0	1,399.0	1,503.7	2,142.7	4,484.7	3,020.9	6,437.1	4,957.1	2,835.3	929.6	1,054.9	34,909
<i>Lates calcarifer</i>	1,024.6	638.3	745.0	287.6	891.7	713.0	154.3	705.7	156.7	576.7	875.4	531.0	7,300
<i>Polynemus</i>	312.6	147.3	583.6	1,075.7	632.3	87.9	54.7	40.9	105.7	1,893.3	745.0	721.0	6,400
Seer fish	36,747.7	12,916.7	13,840.4	28,190.9	7,040.7	8,476.4	15,211.7	27,553.4	21,610.6	23,546.1	42,943.4	28,421.0	2,66,499
<i>Istiophorus</i>	00	85.7	00	272.3	00	321.4	1,004.9	1,403.7	59.4	88.0	185.7	178.9	3,600
<i>Rachycentron</i>	2,571.4	1,745.4	7,066.1	4,374.3	2,424.3	791.3	685.9	1,488.7	2,932.3	4,774.0	2,625.6	1,320.7	32,800
Belonids	4,099.1	906.6	2,280.0	860.9	460.3	1,293.4	1,857.4	877.3	1,115.0	2,151.4	8,515.3	8,383.3	32,800
Lobster	22.1	72.0	101.3	312.9	126.9	191.1	202.4	233.7	132.0	294.9	210.7	00	1,900
Prawns	167.1	334.3	1,268.6	452.9	179.0	161.4	321.6	00	00	1,013.1	544.7	1,277.3	5,720
Crabs	1,435.7	85.7	00	00	00	00	1,062.9	49.7	292.9	801.7	900.0	21.4	4,700
Other fishes	8,528.6	16,060.4	10,140.0	11,482.00	5,396.6	11,212.3	9,677.3	8,308.0	20,904.7	10,267.7	11,620.9	19,101.5	1,42,500
TOTAL	5,21,400.8	5,00,264.7	5,70,120.9	4,80,482.2	3,30,939.8	3,89,161.9	5,11,436.1	5,62,321.8	6,24,756.0	6,47,241.8	5,80,783.6	6,32,339.4	63,51,249