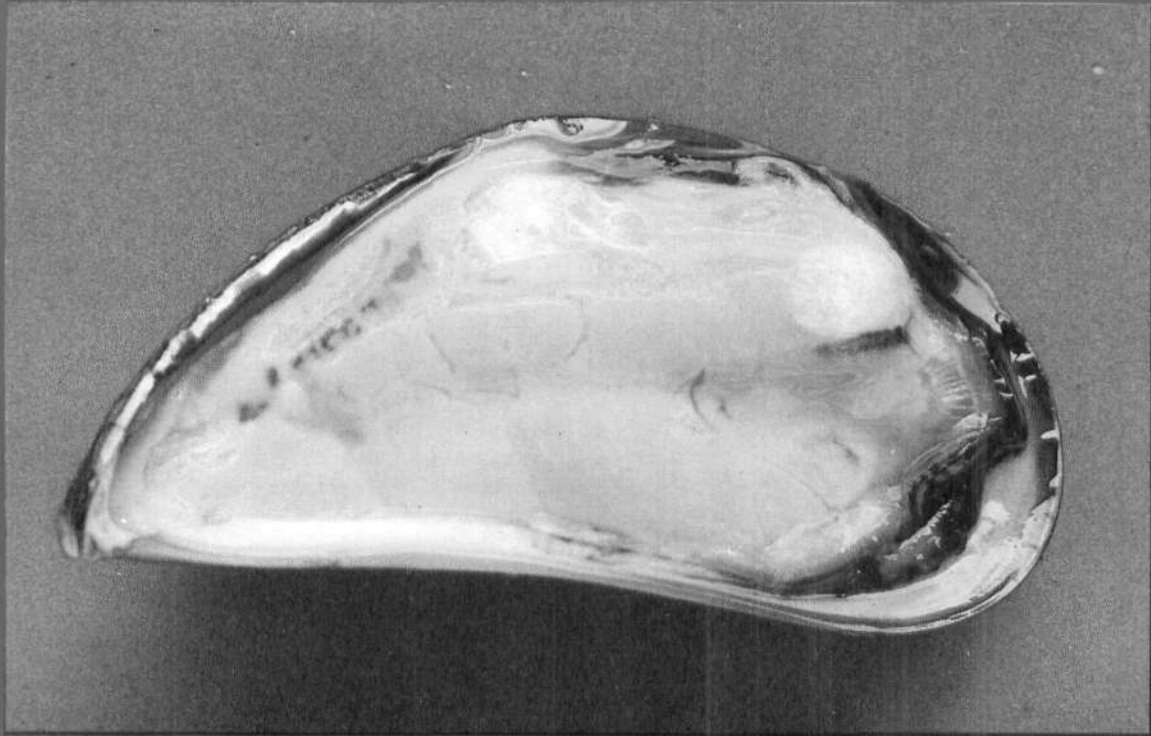




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भारतीय कृषि अनुसंधान परिषद  
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937 **MODIFICATIONS OF CRAFT AND GEAR IN DIVERSIFIED TUNA FISHERY UNDERTAKEN AT THARUVAIKULAM, GULF OF MANNAR, INDIA**

**T.S. Balasubramaniam**

*Tuticorin Research Centre of Central Marine Fisheries Research Institute,  
Tuticorin-628 001, India*

**Introduction**

The production of tuna has shown spurts of increase from time to time, mainly due to new areas of operation combined with new fishing practices and better market demand. Although there has been a noticeable increase in the landings of coastal tunas during the last three decades the tuna stock remains to be one of the least exploited pelagic resources of the EEZ of India. The impact of modern technology was mainly witnessed in the introduction of synthetic yarn for fishing gear and mechanisation of the crafts which enabled the fishermen to develop their fishing practices in a progressive manner.

Diversification in the fishery is often spoken of to reduce effort on shrimp trawling. The seasonal conversion of mechanised boats involved in trawling into efficient gillnetters with mechanised hauling system needs consideration. Shrimp trawlers ranging in size between 9 and 13 m are considered to be the most suitable boats for making modifications in the design and super structure.

**Modification of shrimp trawlers**

In recent years some of the shrimp trawlers at Tuticorin Fishing Harbour could not realise better return due to some reasons involved in it. Hence some trawl owners sold their trawlers costing between Rs. 15 and 20 lakhs for very low prices ranging between 5 and 7 lakhs. But at the same time some enterprising boat owners decided to effect diversification in the fishery instead of keeping their trawlers either idle or dispose off at a lower price. Accordingly they undertook relevant modifications in their trawl-

ers so as to convert them suitable for drift gill net fishery.

**Details of modifications carried out in the existing shrimp trawlers for drift gill net operation**

1. The mast, winch and gallows were removed totally (Figs. 1 & 2)
2. Size of the wheel house was considerably reduced and simplified by reducing height, length and breadth of the same which in turn could provide more deck area on either side of the wheel house for handling the fishing gear during and after the operation. And also reduction of height helped the boat to withstand rough weather conditions when the engine was put off in the open sea during fishing. (Figs. 3, 4 & 5)
3. Required deck alterations were made so as to provide gear hold in the anterior deck area (Figs. 6 & 7).
4. Part of the rear portion of the deck was converted as storage for ice blocks and fish catch for a longer period by attending suitable modifications. The size of the storage space was 3.6 x 2.1 x 1.6 m and storage capacity 1.5 to 2 tonnes. (Figs. 8 & 9).
5. Storage for gear/craft operational materials and accessories were also provided just in front of the gear hold (Fig. 10).
6. Small cooking area with necessary partitions to keep stove, utensils and cooking materials was also created in the extreme rear end of the boat (Figs. 11 & 12).

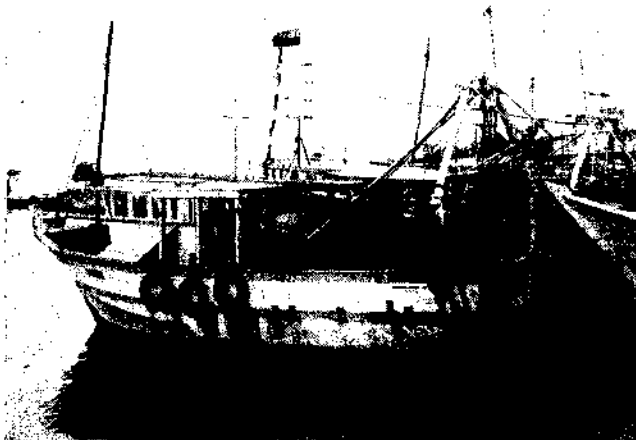


Fig 1. Common trawler.

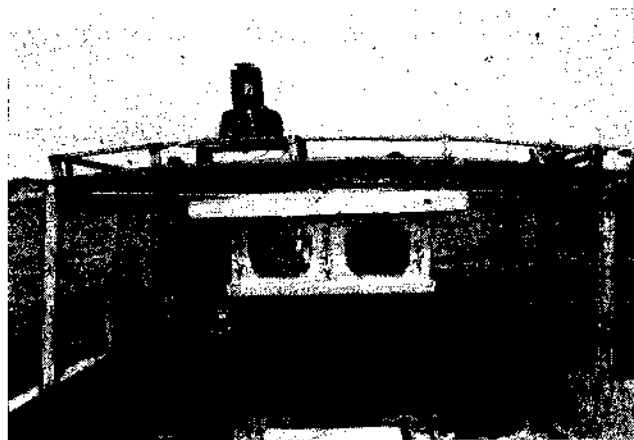


Fig 4. Modified wheel house in gillnet boat.



Fig 2. Modified trawler without mast, winch & gallows for drift gillnet operation.

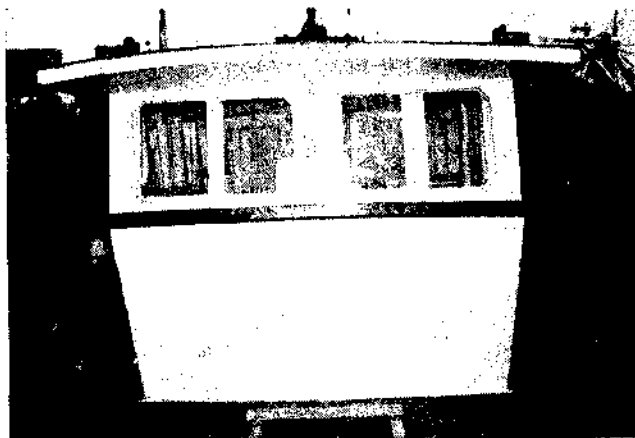


Fig 3. Wheel-house of a common trawler.

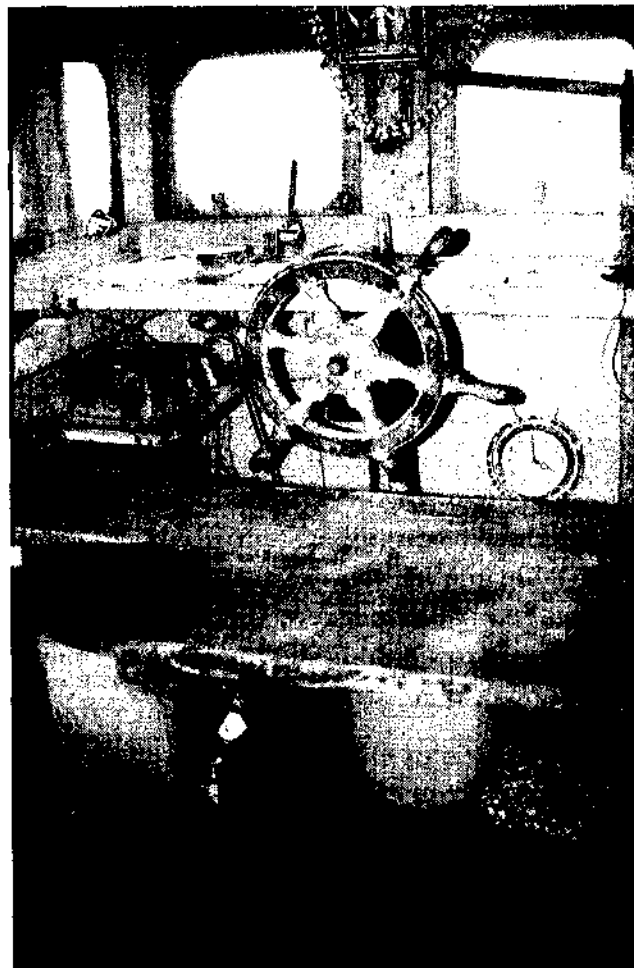


Fig 5. Inside of the wheel house

7. Necessary alterations were made in the crank shaft to fix the manual rudder operator with vertical iron rod and wooden handle as and when it was required to use (Figs. 13, 14 & 15).

#### **Modification of the gear**

Drift gill nets are employed by coastal fisherfolks to catch pelagic fishes which swim at or near surface. The gear is set anywhere from midwater to surface and the fishes are

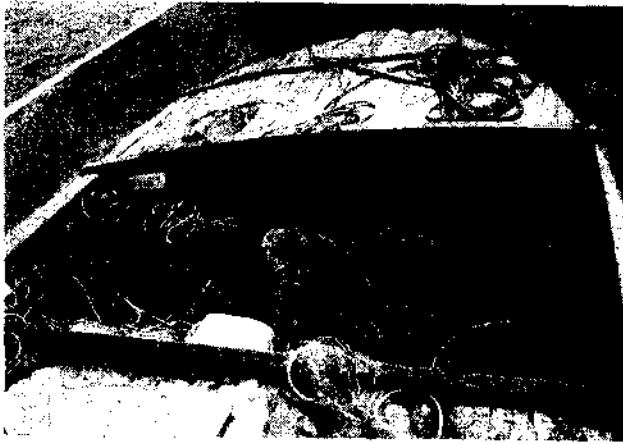


Fig 6. Modified gear hold in front of wheel house.

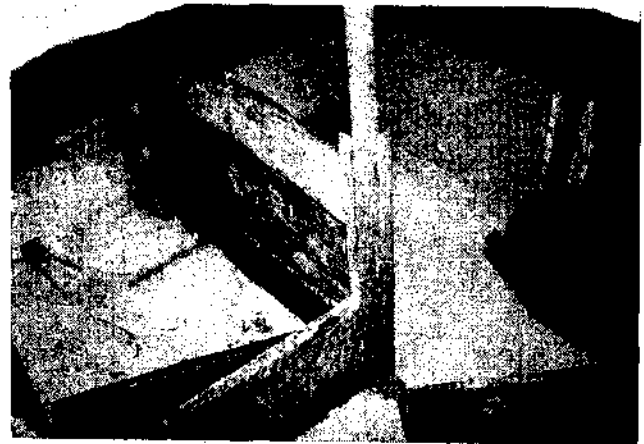


Fig 9. Inside view of Ice & fish hold

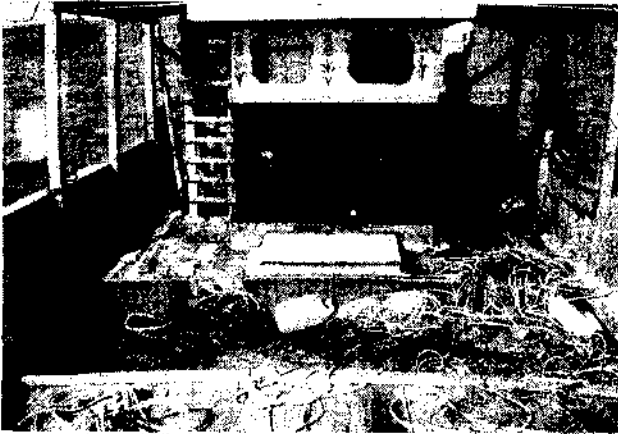


Fig 7. Over all view of fish hold.

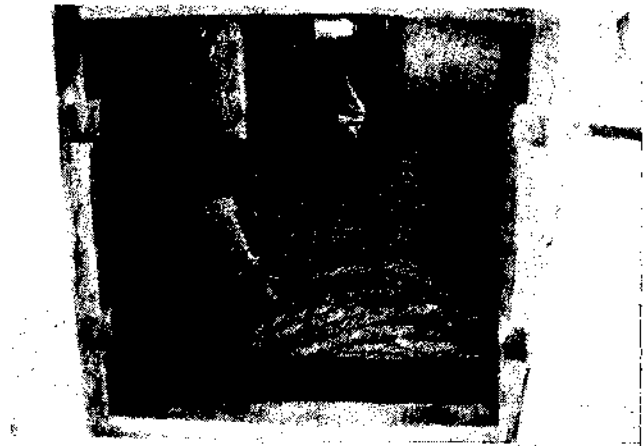


Fig 10. Storage for craft & gear accessories.

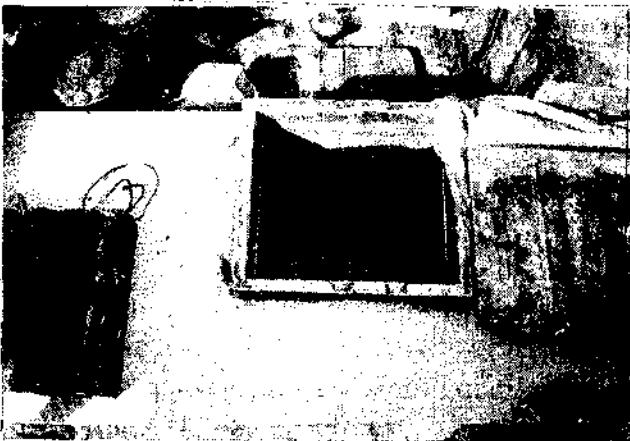


Fig 8. Over all view of Ice and fish hold.

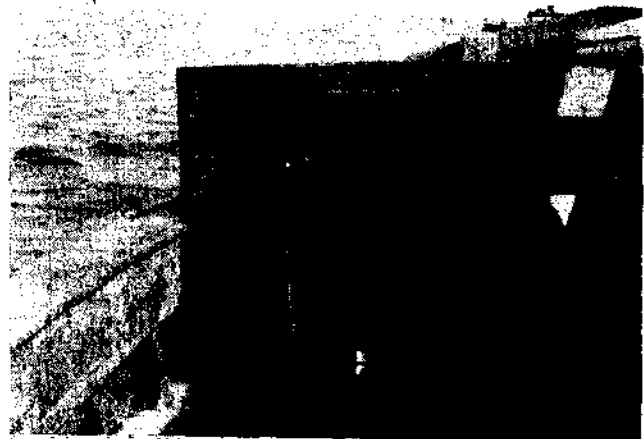


Fig 11. Cooking chamber at the rear end corner of the boat.

gilled as they try to swim through the mesh of the net. Drift gillnet with larger mesh size of 8-16 cm is widely accepted as the most ideal gear in the exploitation of tuna and allied species in coastal waters at a depth between 30 and 80 m. There has not been much modifica-

tions of the gear. It differs from the existing gear, only by the absence of foot rope with lead weight. At the bottom of the gear without foot rope, stone weights of 200 g each are tied directly to the bottom line mesh at regular intervals. This keeps the net spread vertically when

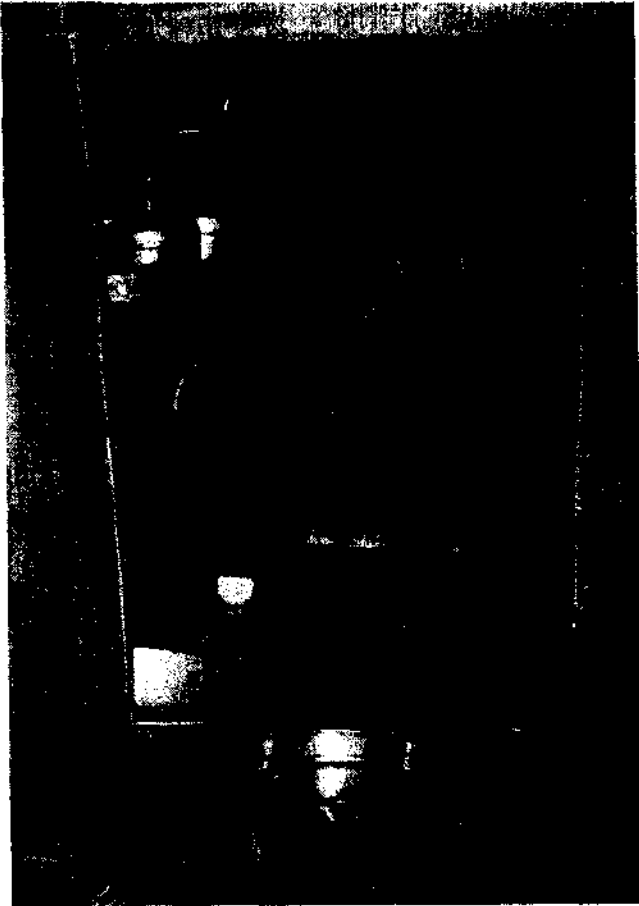


Fig 12. Cooking chamber at the rear end corner.

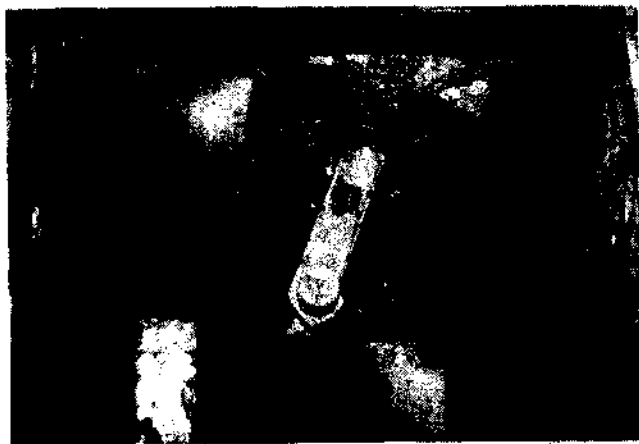


Fig 13. Crank shaft for fixing vertical iron rod.

the net is in operation. If the foot rope is provided larger portion of net will be rolled up and only small portion of net will be available for fishing. For ensuring safety to the net two floats are provided with kerosene lamp, one on the top of the wheel house and the other attached to the far end of the gear (Figs.16 & 17).

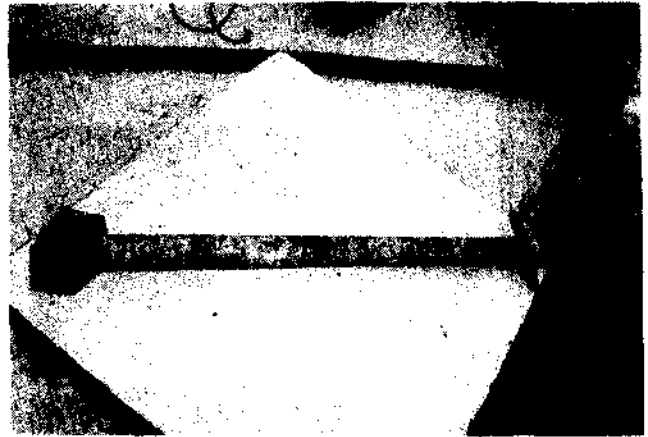


Fig 14. Vertical iron rod to fix on the crank shaft to operate rudder manually.



Fig 15. Manual rudder at operation

### Fishery

An estimated quantity of 50,473 t of tunas and billfishes were caught in India during 1997. Of this Tamil Nadu contributed 3,862 t of which the share of Tuticorin was 711.7 t. At Tuticorin, tuna and allied species were caught by drift gill net with larger mesh size of 8 to 16 cm (*Paruvalai*), drift gill net with smaller mesh size of 3.5 to 7.5 cm (*Podivalai*) and hooks & line. Among these three types of gear 97% of the catch comes from *paruvalai* (Table 1).

The peak season for tuna fishery is from June-September. During this period fishermen from the northern parts of the Gulf of Mannar used to migrate to Veerapandiya Patnam with their boats and gear and camp there for tuna fishing. After the season they return to their villages or migrate towards north of Gulf of

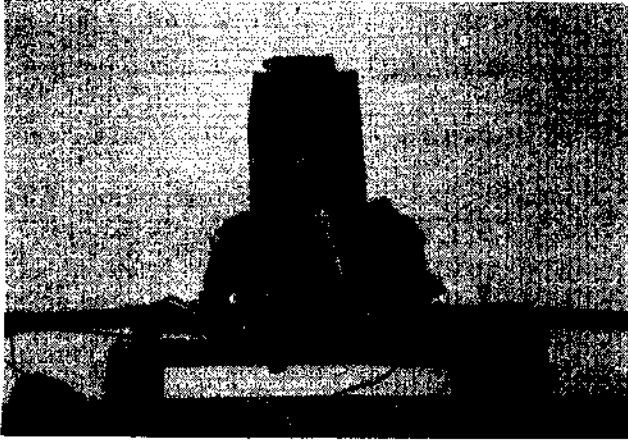


Fig 16. Float kept on the top of the wheel house.



Fig 17. Floaat to be attached with the far end of the gear.

Mannar to continue their operation. Due to these facts almost a total absence or less quantity of tuna was realised in the fishery during off season. However, this trend has been totally changed in recent years as the drift gill

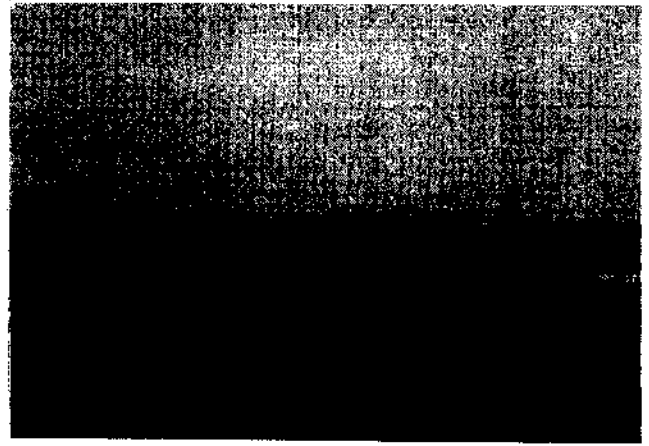


Fig 18. Partial view of anchored gillnet boats at Tharuvaikulam.

net fishery is carried out by Tharuvaikulam fishermen without migrating to other places keeping Tharuvaikulam as base throughout the year except during monsoon period of October-November. Hence it is understood that tuna is likely to occur round the year.

It has been reported that seven species of tuna such as *E. affinis*, *A. thazard*, *A. rochei*, *T. albacares*, *T. tonggol*, *S. orientalis* and *K. pelamis* occur during tuna season (June-Oct) and in the rest of period only a few species of tuna would support the fishery. However, due to recent development during the off season also one can encounter seven species of tuna (Table 2).

### Conclusion

At present nearly 30 shrimp trawlers have been converted for drift gill net fishing at Tharuvaikulam. In the years to come perhaps more and more trawlers may be converted for tuna fishery employing drift gill net. The day may not be far away even, to introduce the mechanical hauling system which is no longer in use. Diversification in the small scale fishing sector with greater use of drift gillnets and crafts may play a vital role in augmenting the production of tunas along the Gulf of Mannar coast.

TABLE 1. *Estimated catch of tuna and effort*

Centre : Tuticorin

Gear : Paruvalai Podivalai Hooks &amp; line

Period : 1992-1999

Year	Drift gill net Paruvalai (8-16 cm mesh)				Podivalai (3.5-7 cm mesh)				Drift gill net Hooks & line			
	Effort	Total catch	Tunnies	CPUE	Effort	Total catch	Tunnies	CPUE	Effort	Total catch	Tunnies	CPUE
'92-'93	7,063	27,83,059	17,69,719	250.56	6,752	3,32,807	12,817	1.89	4,204	1,42,566	8,749	2.08
'93-'94	5,362	13,68,154	7,11,863	132.7	9,725	6,48,818	2,749	0.28	5,965	1,47,431	2,114	0.35
'94-'95	4,585	9,09,212	3,29,010	71.75	3,885	2,63,349	1,594	0.41	7,650	2,12,994	14,699	1.92
'95-'96	6,045	13,55,179	4,83,513	79.98	5,773	6,30,500	11,300	1.95	4,645	97,425	8,148	1.75
'96-'97	4,810	12,35,935	2,93,766	61.07	6,199	8,14,464	7,774	1.25	7,595	2,86,780	13,023	1.71
'97-'98	4,716	9,12,595	2,82,484	59.89	5,809	5,60,389	4,046	0.69	24,087	29,24,633	38,735	1.60
'98-'99	8,449	21,60,767	9,63,223	114.00	6,388	3,82,977	14,487	2.26	12,184	12,74,236	8,029	0.65
Total	41,030	1,07,24,901	48,33,578	117.8	44,531	36,33,304	54,767	1.22	66,330	50,86,065	93,497	1.4
Mean	5,861	15,32,129	6,90,511	117.8	6,362	5,19,043	7,824	1.22	9,476	726,580	13,357	1.4

Catch in kg

Effort in No. of units.

TABLE 2 : *Estimated species composition of tuna*

Centre : Tuticorin

Gear : Paruvalai

Period : April '99 - June '99

Month & year	<i>E. affinis</i>	<i>A. thazard</i>	<i>A. rochie</i>	<i>T. albacare</i>	<i>T. tonggol</i>	<i>S. orientalis</i>	<i>K. pelamis</i>	Total
Apr. 97-'98	2,917	NIL	NIL	NIL	NIL	NIL	NIL	2,917
Apr. 98-'99	14,054	7,499	69	NIL	NIL	NIL	NIL	21,622
May 97-'98	15,354	164	6	NIL	NIL	NIL	NIL	15,524
May 98-'99	2,093	963	NIL	NIL	NIL	NIL	NIL	3,056
Jun. 97-'98	5,881	94	NIL	NIL	NIL	NIL	NIL	5,975
Jun. 98-'99	36,913	1,205	126	NIL	NIL	NIL	NIL	38,244
Jul. 97-'98	3,572	956	2,880	NIL	NIL	NIL	NIL	4,528
Jul. 98-'99	1,81,632	1,70,169	9,366	24,638	NIL	299	748	3,86,852
Aug. 97-'98	71,535	11,844	1,187	10,549	33	4,380	NIL	10,121
Aug. 98-'99	1,00,146	60,810	6,390	1,56,762	NIL	1,302	3,534	3,28,944
Sep. 97-'98	45,417	11,098	NIL	30,146	25,949	111	164	1,14,072
Sep. 98-'99	12,388	358	-	23,101	84	NIL	32,526	68,457
Oct. 97-'98	29,025	NIL	NIL	567	NIL	NIL	NIL	29,592
Oct. 98-'99	10,879	3,402	70	27,188	511	NIL	14,595	56,645
Nov. 97-'98	485	NIL	NIL	NIL	NIL	NIL	NIL	485
Nov. 98-'99	8,094	NIL	NIL	110	150	NIL	NIL	8,354
Dec. 97-'98	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Dec. 98-'99	6,777	NIL	NIL	NIL	NIL	NIL	NIL	6,777
Jan. 97-'98	8,110	NIL	NIL	NIL	NIL	NIL	NIL	8,110
Jan. 98-'99	11,847	105	NIL	429	NIL	NIL	11	12,392
Feb. 97-'98	NIL	NIL	NIL	60	NIL	NIL	NIL	60
Feb. 98-'99	13,249	NIL	NIL	1,178	NIL	NIL	94	14,521
Mar. 97-'98	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Mar. 98-'99	12,462	3,082	NIL	1,675	54	NIL	86	17,359
Total 97-'98	1,82,296	24,156	4,073	41,322	25,982	4,491	164	2,82,484
Total 98-'99	4,10,594	2,47,593	16,021	2,35,081	799	1,601	51,594	9,63,223