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PRESENT STATUS OF TRAWL FISHERY AT COLACHEL

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Introduction

Colachel (Lat. 8°10'N, Long. 77°15'E), about 35 km northwest of Kanyakumari in the southwest coast, lies within the Kanyakumari District of Tamil Nadu. Presently a municipal town, it has been an important fishing centre for traditional as well as mechanised fishery sectors, the latter being relatively recent. Trawlers operate from here during monsoon months in numbers varying from 20 to 250 per day depending on the catch trend. (Fig. 1). Absence of a fishing harbour is a major constraint, and demand for one is gaining



Fig. 1. Trawlers after a day's fishing.

Scope of the study

Large quantities of finfish, cuttlefish, squid, prawn and sand lobster are landed here in a period of 3 to 5 months of trawl operation every year. An yearly average of 5,903 t (1990-'94) of marine fish worth Rs. 125.4 million is landed here of which 62.58% is realised from cephalopods alone. Besides cephalopods and crustaceans, varieties of finfish and, during some years, gorgonids were also exported. During 1990-'93 a major portion of the catch comprising of low grade fishes was sent to fishmeal plants in north Tamil Nadu. Unlike other centres where trawling is

mainly done for prawns, Colachel is cephalopod oriented and prawn catch is low in this area (0.44% of the annual average trawl landings). Hence, usually the presence of either cuttlefish or squid in the fishing grounds triggers the trawl operations except on rare occasions when other items are spotted in plenty.

The mechanised fishing operations at Colachel for a 3 month period in 1989 with economics of its operation, catch and distribution have been reported by Sathiadhas and Benjamin (*Seafood Export Journal*, 28(1), January 1991). The present account deals with the trawl landings, the revenue realised and some related aspects for a period of 5 years from 1990 to 1994 at Colachel.

Data source

Catch and price statistics collected from the centre for the Fishery Resources Assessment Division of the Central Marine Fisheries Research Institute form the major source of data of the present report. The price of fish reported here is the price at the fish landing centre.

Craft and gear used

Mechanised boats operating from here are in the OAL range of 11 to 15 m fitted with Ashok Leyland engines of varying horse power, namely, ALM/370 - 68 HP, ALM/400 - 98 HP, ALM/402 and 411 - 106 HP and ALM/412-110 HP. Hulls of about 75% of the boats are made of wood sheeted with aluminium, 20% of wood coated with fibreglass and the rest of steel. About a third of the fleet is in the lower length range and is fast getting replaced by bigger boats.

The type of trawl operated is locally termed *mixture madi* of about 50 m length having bigger meshes than the ordinary trawl. Beginning with 160 mm mesh at the wings and ending at 40 mm

at the cod end, the portion in between has sections of mesh sizes 120, 80 and 60 mm towards the tapering side. Throughout the entire length of the net the lower belly (lower half) is of thicker High Density Poly Ethelene twine (HDPE twine No. 2.5 or 2) to withstand the rough bottom operation while the upper belly which does not come in contact with the sea floor is of less thicker twine (HDPE twine No. 1.5). The net is supported by Poly Propylene rope (PP rope Nos. 6 to 8) and thus the net is also called *rope madi*.

Details of operation

Normally the boats with a crew of 5-8 leave the base at 0500 hrs, make 2 or 3 hauls at conducive grounds and return to shore between 1200 and 1700 hrs. The direction and distance from the base depend on the type of catch intended for and stocks available. The usual area covered is anywhere between Kanyakumari in the southeast and Vizhinjam in the northwest at distances ranging from 5 to 35 km and at 25-70 m depth.

During 1990 the trawl operations lasted for 4 months from August to November; in 1991 from

August to October; in 1992 from July to September and in 1993 and 1994 from June to October. Thus the trawling operations were carried out only for 20 months totally during the above 5 year period.

Effort distribution

A fishing trip made by a boat on a day was taken as a unit of effort. Ranging from 5,980 in 1991 to 12,547 in 1994 an yearly average of 8,908 trips was made during 1990-1994. August and September were the months of peak trawl fishing and landings, when, on an average, 63.1% of the total units was operated bringing 70.1% of the annual catch with the exception of 1993 when 67.8% of the total units was operated during July and August landing 76.8% of the total catch (Table 1).

Catch per effort

The monthly average catch per trip varied from 144 to 1,390 kg. The highest rate (1,390 kg) was in August 1990 due to heavy landings of *Odonus niger* and *Decapterus* spp. and the next (1,114 kg) was in September 1991 due to good catch of

TABLE . 1. Monthly catch in tonnes (C) effort (E), and catch per effort in kg (C/E) of the trawl operations at Colachel during 1990/94

Year	Para- meters	Months						Total
		June	July	August	September	October	November	
1990	E	-	-	2,631	2,016	1,475	350	6,472
	C	-	-	3,654	1,452	445	105	5,656
	C/E	-	-	1,390	720	301	297	874
1991	E	-	-	2,224	2,965	791	-	5,980
	C	-	-	1,963	3,302	125	-	5,390
	C/E	-	-	883	1,114	155	-	901
1992	E	-	1,858	3,175	3,300	-	-	8,333
	C	-	907	2,100	1,959	-	-	4,966
	C/E	-	488	661	594	-	-	596
1993	E	1,020	3,213	4,390	1,112	1,475	-	11,210
	C	853	2,231	1,956	161	251	-	5,452
	C/E	836	694	446	144	170	-	486
1994	E	1,440	2,463	3,036	3,256	2,352	-	12,547
	C	1,407	1,820	1,323	2,804	696	-	8,050
	C/E	977	739	435	861	296	-	642
Average effort		492	1,507	3,091	2,530	1,219	70	8,908
Average catch		452	992	2,199	1,934	301	21	5,903
Catch per effort		919	658	711	765	249	300	663

Saurida spp. (Table 1). The daily average catch per trip was occasionally above 1,000 kg during the months of peak landings (August, September) and it touched the highest peak of 1,705 kg on 29-8-1990 due to the abundance of *Decapterus* spp., *Odonus niger* and *Saurida* spp. On 19-9-1994 three trawlers landed an unprecedented total quantity of 5,200 kg at the rate of 1,900 kg each by two and 1,400 kg by the other (details elsewhere in this report).

Trend in catch

The annual catch ranged from 4,966 (1992) to 8,050 t (1994). The average yearly catch was 5,903 t and 70.1% of it was caught in August and September. But, as an exception, the peak landings during 1993 (76.8%) were in July - August (Table 1). Eventhough different groups dominated during the years of observation on an average, cephalopods was the most abundant constituent (22.4%) followed by lizard fishes (21.5%), balistids (14.7%), carangids (13.0%), serranids (6.5%), threadfin breams (6.3%) and barracudas (5.4%). These together contributed 89.8% to the total landings. Others which accounted for the remaining 10.2% were crustaceans, gorgonids, pomfrets, tunas and species of *Artus*, *Holocentrus*, *Kathala*, *Lethrinus*, *Plectorhynchus*, *Priacanthus*, *Scolopsis* and *Upeneus*, and the miscellaneous varieties comprised of crabs, eels, flatfishes, rays, sharks and species of *Fistularia*, *Lutjanus*, *Megalaspis*, *Parupeneus* and *Trichiurus*. Fig. 2 gives the yearwise effort, catch and catch per effort, and Fig. 3, the monthly averages for the same parameters. Relative abundance of catch components for the years is presented in Fig. 4A.

Catch composition

Catch details of seven groups in the order of abundance on an annual average basis and two groups of topical importance namely, crustaceans and gorgonids are given below. Some groups were landed only for one or two years showing irregular fishery. Among them those found commercially important are dealt with under the subtitle 'others'.

Cephalopods : This group constituted by cuttlefishes and squids, was the most dominant one in the landings and was fished mainly off Muttom, Colachal and Vizhinjam. It plays a vital role in sustaining the trawl operations accounting

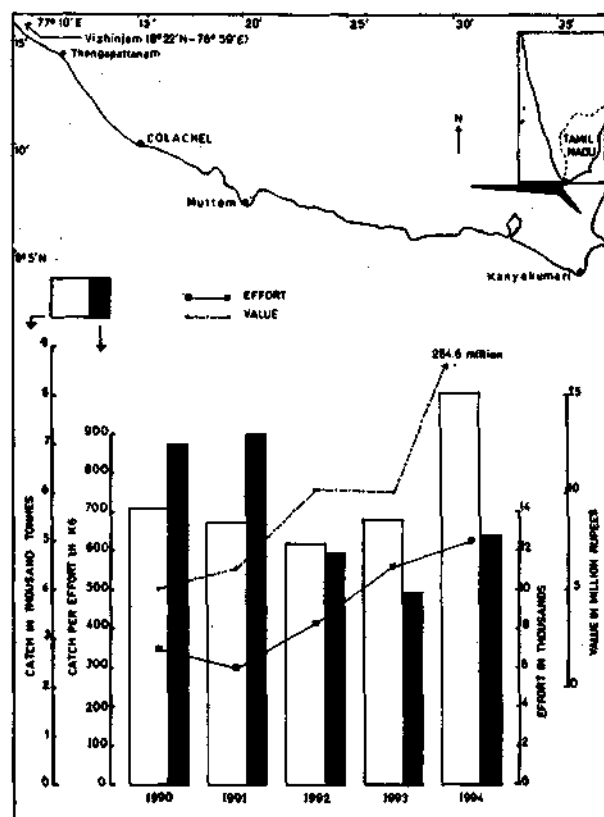


Fig. 2. Annual effort, catch, catch per unit effort and value realised of trawl fishery at Colachel during 1990-'94

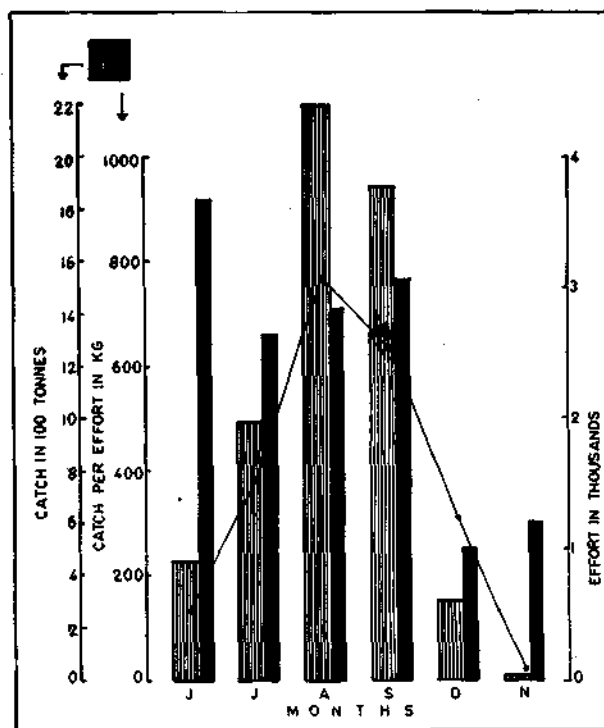


Fig. 3. Average monthly trends of trawl landings, effort and catch per unit effort at Colachel during 1990-'94.

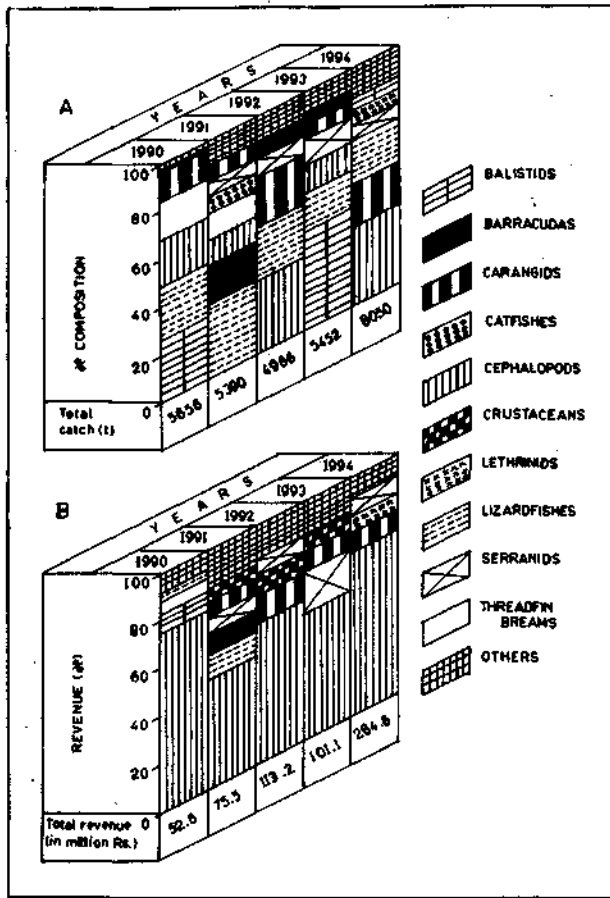


Fig. 4. A. Percentage composition of different groups of trawl fishery at Colachel. B. Value realised (%) of different groups of trawl fishery at Colachel. (In both the figures only those which contributed 4% and above are independently projected; the rest clubbed under 'others').

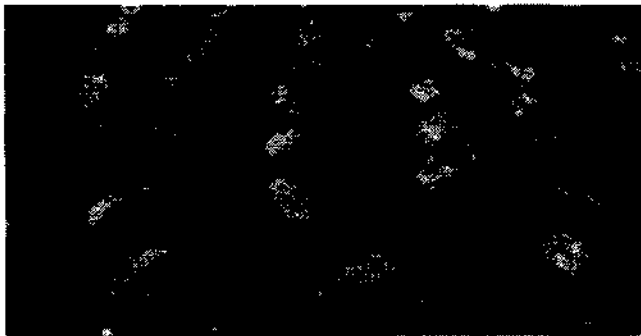


Fig. 5. Cuttlefish (*Sepia pharaonis*) - the target of trawlers - being paraded to tempt traders.

to 22.4% of the annual average catch with 1321 t ranking the first in the total revenue realised (Fig. 5). Monthly average catch of cephalopods ranged from 7 t in November to 747 t in September and the catch per effort from 26 kg in June to 295 kg in September. Monthwise catch of cuttlefish and squid with catch per effort for the

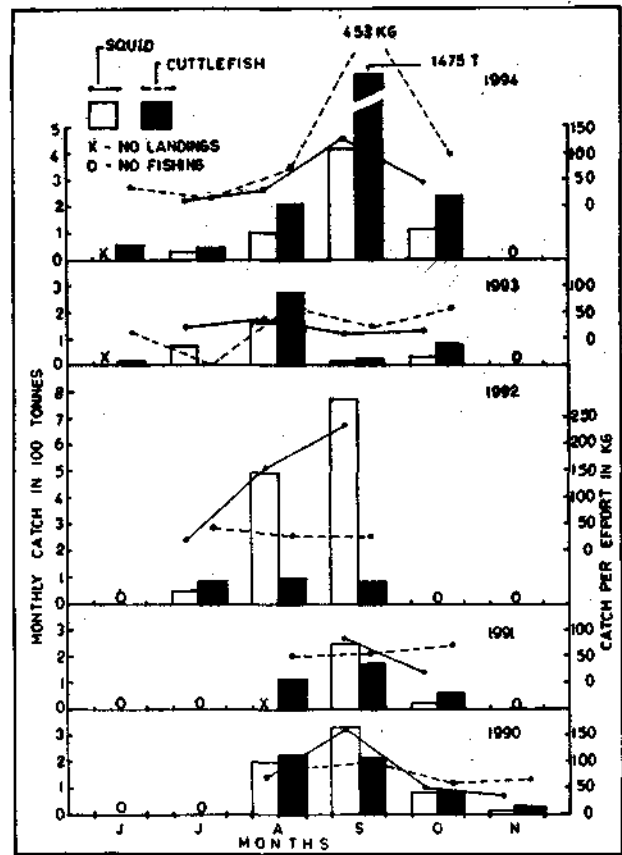


Fig. 6. Monthly trend of catch and catch rate of squid and cuttlefish at Colachel during 1990-'94.

5 years is presented in Fig. 6. The species of cuttlefish landed were *Sepia aculeata*, *S. pharaonis* and *Septiella inermis* and those of squid were *Doryteuthis sibogae*, *D. singhalensis* and *Loligo duvauceli*. But in the case of cuttlefish *S. pharaonis* was the most dominant species whereas *S. aculeata* was landed in considerable quantity only occasionally. Availability of the third species was meager. All the afore said species of squids occurred in good quantities either on the same or different occasions. *S. pharaonis*, *D. singhalensis* and *L. duvauceli* remained the much valued species. The price of cuttlefish ranged from Rs. 45 to 100 per kg and that of squid Rs. 7 to 80. Annual average quantity of cuttlefish landed was 703 t worth Rs. 55.2 million and the same of squid was 618 t valued at Rs. 23.3 million. Cuttlefish as a single item, contributed to 44.0% of the total revenue and squids came second with 18.6%. This group was responsible for as much as 31.2% of the total landings in 1992 and 33.1% in 1994.

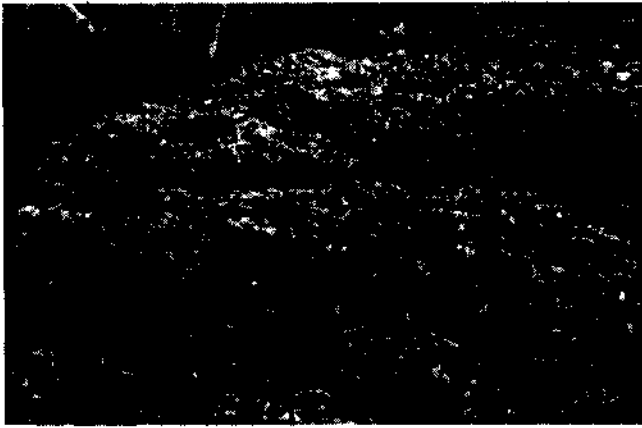


Fig. 7. The lizardfishes to be despatched to fishmeal plants.

Lizard fishess : This group formed the second most abundant component of the trawl fishery contributing to 21.5% (1270 t) of the average yearly landings (Fig. 7). Represented by *Saurida tumbil*, *S. undosquamis*, *Synodus jaculum* and *S. indicus*, 92% of their landings was accounted during July to September even though they were available during all the months of the trawl operation. These were the most abundant items of landings in 1991 forming 31.5%. During this period the daily average catch per trip has gone upto 864 kg. With the price range of Rs. 0.50 to 8.00 per kg over the 5 years, the major portion of the landings was diverted to fishmeal plants during 1990-'93 excluding a small quantity of larger individuals usually *S. tumbil*, for local markets.

Balistids : Landings composed exclusively of two species, viz, *Odonus niger* and *Sufflamen fraenatus* (= *S. capistratus*). They were present throughout the trawling season. But their occurrence during July - August was heavy reaching a maximum daily average of 961 kg per unit. Almost the entire bulk was sent to fishmeal plants during 1990-'93. They contributed to 14.7% (865 t) of the total landings, but being low - priced (Rs. 2.50 to 6.00/ kg) fetched only 1.8% of the total revenue. *O. niger* was the most prominent catch in 1990 forming 26.2% of the landings. So was *S. fraenatus* in 1993 which contributed 40.9% to the total landings. The landings of the two species were inversely proportional during the reported years. It may be interesting to note that while either of these two species continued to land here in bulk quantities, in the other nearby areas of the southern coast where it was once a major

artisanal seasonal fishery, the catches are becoming negligibly low for more than a decade now.

Carangids : Species of this group accounted for 13.0% (765 t) of the total catch on an yearly average. *Decapterus* (*D. russelli* and *D. macrosoma*) were responsible for 8.5% of the total carangid catch. Being low priced (Rs. 2 to 8 per kg) the average yearly revenue realised from *Decapterus* spp. was only 3.3% (Rs. 4.1 million) whereas the rest of the carangids (the common of which were *Carangoides ferdau*, *C. praeustus*, *Caranx melampygus*, *Seriolina nigrofasciata* and *Uraspis helvola*), which had better landings in July-September, accounted for 4.6% of the revenue amounting to Rs. 5.8 million at Rs. 12 to 40/kg. A good quantity of these species was exported while a major portion of *Decapterus* spp., which was more in June-August was sent to fishmeal plants during 1990-'93.

Serranids : The contribution of this group to the annual average was 6.5% (384 t); but they fetched relatively better revenue (8.0% amounting to Rs. 5.6 million) as price was ever on the increase ranging from Rs. 13 to 45 per kg due to heavy export demand. (Fig. 8). Among the many species landed mostly during August - September, the following 10 species were common: *Cephalopholis argus*, *C. sexamaculata*, *C. sonnerati*, *Eptinophelus bleekeri*, *E. diacanthus*, *E. malabaricus*, *E. merra*, *E. rivulatus*, *E. tauwina* and *E. undulosus*.

Threadfin breams : *Nemipterus bleekeri* and *N. japonicus* constituted the species which were largely landed in August and September. Larger specimens were sent to local as well as outside



Fig. 8. Serranids meet the increasing demand from export industry.

markets and smaller ones, while landed in plenty, were pooled with those sent for fishmeal plants during 1990-'93. Its price varied from Rs. 2.50 to 8.00 per kg. Contributing to 6.3% (374 t) the annual average total landings, its share in the total revenue was only 1.4% (Rs. 1.8 million).

Barracudas : These were represented by *Sphyraena forsteri*, *S. jello* and *S. obtusata*. Mostly medium sized specimens contributed the fishery. Small numbers of larger ones were sorted out for export (Fig. 9). Forming an yearly average

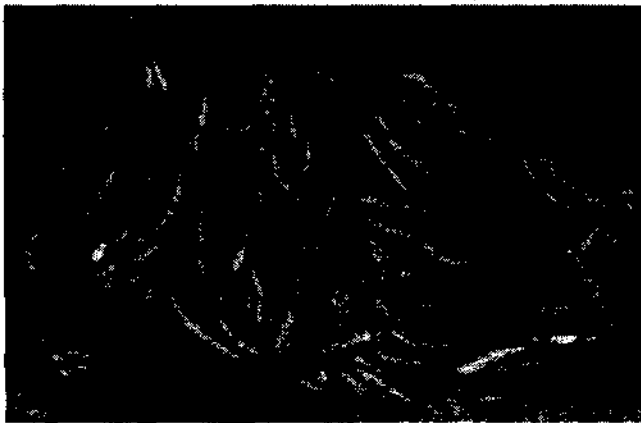


Fig. 9. Barracudas - undersized, and hence spared for local consumption.

of 322 t (5.4%) in the total landings and being available mostly during July-September, its contribution towards revenue was 2.8% (Rs. 3.6 million). Price ranged from Rs. 7 to 35 a kg.

Crustaceans : Prawns, sand lobsters and crabs (the last included under miscellaneous) were the common crustaceans encountered. *Penaeus japonicus* and *P. indicus* were the prawns landed; the former was recorded during 1990, 1991 and 1994 with a total of 21 t worth Rs. 3.5 million. The latter was recorded during 1991, 1992 and 1993 with a total of 68 t



Fig. 10. Gorgonids - their varieties, size and shape on display immediately on landing.

generating Rs. 15.7 million. *Therius orientalis*, the sand lobster, was recorded during all the years except 1993 with a total of 42 t valued at Rs. 4.0 million. The crustaceans contributed annually to only 0.44% (26.2t) of the total landings, but claimed 3.7% (Rs. 4.6 million) of the average annual revenue. The price of prawns ranged from Rs. 80 to 400 a kg and of sand lobster Rs. 60 to 130.

Gorgonids : Commonly known as sea-fans or horny corals, (Fig 10 & 11 and front cover photo) these anthozoans are considered important items as they have good export market. They are landed only as bycatch and were present only during 1991 and 1992 when 61 t (Rs. 1.0 million) and 16

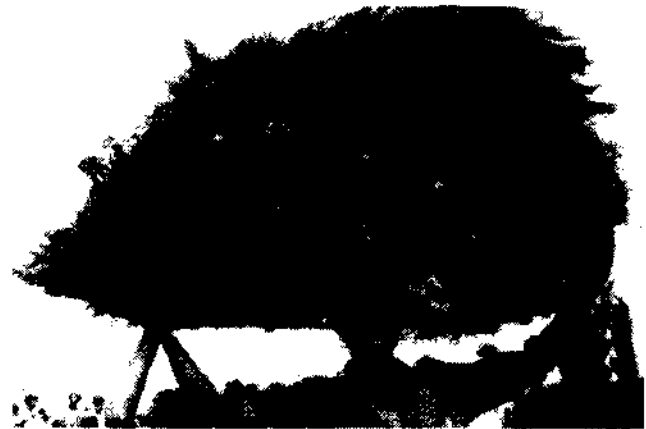


Fig. 11. A head load of gorgonids being taken to the trader.

t (Rs. 0.2 million) were landed respectively. The price ranged from Rs. 10 to 18 per kg. The seafans being displayed by spreading on the shore to attract merchants was a common scene here. Though there are many species in the catches, mainly of the 'black' and 'red' types the larger 'black type' belonging to the genera *Echinogorgia*, *Echinomuricea* and *Heterogorgia* are preferred for export. These gorgonids were taken in the trawl operations made off Muttom and Thengapattinam. Export of gorgonids became scarce in some neighbouring districts also in the later years. According to the fishermen, absence of gorgonid landings in the trawl since 1992 may be due to the thoroughly depleted condition of the fishing grounds at Colachal. This view is supported by the landing of young gorgonids in small numbers in the trawl catches.

Others : Lethrinids, a good table fish having export value, were landed during 1991, 1992 and 1994 in the order of 32, 58 and 444 t respectively.



Fig. 12. Catfishes - not a regular fishery.

During 1994 its contribution to the total landings was 5.5% valued at Rs. 20.9 million with rates up to Rs. 50/kg. The common species were *Lethrinus lentjan*, *L. microdon*, *L. nebulosus* and *L. ramak*.

Haemulids, chiefly, *Diagramma pictum*, *Plectorhynchus griseus*, *P. picus* and *P. schotaf* were landed only in 1994 when 98 t of it worth Rs. 3.7 million at rates up to Rs. 45 a kg was landed, and almost the entire quantity was exported.

Landing of catfishes was recorded only in 1991 and 1993. In 1991 371 t (6.9% of the year's total landing and valued at Rs. 3.5 million) and in 1993 19 t were recorded. The catch generally made up of *Arius dussumieri*, *A. tenuispinis* and *A. thalassinus*, was of smaller size range and sold at local markets (Fig. 12).

Unusual catches

Catch of some species on certain days during the 5-year period of study reached exceptional dimensions. They are recorded here:

Ballistids : On 7-8-1990 a total catch of 129 t was landed by 94 units at the average rate of 1376 kg per unit. *Odonus niger* alone constituted 90 t (70%) at 961 kg/unit.

Carangids : Total landing by 115 units on 29-8-1990 was 196 t at 1705 kg per boat. Of this, 91 t (46.4%) was *Decapterus* spp. the catch per unit being 796 kg.

Lizardfishes : Catch of *Saurida* spp. on 16-9-1991 was 111 t at the rate of 864 kg per unit. This was 61% of the total catch of 182 t of that day by 125 units at an average of 1418 kg a boat. (Fig. 7).

Cephalopods : One of the present authors had recorded at Colachel on 8-9-1986 a total catch of

45.8 t by 54 trawlers at 882 kg/boat, of which 27 t (60%) was cuttlefish at 519 kg per boat (CMFRI News Letter No: 33, July-September 1986). Now after eight years, the total landings at the same centre on 19-9-1994 was an unprecedented 149 t, out of which 139 t (92%) was of cephalopods (cuttlefish 64.8% and squids 27.2%) to the value of Rs. 105.5 million (87.2 and 18.3 million respectively for cuttlefish and squid). This astounding quantity and revenue for a day was achieved by 145 units landing 87 t cephalopods and 10 t finfishes at an average catch per unit of 670 kg. In addition, 3 other trawlers landed a total of 52 t almost entirely of cephalopods.

Disposal

Export market : Apart from cuttlefishes, squids, prawns and sand lobsters, varieties of finfish of a specified weight (generally around 1.5 kg) were procured and graded for export. These included carangids (other than *Decapterus*), haemulids, lethrinids, lutjanids and serranids. Gorgonids were also exported in 1991-92.

Domestic market : Those categories which neither met export market nor regarded as trash fish were sold for consumption at local markets as well as at neighbouring districts. They included representatives of almost all groups. But however, those considered inferior in some years because of their abundance could be sold for human consumption later as explained in the ensuing paragraph.

Trash-fish market : For the first time fish from Colachel were sent to fishmeal plants in north Tamil Nadu (Periyar and Salem districts) during 1990 - 1993 when large quantities, mostly of balistids, *Decapterus* and lizardfishes, posed the problem of disposal locally. Others commonly included with them were sciaenids, small-sized threadfin breams, crabs, and species of *Fistularia*,



Fig. 13. Bundles of dried flutemouths (*Fistularia* spp.) to fishmeal plants.

Holocentrus, *Priacanthus*, *Scolopsis* and *Upeneus*. They were despatched in van loads of 2 t capacity in fresh as well as dried condition (Fig 13). The exact quantity of the fish despatched could not be ascertained. However, a modest estimate is 14 to 20 t per day during July - September. Since 1993 many good varieties of fish which were freely available earlier for local consumption became scarce and costly due to demand from export industry. As a consequence a major portion of the catch used for fishmeal plants were also diverted for domestic consumption. However, a small part of the catch was dried and sent to fishmeal plant occasionally.

Revenue trend

The turnover during the five years ranged from 52.6 (1990) to 284.6 million rupees (1994) with an annual average of Rs. 125.4 million. In the average annual revenue cephalopods topped with 62.6% (cuttlefish 44.0% and squid 18.6%) followed by serranids (8.0%), carangids (7.9%), lizard fishes (4.4%), crustaceans (3.7%), lethrinids (3.6%) and barracudas (2.8%). Contribution by these groups totalled to 93.0%. But however, the revenue-wise ranking varied each year depending on the quantity as well as the quality of the catch, but still the top position was retained exclusively by cephalopods. Yearly turnover from different groups is given in Fig. 4b.

General remarks

The annual average gross income per fishing trip worked out to a minimum of Rs. 8,121 in 1990 to a maximum of Rs. 22,683 in 1994. The unusual cuttlefish catch was the cause for the boost in income in 1994. Still even at its minimum the net profit (arrived at after deducting the operational and other incidental expenses) is attractive enough for the owner of the boat and net, and the crew who share it.

Boat operators claim that the bulk of the landings from *mixture madi* operations is from the grounds inaccessible to the traditional fishermen and can be caught only by trawls. The mesh size being relatively big (40 mm at the cod end) the possibility of large scale catch of young fishes is also unlikely. In fact such an occurrence has never been reported from Colachel. However, detailed population studies and catch estimates on the different species are required for a judicious management of the fishery in the

coming years.

The boat operators are not without problems and constraints. Absence of a fishing harbour which is the basic infrastructure for a fleet of mechanised fishing boats is the major limiting factor. The recently constructed pier here (Fig. 14) for the purpose of shipping mineral sand to other

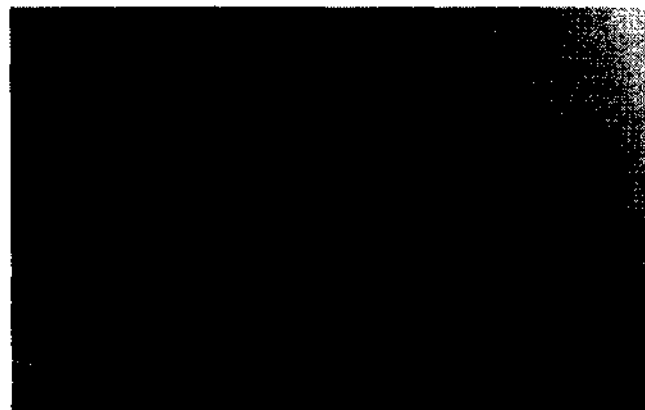


Fig. 14. The pier at Colachel. Would it ever be of use to trawl fishermen?

countries does not serve the purpose for which it was made due to technical reasons, and hence trawl operators wonder whether it would at any time be modified to be of use to them. The tactics employed by merchants and middlemen to lower the price of the catches have often vexed them. Occasional shortage of diesel is another nagging problem. The lurking animosity between mechanised boat operators and artisanal fishermen, which flares up at times, has become the bane of the fishermen in the district as a whole. In spite of all these odds the performance of trawl fishery during the reported five years has been satisfactory.

"The Kanyakumari District Mechanised Boat Operators Association," a registered society under which 400 boats have been registered till 1994, looks after the welfare of the trawl fishermen of the area. The society has been persuading the government for a fishing harbour here and it is hoped that the establishment of the harbour would go a long way in the development and expansion of trawl fishery in the area.

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