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THE MARINE FISHERIES INFORMATION SERVICE: Technical and Extension Series envisages the rapid dissemination of information on marine and brackish water fishery resources and allied data available with the Fishery Data Centre and the Research Divisions of the Institute, results of proven researches for transfer of technology to the fish farmers and industry and of other relevant information needed for Research and Development efforts in the marine fisheries sector.

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Cover photo: Monsoon leap at Valiathura.

FOCUS ON SMALL-SCALE FISHERIES SECTOR

ADVENTUROUS LAUNCHING OF CATAMARANS FOR MONSOON FISHERY AT VALIATHURA, TRIVANDRUM

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The way the fishermen of Valiathura and adjacent fishing villages near Trivandrum launch out their catamarans into the sea during the period of southwest monsoon is an example of overcoming obstacles of nature through innovations and ingenuity. Fishing activity in many parts of the southwest coast lying between Cape Comorin and Quilon remains suspended often at many centres during June to August, the southwest monsoon period, mainly because the fishermen find it difficult to negotiate their catamarans through the breakers. The unfavourable height, direction and type of breakers that prevail along the coast during this period mainly cause this difficulty. On account of this the fishermen move to certain centres that afford favourable conditions for setting off their crafts into the sea. Centres like Colachal, Kollangode, Vizhinjam and Quilon have bays or barriers and hence are considered good for fishing operations during monsoon period. The fishermen of the area from Kovalam to Veli where the coast is rather straight, sandy and much exposed to the fury of monsoon waves, solve this problem by taking advantage of Valiathura pier for launching the craft safely into the sea.

The operations (Fig. 1-6)

The logs of catamarans are transported upto the terminus of the pieron trollies provided by the port authorities. Here, the logs are assembled and the fishing gear is loaded and fastened tight by the crew at the front part of the catamaran together with personal belongings of fishermen such as beetle leaves, beedis, etc. packed in polythene covers. A nylon rope is fastened to the front part of the catamaran with its free end tied to the fist or waist of one of the crew who gets ready to plunge into the sea. On noticing a major receeding wave with no incoming ones in sight, this fisherman jumps into the sea. The force of the receding wave takes him away from the pier. On noticing a similar powerful receding wave the catamaran also is pushed diagonally into the sea. The catamaran, like the fishermen, moves away from the pier, but its further movements are controlled by the first fisherman holding the rope. The other two fishermen forming the crew of the fishing unit likewise jump into the sea and all the three get into the craft as quick and fast as possible and manoeuvre it well beyond the wave crests.

Field enquiries made at Valiathura revealed that this practice was in vogue even in the olden days when a wooden pier existed at the place of the present pier. It is not known when this practice of fishing started at Valiathura. Usually fishermen below 40 years of age venture in this type of fishing activity.

The catamaran engaged in monsoon fishing is to be registered every season and a licence fee of Rs. 5 per fishing unit is levied at present by the port authorities. The system of licensing started in 1956 when the present pier was commissioned. During the period 1977-1981 the number of licences issued for such catamarans varied from 334 to 442 with an average of 403 per monsoon season. Of these the majority (75%) is for boat seine and the rest for hooks and line.

Though the Valiathura pier is open to all fishermen during the southwest monsoon period for launching their catamarans, only fishermen of Valiaveli (Veli), Vettukadu, Kannenthura, Cheriathura, Poonthura and Panathura, besides Valiathura alone make use of this facility. The fishermen intending to launch the craft from the pier start moving their units to Valiathura by the end of May. The crafts are transported by bullock-carts and by lorries. Apart from transporting charges, coolie charges also will have to be paid for handling the logs upto the pier.

No remuneration in cash is paid to the fishermen engaged in this type of fishing, the sale proceeds of the catch being divided among the crew and others in the following manner: owner of the craft and gear, 40%; crew, 40%; church, 10%; barber, 3% and other helpers, 7%.

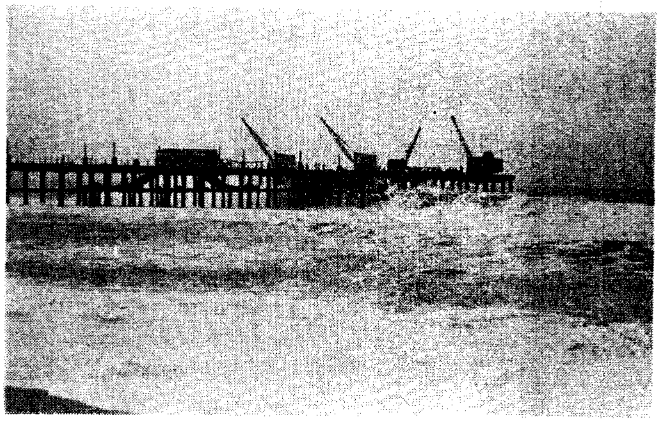

Fig. 1. Valiathura Pier

Fig. 2. Waiting for their turn - Catamarans are loaded on the trolley to be taken to the terminus of the pier.

Fig. 3. Loading the gear and other personal belongings.

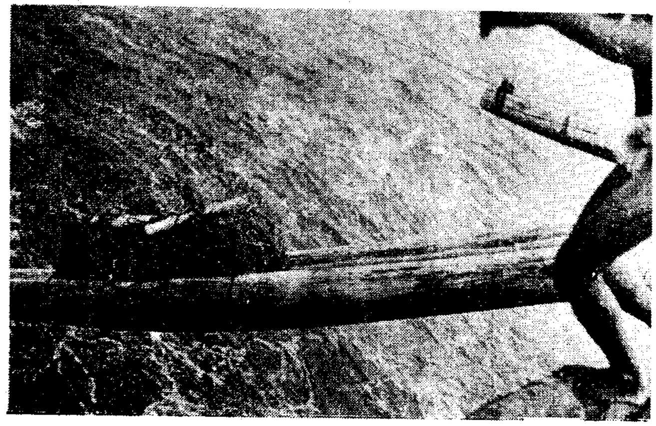

Fig. 4. The catamaran is pushed into the sea.

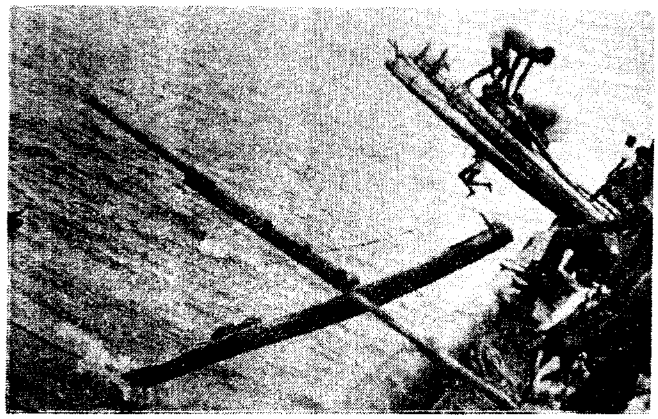

Fig. 5. The catamaran being pushed into the sea followed by the crew.

Fig. 6. Fisherman leaping into the turbulent sea.

Fishery

Observations on the trend of fishing effort and fish landings during 1977-1981 period at Valiathura and adjacent centres (Fig. 7) revealed an increase in the fishing activity in some centres during the southwest monsoon period (Figs. 8 & 9). The fishing effort has been standardized to boat seine unit, which is the common and effective fishing gear in this area (*Mar. Fish. Infor. Serv. T & E Ser.*, No. 38: 1982). During the monsoon period the fishing crafts of the adjacent centres also take off from Valiathura pier but land at their respective landing centres, as by tradition, fishing units not belonging to a particular centre are forbidden to land at that centre mainly due to problem of marketing. However, when the wind and water current conditions are not favourable to land at their respective centres, they may land at Valiathura or any other adjacent centres.

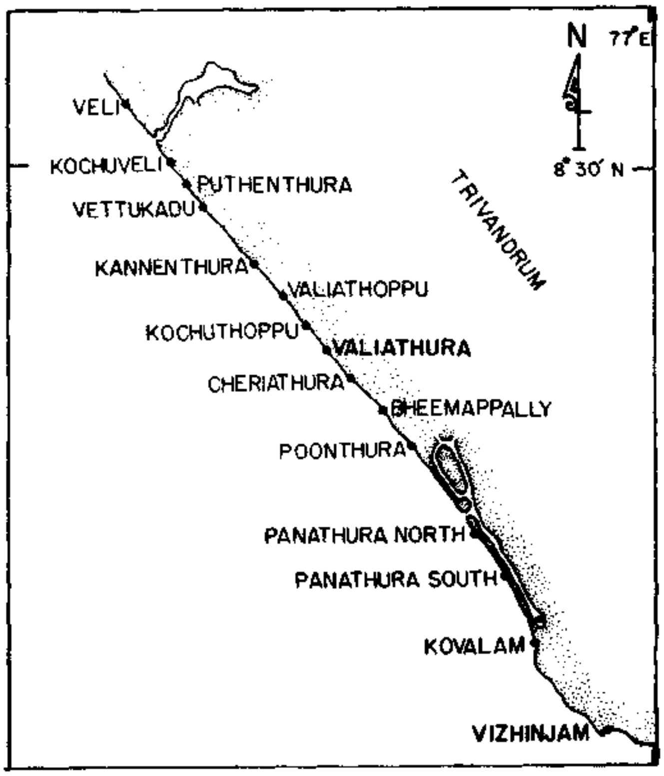

Fig. 7. Map showing Valiathura and adjacent landing centres.

Among the 14 centres, maximum fishing is carried out by the fishermen of Poonthura involving round the year operations of the indegenous gears. Kovalam, Panathura, Bheemapally, Cheriathura and Valiathura are the other important centres from where considerable quantities of fish are supplied to the markets in Trivandrum city. It could be seen from Fig. 9 that while at most of these centres the fishery is at its peak either before or after the monsoon season, at Valiathura it is maximum during the early part of the monsoon period due to the concentration of fishing activities on account of the launching facilities available there. The highest catch as well as catch rates of fish are recorded during the monsoon months at Valiathura, Cheriathura and Kochuveli. At the other centres while the most productive period falls outside the monsoon season relatively higher catch rates are recorded during the southwest monsoon months at Poonthura, Kannanthura, Valiathoppu and Kochuthoppu.

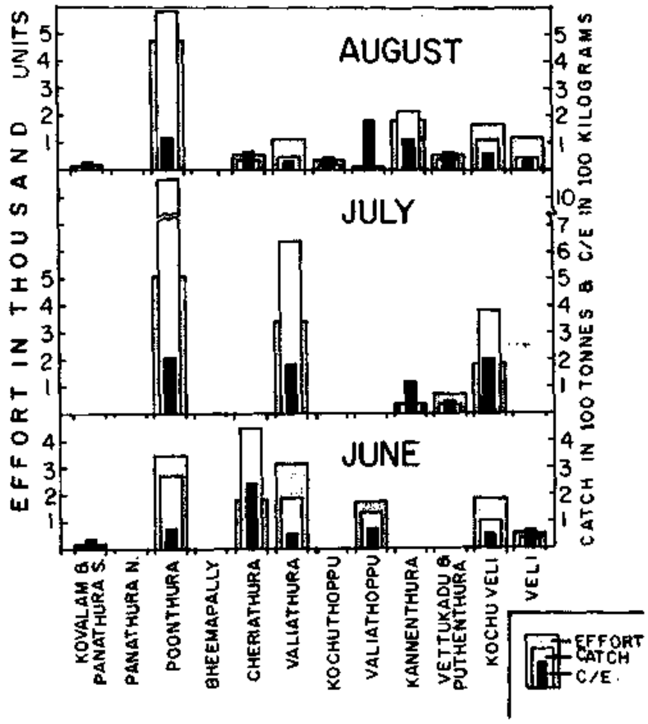

Fig. 8. Seasonal trend in the fishery (Effort, Catch and Catch/Effort) at Valiathura and adjacent centres.

The fish landings during monsoon period at Valiathura account for about 77% of the total annual landings at this centre. Similar figures for other centres are: Kovalam & Panathura, 7.3%; Panathura North, nil; Poonthura, 50%; Bheemapally, nil; Cheriathura, 45.6%; Kochuthoppu, 5.8%; Valiathoppu, 9.7%; Kannenthura, 16%; Vettukadu & Puthenthura, 6.4%; Kochuveli, 32% and

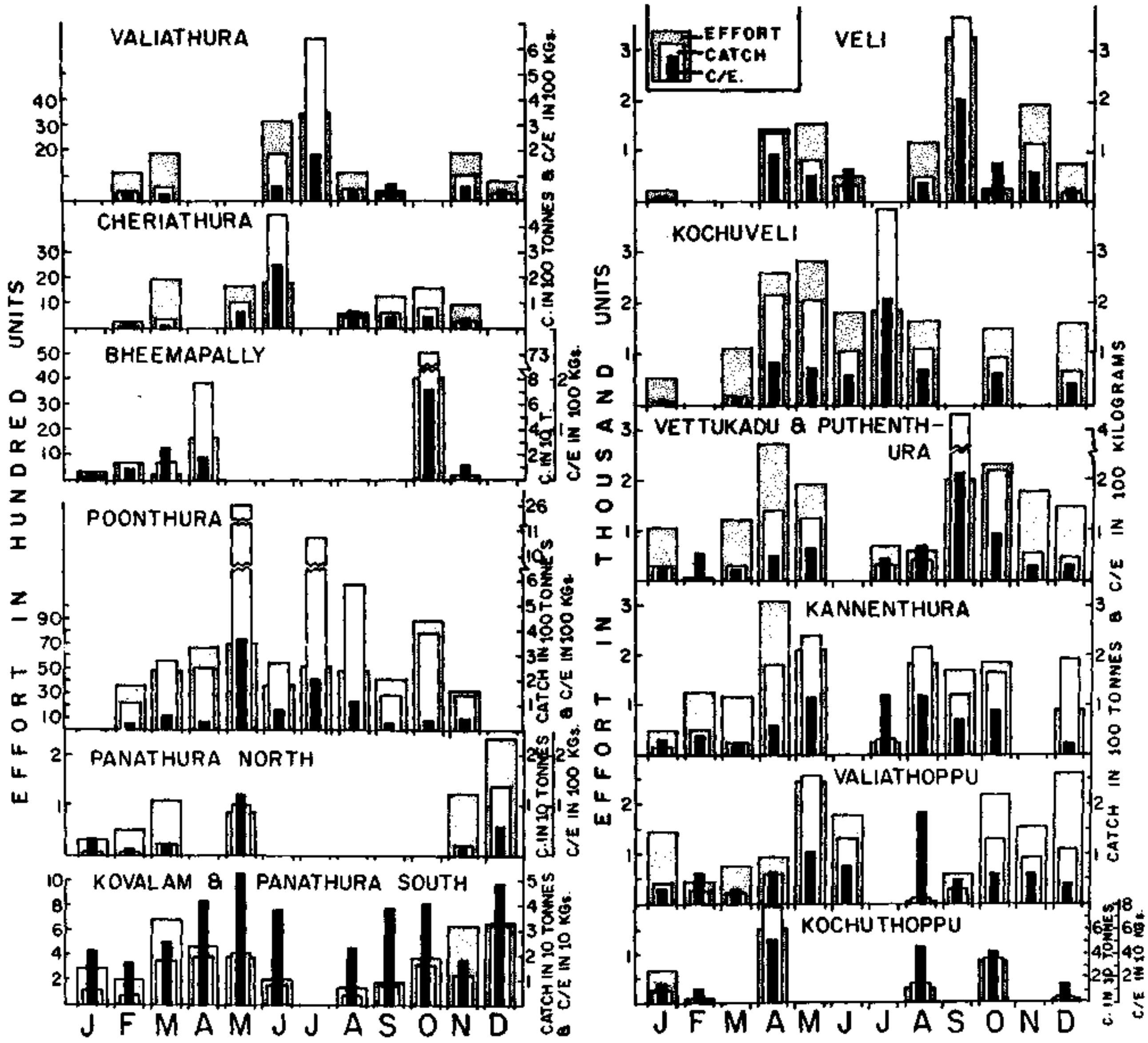

Fig. 9. Effort, Catch and Catch/Effort at different Centres during the southwest monsoon period.

Veli, 4.7%. As could be expected, no fishing activity takes place sometimes during the monsoon period at some of these centres due to rough sea. But the daring fishermen of Valiaveli, Vettukadu, Kannenthura, Cheriathura, Poonthura and Panathura brave the rough sea even during this period when the sea is relatively calm. Resumption of normal post-monsoon fishing activity takes place at most of the centres by about middle of August when the fury of the monsoon abates.

The major components of fish landed at Valiathura and the adjacent centres during this period are *Trichiurus haumela*, tunas (*Euthynnus affinis* and *Auxis thazard*), species of *Stolephorus*, namely *S. devisi*, *S. bataviensis* and *S. buccaneeri*, *Caranx* sp., *Nemipterus* sp. and *Saurida* sp. as well as perches. Species of *Loligo* and *Acetes* also contribute to a minor share during the monsoon period.

Remarks

Although the method adopted by the fishermen for launching of their catamarans is quite ingenious, it is most hazardous and full of perils. Out of sheer necessity to make a livelihood the fishermen have evolved this method when the stormy breakers of the monsoon season prevent them from launching their crafts into the sea. Accidents, sometimes fatal, often happen while launching or landing these fishing crafts. The catamaran on launching, may hit against the concrete pillars of the pier and break into bits. The fishermen sometimes sustain hits, cuts and fractures on jumping into the water, as waves dash them against the concrete pillar or the catamaran itself. Several such accidents have been reported. In this connection it would be most useful if the state Government think in terms of implementing insurance or some such schemes in order to help the fishermen and their family who get involved in such calamities.

EXPERIMENTAL TRAWLING OFF VIZHINJAM*

Introduction

A knowledge of the fishery potential of all regions of the coast line is an essential prerequisite for fishing beyond the traditional coastal fishing areas, especially in the context of exploitation of the resources of the Exclusive Economic Zone. Though there have been exploratory offshore fishing activities along the southern section of the southwest coast of India in recent years, they were mainly confined to areas off Kanyakumari and Quilon. As there is no information on the demersal fishery resources of the trawling grounds of Vizhinjam area the results of experimental trawling conducted there are presented in this account.

Fishing area and methods

Experimental trawling operations were conducted north of Vizhinjam, near the southern end of Kerala coast, in the area: 8-76/3 F, between latitude 8° 20′ N and 8° 30′ N and between longitude 76° 50′ E and 77° 00′ E employing the Research Vessel CADALMIN II of the Central Marine Fisheries Research Institute during March-April 1978 (Fig. 1). The vessel is 43½′ long and is fitted with 88 HP Ashok Leyland Marine Engine, a mechanical winch, and a Simrad Echo Sounder. It has a small laboratory with a capacity to accommodate seven personnel including scientists.

Three grounds in the depth ranges of 10-20 m, 20-30 m and 30-40 m were trawled. A total of 17 hauls of one hour duration each using otter trawl with a cod end mesh of 25 mm were made. The nature of the sea bed of these grounds is sandy with a slight admixture of mud. Sea urchins, gastropod shells and crabs were the invertebrate bottom fauna noted.

The weights of the different groups of fishes obtained in each haul were taken separately from which the total catch of fish in each haul was estimated, and random samples were taken from each group of fish for measuring the length of fish caught and for noting the maturity stage and food. Total length was recorded for fish and prawns.

*Prepared by M. D. K. Kuthalingam, G. Luther, S. Lazarus and K. Prabhakaran Nair

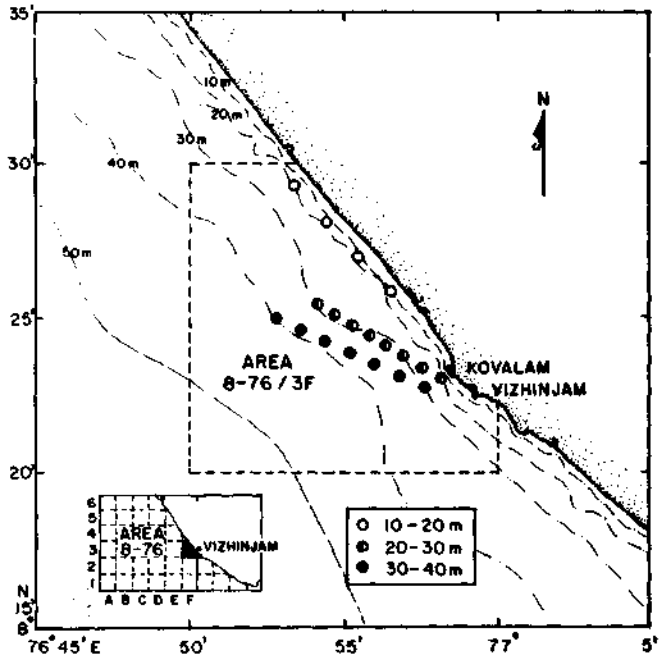

Fig. 1. Course of trawling made in fishing area 8-76/3 off Vizhinjam. Positions of trawl hauls made along the trawling track are represented by circles.

Results

The yield of fish and shell fish per hour of trawling in the different depth zones are presented in Table 1. It may be seen from the table that the total catch per hour of trawling increased steadily with increase in depth. Thus, the catch per hour was 25.2 kg at 10-20 m depth, 48.5 kg at 20-30 m depth, and 61.5 kg at 30-40 m depth. Prawns were met with only in 10-20 m depth zone and in negligible quantities during the period of observation. Though elasmobranchs were available in all the 3 depth zones, the catch rate for them was higher in 20-30 m depth. The catch rate for teleosts, however, increased with increase in depth. Crabs were more in shallower depth (10-20 m) and cephalopods in 30-40 m depth.

Table 1. *Catch per hour (in kg) for fish and shell fish in different depth zones*

Depth zone in m	Number of hauls	Catch per hour (in kg): Fish – Elasmobranchs	Fish – Teleosts	Shell fish – Prawns	Shell fish – Crabs	Shell fish – Cephalopods	Total
10-20	4	3.0	16.0	4.0	1.5	0.7	25.2
20-30	8	13.0	35.2	—	—	0.3	48.5
30-40	7	8.4	48.5	—	0.6	4.0	61.5

Species composition

Important species of fish and shell fish in the catches and their size ranges are as follows:

1. Prawns: *Penaeus indicus* (98-147 mm) *P. monodon* (136-153 mm)
2. Cephalopods: *Sepia pharaonis* (83-225) mm), *S. aculeata*, (45-93 m) *Loligo duvaucelii* (35-137 mm), *Doryteuthis* sp. (58-85 mm), *Octopus* spp. (220-260 mm)
3. Sharks & skates: *Loxodon macrorhinus* (400-480 mm), *Scoliodon laticaudus* (450-550 mm), *Rhynchobatus djiddensis* (450-650 mm);
4. Rays: *Himantura bleekeri* (320-410 mm), *Trygon kuhlii* (181-382 mm), *Amphotistius imbricatus* (107-155 mm), *Aetobatus narinari* (292-315 mm), *Narcine timlei* (142-155 mm).
5. Synodontid: *Saurida tumbil* (205-325 mm)
6. Congrids: *Conger cinereus* (450-525 mm) *Uroconger lepturus* (420-515 mm).
7. Fistularid: *Fistularia villosa* (300-450 mm)
8. Carangids: *Caranx malabaricus* (120-160 mm), *C. williamsi* (164-195 mm), *C. chrysophrys* (175-195 mm), *C. djedaba* (110-140 mm), *C. sexfasciatus* (110-135 mm), *C. melampygus* (145-175 mm), *Selar kalla* (80-120 mm), *Megalaspis cordyla* (280-330 mm), *Decapterus dayi* (110-175 mm), *Alectis indica* (302-310 mm).
9. Nemipterids: *Nemipterus japonicus* (230-265 mm), *N. bleekeri* (96-200 mm).
10. Leiognathids: *Leiognathus bindus* (65-85 mm), *L. lineolatus* (60-75 mm), *Secutor insidiator* (52-85 mm), *S. ruconius* (50-75 mm).

Table 2. *Depthwise distribution of different categories of fish and shell fish (%) and ranges of salinity and temperature in the trawling grounds during March-April 1978*

Depth zone (m)	Prawns	Cephalopods	Sharks	Rays & Skates	Synodontids	Congrids	Fistularid	Carangids	Nemipterids	Platycephalid	Psettodid	Bothid	Cynoglossid	Balistids	Diodontids	Leiognathids	Sciaenids	Trichiurid	Miscellaneous	Salinity (‰) Surface	Salinity (‰) Bottom	Temperature (°C) Surface	Temperature (°C) Bottom
10-20	12.5	2.8	5.6	6.9	5.6	13.9	4.2	9.7	11.1	8.3	—	—	—	—	5.6	8.3	5.6	—	—	30.01	30.52	30.0	28.4
20-30	—	0.5	1.6	24.8	1.1	0.2	5.9	4.1	5.0	0.5	0.2	0.2	1.6	1.1	45.2	1.4	—	0.5	5.2	to	to	to	to
30-40	—	6.9	6.2	7.6	2.4	—	20.2	—	2.1	—	0.9	1.9	6.7	4.3	33.8	2.1	—	—	4.9	35.64	36.67	31.5	29.0

11. Sciaenids: *Johnius dussumieri* (140-180 mm), *Otolithus ruber* (250-285 mm).
12. Trichiurid: *Trichiurus lepturus* (450-460 mm).
13. Platycephalid: *Grammoplites scaber* (114-210 mm)
14. Psettodid: *Psettodes erumei* (400-465 mm)
15. Bothid *Pseudorhombus javanicus* (277-315 mm)
16. Cynoglossid: *Cynoglossus semifasciatus* (40-145 mm)
17. Balistids: *Sufflamen capistratus* (135-164 mm), *Odonus niger* (124-135 mm)
18. Diodontids: *Diodon hystrix* (150-175 mm), *D. maculifer* (120-135 mm); *D. holacanthus* (100-120 mm)
19. Miscellaneous: *Lactarius lactarius*, *Lethrinus* spp., *Therapon jarbua*, *Sphyraena obtusata*, *Polynemus* spp., *Pampus argenteus*, *Tachysurus* spp., *Tetrasomus concatinatus*, *Arothron stellatus*, *Epinephelus* sp., *Triacanthus brevirostris*, *Gerres* spp., *Apogon enneastigma*, *Parapercis pulchella*, *Canthigaster margaritatus*, *Antennarius* sp., *Dactyloptena orientallis*, *Siganus oramin*, *S. javus* and *Thenus orientallis*.

Mature gonads (in stages IV-VI ICES) were noticed in *Decapterus dayi*, *Caranx melampygus*, *Caranx chrysophrys*, *Sphyraena obtusta*, *Fistularia villosa*, *Grammoplites scaber* and *Psettodes erumei*.

Prawns and squids formed the principal food of *Fistularia villosa* and *Nemipterus bleekeri*. Early juveniles of *Leiognathus*, *Nemipterus* and *Stolephorus* formed the main food of *Alectis indica*, *Caranx melampygus*, *Caranx chrysophrys*, *Nemipterus japonicus*, *Grammoplites scaber* and *Otolithus ruber*. *Stolephorus* formed the exclusive food item of *Sphyaerna obtusata* and *Squilla* formed the chief food of *Gerres limbatus* during the period of observation.

Remarks

Each depth zone was found to be dominated by certain groups of fish and shell fish (Table 2). Thus, in the 10-20 m depth zone congrid eels, prawns, nemipterids, carangids, leiognathids, and platycephalid ranked high. Similarly diodontids and rays were dominant in the 20-30 m depth zone in comparison with the other two depth zones. Apart from diodontids, *Fistularia villosa*, was the most dominant species in the 30-40 m depth zone. These comparisons of the dominant catches in the three depth zones indicate that (1) quality fishes are abundant in 10-20 m zone, (2) diodontids dominate the catches in 20-30 m and 30-40 m depth zones, (3) rays and skates are relatively more abundant in 20-30 m depth zone, (4) cephalopods, fistularids and flat fishes are common in the 30-40 m depth zone and (5) prawns are present only in 10-20 m depth zone.

The overall picture emerging from the present experimental trawling operations is that of a steady increase in the catch per hour with increase in depth upto 40 m area during March-April period. The results are quite encouraging and indicate the availability of trawlable quantities of demersal fishes in these grounds. However, more intensive trawling should be attempted during different seasons in order to assess the potentiality of these trawling grounds.

IMPACT OF PURSE SEINE OPERATIONS ON TRADITIONAL FISHERY WITH SPECIAL REFERENCE TO OIL SARDINE IN KERALA DURING 1980 AND 1981*

Introduction

There has been a marked decline in the landings of oil sardine in 1980, compared to the previous two years. A study was undertaken to examine the reasons for this decline and to determine whether the purse seine operations which started in 1979 has any influence on the traditional fishery. For this purpose the data on catch, effort, age and length composition of oil sardine collected by this Institute during 1978-81 period pertaining to indigenous gears and purse seines and the data on socio-economic aspects gathered through a special survey in 1981 in the coastal villages of Kerala were considered.

The purse seiners have started operations in Cochin area during the latter half of 1979 with about 10 units, which increased to about 40 and 60 in 1980 and 1981 respectively. The purse seiners operated are of about 13 m. in length with nets measuring 500-600 m in length and 50-60 m in depth with the meshes ranging from 13 to 20 mm in size.

Catch and Effort

The estimates of marine fish landings, by purse seines and traditional gears during 1978 to '81 in the region Quilon to Manjeshwar where the impact of purse seining was reportedly experienced by the indigenous fishermen, are given in Table 1 along with the effort and the catch per unit effort (CPUE). As seen from the table the total landings by indigenous gears were about 1.9 lakh tonnes in 1978, 1.6 lakh tonnes in 1979, 0.9 lakh tonnes in 1980 and 1.7 lakh tonnes in 1981, thus showing a conspicuous drop in 1980. The CPUE and the effort also showed a decline in 1980. In the case of purse seines, the figures for 1979 are not comparable with those of 1980 and '81 since purse seiners started operating only in the latter half of 1979. The total landings of purse seines were about 15 thousand tonnes in 1980 against 18 thousand tonnes in 1981 thus showing a 20% increase. While the CPUE indicated a slight decline, the effort showed an increase.

In order to know the species which have registered a decline, the landings of oil sardine and mackerel were considered since these two are the largely exploited species by purse seines.

As regards oil sardine, catches by indigenous crafts were a little over one lakh tonnes during both 1978 and '79 which declined almost to its half in 1980. However, the landings revived remarkably in 1981 recording 1.3 lakh tonnes. CPUE also showed almost a similar trend during this period. For purse seines, landings increased from about 10 thousand in 1980 to 12 thousand tonnes in 1981 while the CPUE remained more or less the same.

The mackerel landings by indigenous gears indicated a decline during the period 1978 to '80 with nominal improvement in 1981. CPUE also showed a similar trend. The purse seine landings during 1981 showed a marginal decrease while CPUE registered a decline of about 27% as compared to 1980.

The contribution from mackerel landings to the total was about 10% only during this period under report, whereas the share of oil sardine to the total was over 60% and the trend of the total catches is well reflected by that of oil sardine. Hence landings of oil sardine were alone considered for the analysis in this report.

Age composition of oil sardine

Regarding length frequency distribution of oil sardine in purse seine catches in 1979 at Cochin, contributions of 0-year recruits (below 145 mm in total length) of the oil sardine was 80%. In 1980 and '81, however, they yielded about 71% indicating a decrease.

In the boat seine, Thanguvala the yield from the 0-year olds recorded a slight decrease in 1980 when compared to 1979 (Table 2). In the boat seine, Pattenkolli catch at Calicut, the contribution from the 0-year declined markedly in 1979 and 1980 compared to 1981. However, during 1981 the 0-year recruits recorded a remarkable increase coinciding with the improvement in the landings (Table 2).

Economic aspects

A special survey was conducted covering 41 fish landing centres in the region Quilon to Manjeshwar

*Prepared by T. Jacob, K. Alagaraja, S. K. Dharmaraja, K. K. P. Panikkar, G. Balakrishnan, U. K. Satyavan, V. Balan and K. V. N. Rao.

Table 1. *Contribution of purse seiners and indigenous crafts to the marine fish landings of the region Quilon to Manjeshwar in Kerala during 1978-1981.*

Years		1978		1979		1980		1981	
Species	Gears	Purse seine	Indigenous	Purse seine	Indigenous	Purse seine	Indigenous	Purse seine	Indigenous
1. Oil sardine	Catch (tonnes)	--	1,18,378	1,754	1,07,395	9,763	51,916	12,334	1,33,490
	CPUE (kg)	—	94	3,213	112	1,842	68	1,825	150
2. Mackerel	Catch (tonnes)	-	24,256	48	13,891	4,221	8,470	3,932	10,195
	CPUE (kg)	—	19	88	14	796	11	582	12
Total	Catch (tonnes)	—	1,91,423	1,841	1,58,436	14,858	92,903	17,673	1,73,192
	CPUE (kg)	—	152	3,372	165	2,803	122	2,614	195
	Effort (boat days)	-	12,61,652	546	9,58,720	5,301	7,62,119	6,760	8,87,707

Table 2. *Age composition (%) of oil sardine at Cochin and Calicut during 1978-1981*

	Cochin						Calicut		
	Purse seine			Thangu vala (Boat seine)			Pattenkolli vala (Boat seine)		
Year	0 Yr	1+Yr	2+Yr & above	0-Yr	1+Yr	2+Yr & above	0 Yr	1+Yr	2+Yr & above
1978	No purse seining			67.4	27.4	5.2	81.3	11.3	7.4
1979	79.6	12.8	7.6	79.4	16.2	4.4	42.2	37.4	20.4
1980	71.4	15.6	13.0	74.8	22.7	2.5	43.5	34.6	21.9
1981	71.0	15.2	13.8	(No observation)			70.0	18.8	11.2

during May 1981, to find out the impact of purse seine operations, if any on the indigenous fisheries. Data were collected from country craft owners on general aspects of fishing activities at the landing centres. The data obtained through this survey indicated that landings by purse seiners at Cochin and Mangalore, lifted by trucks, moved out to various parts of Kerala State and sold at competitive prices when compared to local prices. To avail this advantage the head load and bicycle vendors waited for these trucks on the road and did not go to the landing centres to collect the country craft catches which were irregular, undependable and low. The number of trucks that used to visit these landing centres was reduced to one third as they got regularly full loads at places viz. Cochin and Mangalore. Before the introduction of purse seining, traditional fishermen were able to get higher price whenever the catch was less. Thus reduction in the quantity used to be compensated by higher price. But during 1980, even small catches of oil sardine failed to boost the prices at the landing centres because of the regular supply of purse seine catches. This is indicated by the average prices of 50 paise, 50 paise and 60 paise per Kg. ruled in 1979, '80 and '81 respectively. These factors would have played a major role in discouraging the indigenous crafts venturing in fishing in usual numbers. The aggregate revenue from the oil sardine landings by the indigenous crafts worked out to 5.4, 2.6

Fig. 1. Poor arrivals - hawkers in despair in 1980

Fig. 2. Auctioning of indigenous catches of oil sardine in 1981.

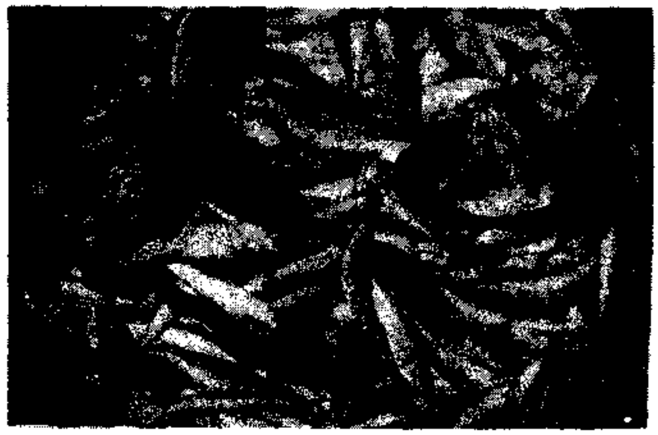

Fig.3 & 4. Bumper harvest of oil sardine in 1981.

Fig. 5. Purse-seiners and carrier boats at Fisheries Harbour, Cochin.

Fig. 6. Indigenous crafts auctioning catches

and 7.8 crores in 1979, '80 and '81 respectively, thus showing a steep fall in revenue during 1980. Fig. 7 shows the comparative value of the revenue per unit effort (Rupees per boat day) from oil sardine for the 3 years 1979 to 1981.

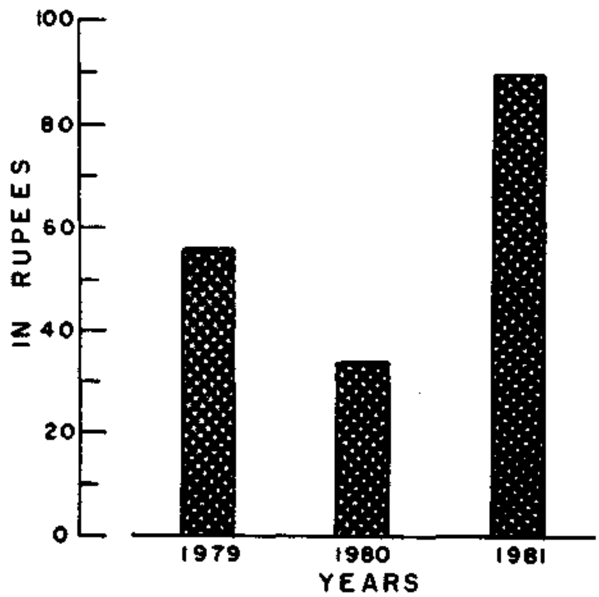

Fig. 7. Revenue from oil sardine per unit effort of indigenous craft (Rupees/boat day)

As per the data collected from country craft owners, during 1980 about 10 percent of the active fishermen have left fishing. Some of them were engaged in road repairing, rubble work, metalling and head load work, etc. At certain centres like Kannamali and Manasseri, a number of fishermen shifted from marine fishing to back water fishing at least temporarily. Even those who did marine fishing were mostly underemployed. The annual average income of a fishermen family has been found reduced by about 50% in 1980 as compared to 1979. The survey further revealed that about 250 traditional fishermen were employed in purse seiners in Cochin Fisheries Harbour.

As stated earlier, in 1981 there has been a revival of oil sardine fishery. The better availability induced the fishermen to increase the effort which helped the indigenous crafts to provide regular supply. Besides, the motorisation of the indigenous crafts which picked up during the latter half of 1981 from Quilon to Munambam also helped in increasing the sardine catches to some extent. These increased landings attracted more traders towards the landing centres which resulted in the flourishing of marketing and related activities.

Discussion

The oil sardine catches in purse seine and Thanguvala at Cochin indicated a greater contribution from 0-year class during 1979 when compared to 1980. This is reflected in the better catches in 1979 than in 1980. Manifestation of the purse seining impact, though noticed, was not on a large scale in 1980. The dwindled availability or decrease in the stock might have affected the catches of the artisanal gears operating in the nearshore waters. The diminished interest shown by artisanal fishermen due to reduced returns also might have brought about a reduction in the landings in 1980. However, in 1981 the oil sardine fishery improved remarkably consequent on better availability and increased effort. From the foregoing analysis it appears that the effect of purse seining, at the present level of exploitation and availability, is not tangibly felt on the indigenous fishery off Kerala coast.

NEWS - INDIA AND OVERSEAS

Aquaculture Scientist visits CMFRI

One of the recent visitors at the Central Marine Fisheries Research Institute, Cochin was the veteran scientist and aquaculturist Dr. Ronald J. Roberts, Director, Institute of Aquaculture, University of Sterling, Scotland. His impressions on the work he saw in the prawn culture programme of the Institute is reproduced below from his column in Fish Farming International 9(3) of May 1982.

FISH VET'S DIARY

by Dr. Ronald J. Roberts, Director, Institute of Aquaculture, University of Stirling, Scotland

Prawns among the rice

IN MY last diary I talked about my visit to the Fisheries College in Mangalore, and the First All-India Symposium on Fish Diseases. I also mentioned how impressed I was by the completely self-sustained progress which the Indians had made towards successful large-scale prawn culture.

The prawn culture programme is carried out under the aegis of one of India's most capable scientists, the Director of Marine Fishery Research, Dr. E. G. Silas, a deeply committed, thinking man who always held that the highest standards of research are allied to satisfying the practical need to feed people and improve their economy.

SCEPTICAL

Since he was justifiably sceptical of the advantages of trying to adapt not terribly efficient Western high capital techniques to India, and dubious of his ability to justify expenditure by achieving the very high price rate of £1 or more per individual prawn, which apply in Japan, Dr. Silas determined to gather together a team around him which would develop their own, low cost, prawn production system, *de novo*.

They set up a research sation at Narakkal, close to the research headquarters in Cochin, and off they went. Cochin is a cosmopolitan shipping port on the coast of Kerala, where the population is said to be the most highly educated in India. It is also the most politically aware, with massive demonstrations in favour of one party or another, obstructing its traffic with great regularity. However, just outside Cochin, agriculture and fishing is the norm and there was already a sort of planned management of prawn capture. It was very similar to the Camacchio Lagoon system, near Venice, where sluices allow migrating eels into lagoons but catch them when they go back out.

Apart from the rather less exotic architecture, Cochin, with its islands and boats has similarities with Venice but the prawn lagoons are really rice fields — there is a local rice variety which grows well in brackish water, and it is this "paddy" which provides the basis for the culture. Rice only provides one crop, the rest of the year very little may be done with the fields and it was to this that Dr. Silas and his team turned their attention.

The normal common prawn of the area is a slow growing small one called *Penaeus dobsonii*. The much more valuable *P. indicus*, larger and faster growing would have much greater potential and it was to this that the group turned their attention. The result is now history.

SUCCESSFUL

They resolved all the growth stages of the prawn, they developed a technique for completely continuous availability of *nauplii* and continuous production of diatoms, rotifers and cladocerons to feed all the larval stages, and devised foods for feeding in the ponds where necessary.

So successful has the technique been that villages to which the young prawns are supplied can achieve three crops a year at 500 kg of prawn per hectare. It is little wonder they are keen to abandon rice and do even more, but Dr. Silas discourages this. The prawns are usually sold, the rice feeds the villages.

SPARTAN

The work at Narakkal deserves to be much more widely recognised. It is a developing country's own application of its own efforts in a local context.

Narakkal is a spartan place — it still has no piped water — but its achievements have now been rewarded by receiving one of India's premier national awards for research, the Sukamara Basu prize. It is not often that aquaculturists are recognised in competition with all other scientists at such a prestigious level, and it is to be hoped that India's success in already reaching a production level of 10,000 tons of highest quality prawns a year in such a short time can be built upon — for the mass prawn consumer market as well as the producers.

Brine shrimp nutritional quality varies

Brine shrimp is the premier live food organism used by aquaculturists the world over. This is mostly because of the convenience it provides for keeping in dried form and bringing to life as needed and also due to the necessary nutrients it provides for finfish and shellfish in certain critical larval stages of their development.

The brine shrimp or *Artemia*, as it is known zoologically, are tiny creatures, not more than a few mm in length. They are not shrimp at all, but a more primitive crustacean, which under the microscope looks somewhat like a man from outer space. Although it never occurs in the ocean, it can survive in waters that range from one tenth to three times the salinity of the ocean. To date brine shrimp have been found in over 160 locations worldwide, consisting of several strains.

Under a project funded by the National Sea Grant Program, scientists at the University of Rhode Island have undertaken the evaluation of chemical and biochemical characteristics of brine shrimp. They have established that *Artemia* is quite a variable biological material and different batches, different strains and ages of brine shrimp from different geographical locations vary greatly in nutritional quality. If an aquaculturist gets poor results from feeding *Artemia*, the fault is more likely due to the variation in nutritional quality of the particular strain used by him.

Aquaculture Magazine 8(1): Nov./Dec. 1981

Cultured marine snails for research

In the Marine Biological Laboratory at Woods Hole simple, less known marine animals are being cultured for use in neurobiological research. A team of scientists headed by Dr. Eric R. Kandel is using the cultured marine snails *Aplesia californicus*, commonly known as sea hares with average adult size of 15 to 20 cm, length and weighing upto 0.5 kg, for research experiments.

It has been known that human beings share many common behavioural patterns with simpler animals, including elementary percaption and motor coordination. The capacity to learn, in particular, is widespread and has evolved in many invertebrate animals and in all vertebrates. Simple invertebrates with lesser number of cells in the nervous system are, therefore, more suited for experimentation to relate the function of individual cells to behaviour. So the cultured snails are made use of in these experiments to study behaviour pattern. Some of the important findings lead to a new way of looking at the relation between the brain and behaviour.

Aquaculture Magazine 8(2): Jan/Feb. 1982

African perch to be released in Australia

The Queensland Government in Australia has drawn up a project with the intention to test the African fresh water sportfish Nile perch for possible release in the State. Fingerlings of the fish will be brought to Australia for trials which would last up to six years. If the trials showed that the Nile perch posed a threat to native fish fauna the programme would be abandoned and all stock held would be destroyed.

The trials will be conducted at a research centre on the Atherton Tableland in the north of Queensland. The first year of the project would be spent in building special ponds and security fences, after which the fingerlings would be collected and transported to Australia by special staff. The handling and care of the fingerlings would be discussed with fisheries experts of FAO. If the fish proves no threat to native fish and are adaptable to local conditions, they will be released into selected rivers and dams.

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