

FISH AND FISHERIES OF THE MUDBANKS

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ABSTRACT

The mudbanks attracted the attention of fishery scientists as they play a vital role in coastal fishing during the S. W. monsoon. Studies on the fishery associated with mudbanks were carried out from Quilon to Mangalore, particularly in the mudbanks of Purakkad and Nattika, where the fishery is more intense. The total catch and catch per unit effort for mudbank and non-mudbank areas were estimated and compared. Changing pattern of fishery, species composition and their relative abundance were studied. The present paper thus embodies a detailed account on the much publicised 'mudbank fishery'—or *Chakara* fishery—and its magnitude and limitations. An attempt has also been made to project the socio-economics of the fishing community of these areas, along with the infra-structure and the impact of legislation in regard to mudbank fishery.

INTRODUCTION

Mudbanks have been a navigational problem since olden times for port authorities. Although mudbank is mentioned in literature since 1678 (*Adm. Rep. Travancore, 1860*), there is very little recorded information on the fishery associated with mudbanks. What little is known in regard to it is restricted to the infra-structure rather than the fishery. Paucity of details on the fishery associated with the mudbanks necessitated the present study.

Many years have elapsed since Bristow (1938) gave his first evaluation of the mudbanks of Kerala coast and it is not known whether any notable changes have taken place in the environment or in our fishing activities all these years. The country, after independence, made a big leap in mechanising the fishing industry and in extending our fishing activities farther out into the offshore waters. Nevertheless, the requirements of the necessary infrastructure to meet the increase in production by the improved fishing activities are not

yet adequately met with. It may be recalled in this connection that the Purakkad mudbank experienced a bumper landing in 1969, and the prawns and fishes that were landed in large quantities had to be buried along the beaches due to the processing and storage facilities then inadequate.

The S. W. monsoon period is generally an off-season for the fisherfolk on the west coast of India, who still use non-mechanised fishing crafts. In this period of general idling, the calm areas created by the mudbanks naturally attract fishermen in large numbers, from far and wide. These calm areas, varying in extent from about 10 km² to 25 km², provide safe harbourage to the country crafts. Launching and landing of canoes are very easy in the mudbank areas. Most of the canoes from the fishing villages of Cochin-Quilon and Cochin-Ponnani congregate (plate 1, A&B) respectively at the mudbanks of Alleppy and Nattika, and these places then become centres of intense fishing activity.

Fishery at the mudbanks of Kerala coast in general, and of Purakkad in particular, had, however, a severe set back in the year 1971, when the presses in Kerala came out with headlines on the failure of mudbank formation and the fishery associated with it. This mudbank failure prompted the Central Marine Fisheries Research Institute to make the all-out effort to investigate the nature of the mudbanks and the fishery associated with them.

MATERIAL AND METHODS

Ambalapuzha, Purakkad and Thottappally (Alleppey), Valapad (Nattika), Tanur (Calicut) and the fishing villages in and around these places were visited and fish samples and catch data were collected. Tanur could not be visited frequently, but Valapad, Ambala-

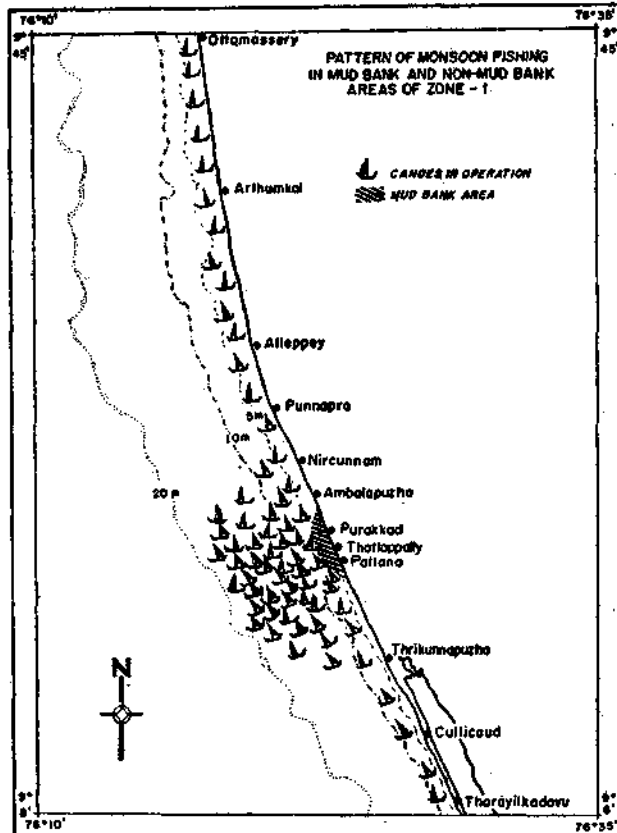


Fig. 1. Pattern of monsoon fishing in the mudbank and non-mudbank areas of Zone-1.

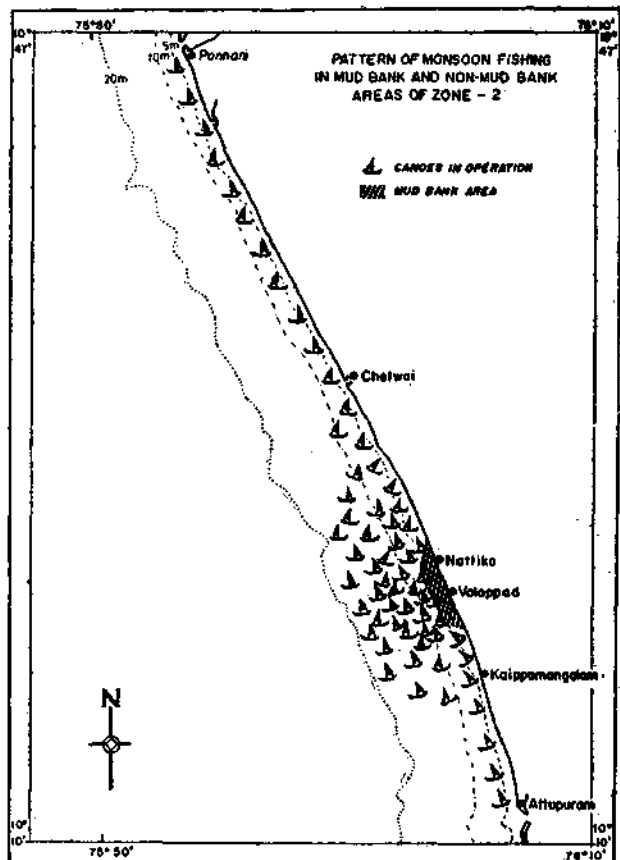


Fig. 2. Pattern of monsoon fishing in the mudbank and non-mudbank areas of Zone-2.

puzha, Purakkad and Thottappally were under regular observation. The present account deals with the craft and gear, species composition and total landings of the mudbank and non-mudbank areas of Alleppey and Nattika. For the purpose of this study the fishing villages of Alleppey (Ottamassery-Tharayilkadavu) is treated as Zone 1 (Fig. 1) and Nattika (Ponnani-Attupuram) as Zone 2 (Fig.2). The catch statistics of Zone 1, in regard to both mudbank and non-mudbank areas, is dealt with in detail. The Zones 1 and 2 are compared in respect of both total landing and the catch per unit effort (CPUE) worked out for a five-year period. The changing pattern of the fishery and the relative abundance of the species are discussed in detail.

FISH AND FISHERY

Craft and gear

Dug-out and rigged canoes (*vallam* or *vanchi*, in Malayalam) were the main crafts used in the fishing operations. Catamarans of Tamil Nadu with hooks and lines were also

seen. The canoes were mainly of two sizes, a larger one of 9.5 m, manned by 15 persons, and a smaller one of 6 m, manned by 9 persons. Canoes fitted with outboard motors, which had been introduced in 1980, were also in operation. The canoes of Calicut area were of flat bottom, while that of Valapad-Nattika and Ambalapuzha-Thottappally were of keel bottom. The main gears of operation were drag nets (*Thangu vala*) and gill nets (*Mathi-chala vala*). Cast nets were also used effectively near the shore in the mudbank area (plate: 1B)

Thangu vala: This is a rectangular net made of cotton or nylon and is about 50-60 m in length and 15-20 m in width, with a narrow end measuring about 6-9 m. The mesh size is about 20 mm. On sighting a shoal, one person jumps into the water holding one end of the net and remains stationary, while the canoe moves paying out the net to encircle the shoal. The canoe, on reaching the person, collects the other end also from him, and the net is hauled. Hauling the ends, a bag-like belly in

the centre is formed, where the fishes are collected and removed.

Mathi-chala vala: This is a gill net made of cotton or nylon pieces, each piece, measuring about 2.5-3 m long and 4-6 m broad, with a mesh of 9-25 mm. One or two canoes are operated to lay the net and these canoes carry 7-8 pieces of net laced together. When a shoal is sighted the net is rapidly paid out in a semi-circular fashion, the fishermen making loud noise. Thus driving the shoals toward the net they are gilled on the nets and removed.

Fish

The monsoon fishery was composed of 50 species of fish and six species of prawns. Fishes of the families Carcharinidae, Clupeidae, Dussumieridae, Dorosomidae, Engraulidae, Tachysuridae, Ambassidae, Theraponidae, Chirocentridae, Sillaginidae, Sciaenidae, Siganidae, Trichiuridae, Scomberomoridae,

Stromateidae, Cyanoglossidae and Drepanidae were encountered in the landings. Of the prawns, *Penaeus indicus*, *P.monodon*, *P. semi-sulcatus*, *Metapenaeus dobsoni*, *M monoceros* and *M. affinis* represented in the catch. While the monsoon fishery of the Alleppey mudbank region was dominated by *M.dobsoni*, *Stolephorus* sp. *Sardinella* sp. and *Leiognathus* sp., the major bulk of the catch of the northern sector (Valapad and Tanur) was contributed by *Sardinella* sp., *P.indicus* and *M.dobsoni*.

The monsoon fishery in Kerala has a legal protection from the state government, providing exclusive operational rights during monsoon to canoes and catamarans, especially so in the vicinity of the mudbank region. Fishing by mechanised vessels is strictly prohibited at the mudbank and nearby areas. However, indigenous crafts fitted with outboard motors, introduced in 1980, are allowed to operate in the mudbank regions.

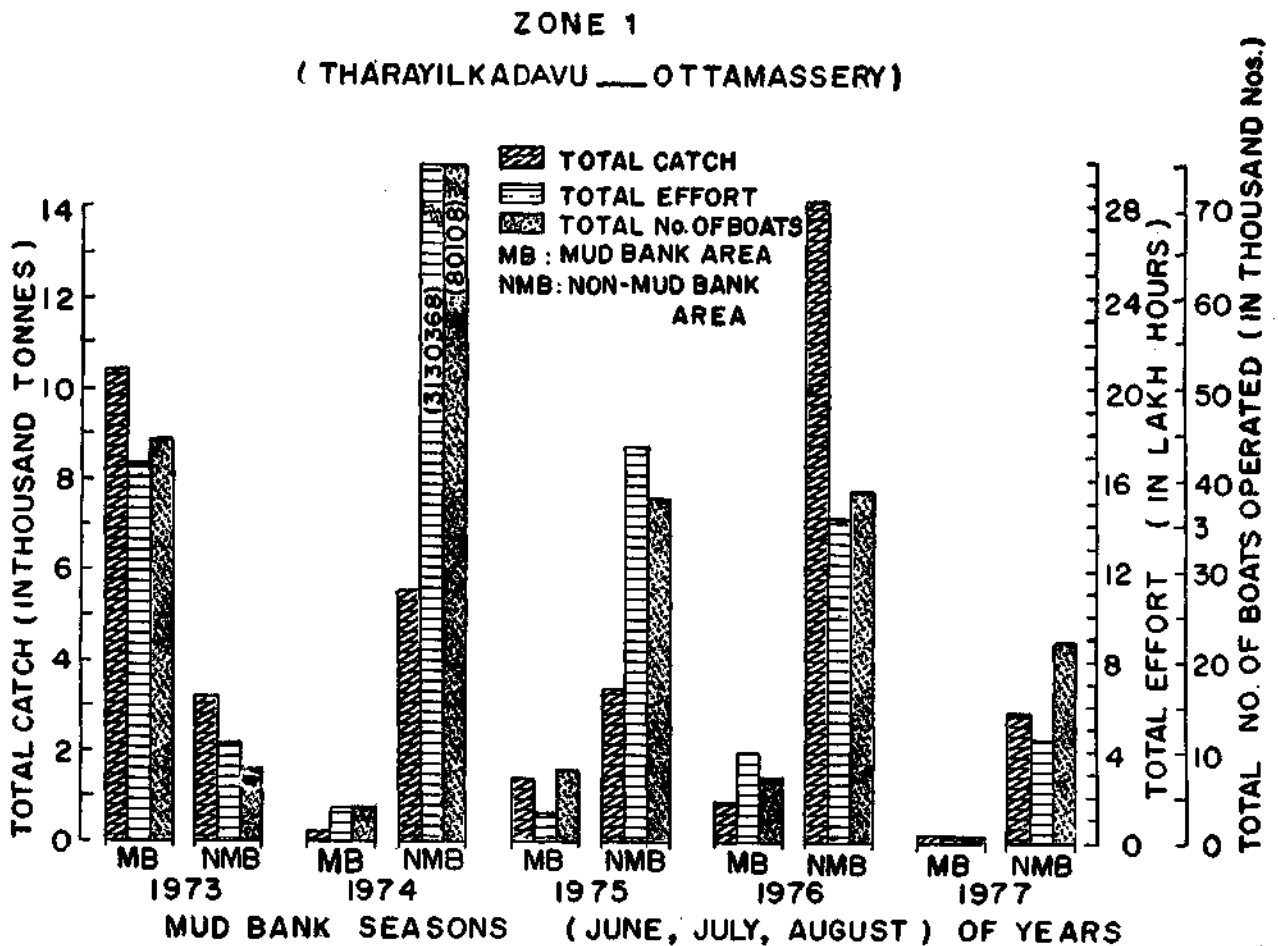


Fig. 3. Total fish landed, total effort and number of canoes operated in the mudbank and non-mudbank areas of Zone-1 during the mudbank seasons of years 1973-1977.

TABLE 1. Comparative study of fish landed in mudbank (M) and non-mudbank (N) areas during the mudbank seasons of the years 1967 to 1970 (in tonnes).

	1967						1968						1969						1970					
	June		July		August		June		July		August		June		July		August		June		July		August	
	M	N	M	N	M	N	M	N	M	N	M	N	M	N	M	N	M	N	M	N	M	N	M	N
<i>Scoliodon</i> sp.			179.1				6.0		6.4				3.2		8.4		1.0		2.0					
<i>A. dussumieri</i>	246.5															53.4								
<i>S. longiceps</i>	27.2				87.3		434.7				1042.7		0.84		0.80		809.9		528.3					
<i>Engraulis</i> sp.	17.3		25.5		5.5		0.2		0.8		20.0	13.0	13.8						9.4		27.9		3.1	
<i>Opisthopterus</i> sp.	10.0		4.1				0.4				0.8		5.7						4.7					
<i>Otolithus</i> sp.							0.6		4.3				3.3		17.1				0.3		3.9		1.3	
<i>Caranx</i> sp.			8.4		2.3	0.4	1.7			5.7	30.1	9.3	2.7	0.5		3.4		18.4						
<i>Leiognathus</i> sp.	9.3		8.1		4.1		31.6		55.7	197.3	37.7	11.5	386.1	71.7	314.9				106.0	71.3	9.1	17.8		
<i>L. lactarius</i>			22.8		1.2	1.0			3.9	155.4	1.5	19.4		8.7										
<i>P. indicus</i>							0.3		0.2	123.7		0.8	4.8	4.8	4.6	6.3	0.3			3.6	0.2	9.5		
<i>M. dobsoni</i>	562.7		3618.7		9.6	271.6	549.4	1488.7	406.0	20.1		1665.9	168.7	29.0	3.7	14.0	18.9		110.3	408.1	1044.2	160.4		
<i>P. stylifera</i>	20.8		44.8				9.2					2.2										65.3		
<i>Rhynchobates</i> sp.									55.1			2.5											0.1	
<i>Dusumieria acuta</i>								23.4		17.8	45.0			0.5	2.1	479.4				6.7		4.2		
<i>S. fimbriata</i>								45.7		53.0	10.0									12.8		0.3		
<i>Anchoviella</i> sp.					17.6	1.7		8.7		5.2	6.0		1.0		89.1	194.9			2816	10.7	31.9			
<i>Ambassis</i> sp.						3.6	1.9	9.6		38.4		4.7			6.4	467.5			35.2	50.6	2.8	29.7		
<i>Sciaena</i> sp.	6.9		75.6		10.8							9.3		20.3	8.1	22.8			16.6		3.9			
<i>Cynoglossus</i> sp.												3.6		1.0		9.0			1.1					
<i>Trichiurus</i> sp.	2.7											5.6				1.0								
<i>R. kanagurta</i>					1.2																			
<i>Zygaena</i> sp.																5.9								
<i>Cybium Commersoni</i>												0.5		17.6										
<i>M. affinis</i>										4.9														
<i>Sphyraena</i> sp.										13.2	1.5	13.7	0.6	10.8	3.9	2.4								
<i>A. thalassinus</i>							13.9																	
Miscellaneous	4.5		73.0		2.1	4.0	9.2	12.1	9.2	38.0	2.0	29.7	2.7	8.0	7.9	41.7	6.7		28.8	40.6	14.9	9.5		

TABLE 2 *Annual landings in metric tonnes for the mudbank and non-mudbank areas of Alleppey coast.*

Year	mudbank area				non-mudbank area				Total for mudbank and non-mudbank
	June	July	August	Total	June	July	August	Total	
1966	18.22	3800.49	—	3818.71	932.48	534.27	—	1466.75	2399.23
1967	906.52	4005.40	54.95	4966.87	—	—	369.98	369.98	5336.85
1968	607.44	2090.18	748.74	3446.36	—	415.25	68.80	484.05	4930.41
1969	2871.51	524.59	224.14	3620.24	186.43	—	2490.47	2676.90	6297.14
1970	1755.62	632.97	1182.38	3570.97	—	581.45	226.97	808.42	4379.39
1971	177.22	698.65	106.70	982.57	4680.00	860.24	892.39	6432.63	7415.20
1972	436.13	1652.62	1148.08	3236.83	863.11	2500.27	152.34	3515.72	6752.65
1973	46.19	2538.83	7840.19	10425.21	—	3207.33	—	3207.33	13632.54
1974	23.24	23.93	—	47.17	1222.84	106.53	4338.40	5667.77	5714.94
1975	—	938.59	472.97	1411.56	133.32	1566.06	1709.52	3408.90	4820.46
	6823.87	18105.76	11778.15	31767.78	7085.70	9237.13	10248.87	26571.70	

THE FLURRY AT THE MUDBANK



Plate-I A Canoes all set for operation; B. Transportation of a canoe to the mudbank area by road; C. Cast nets in operation in the mudbank.

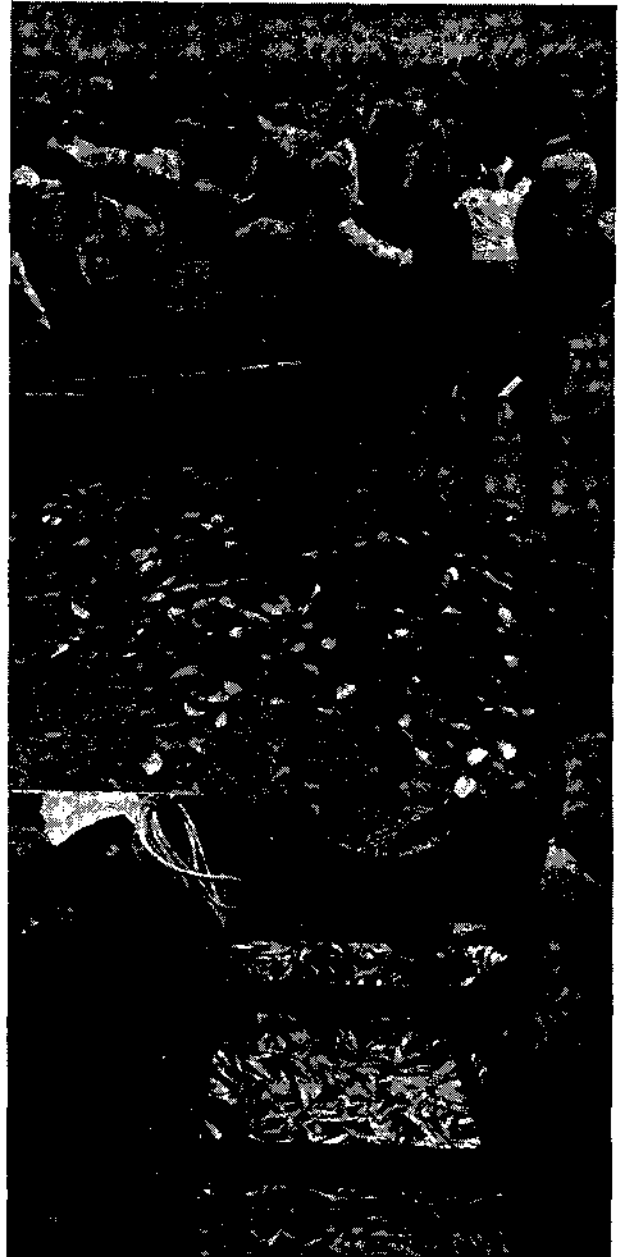


Plate-II A. Throng of fishermen and fish vendors at the mudbank of Alleppey; B & C. Bumper catch of prawns and fishes.

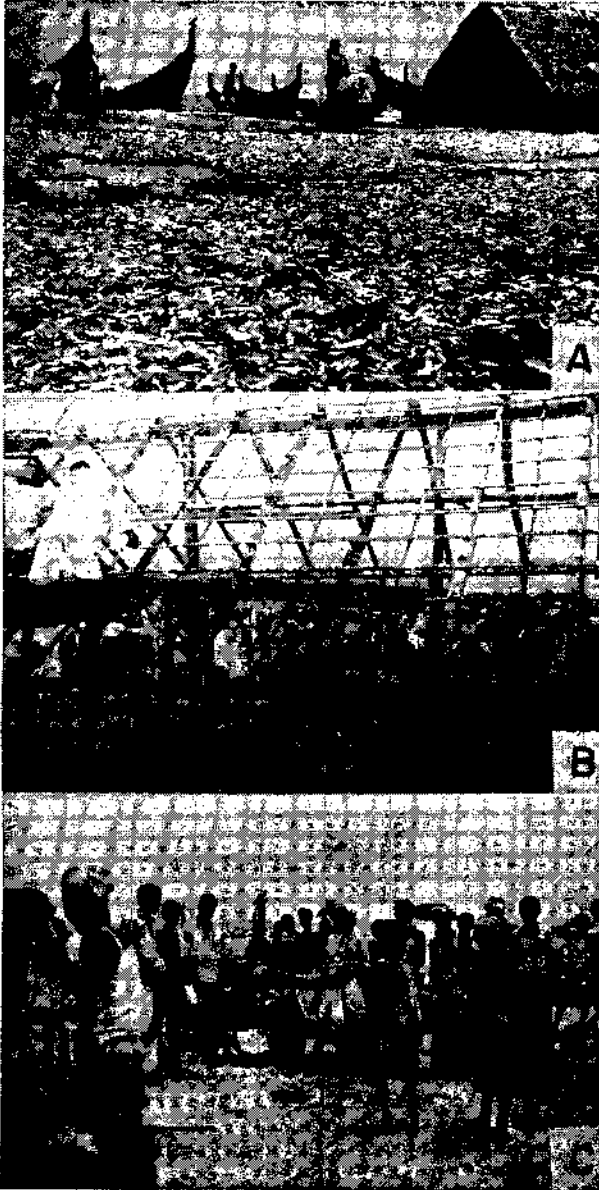


Plate-III A. Drying of excess catch on the beach; B. Preparation for the mudbank fishery—fish storage shed under construction; C. A section of the commercial setup at the mudbank.

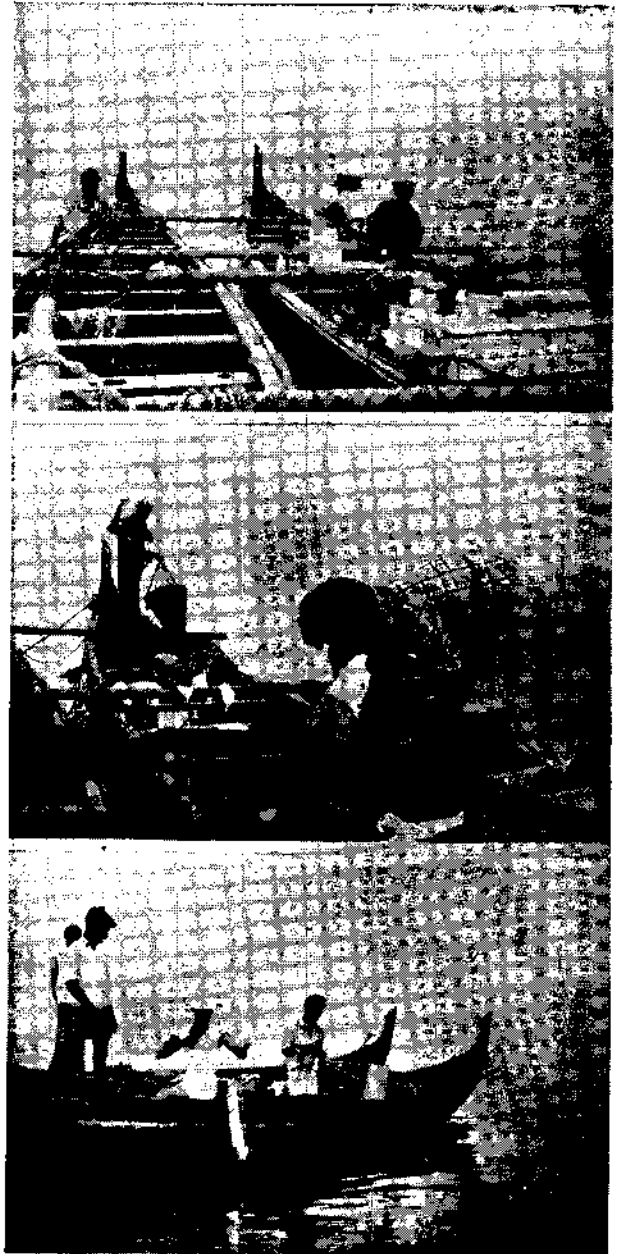


Plate-IV A-C. Diurnal studies being conducted at Alleppy mudbank (Thottappally). (See Chapter 7)

**ZONE 2
ATTUPURAM — PONNANI**

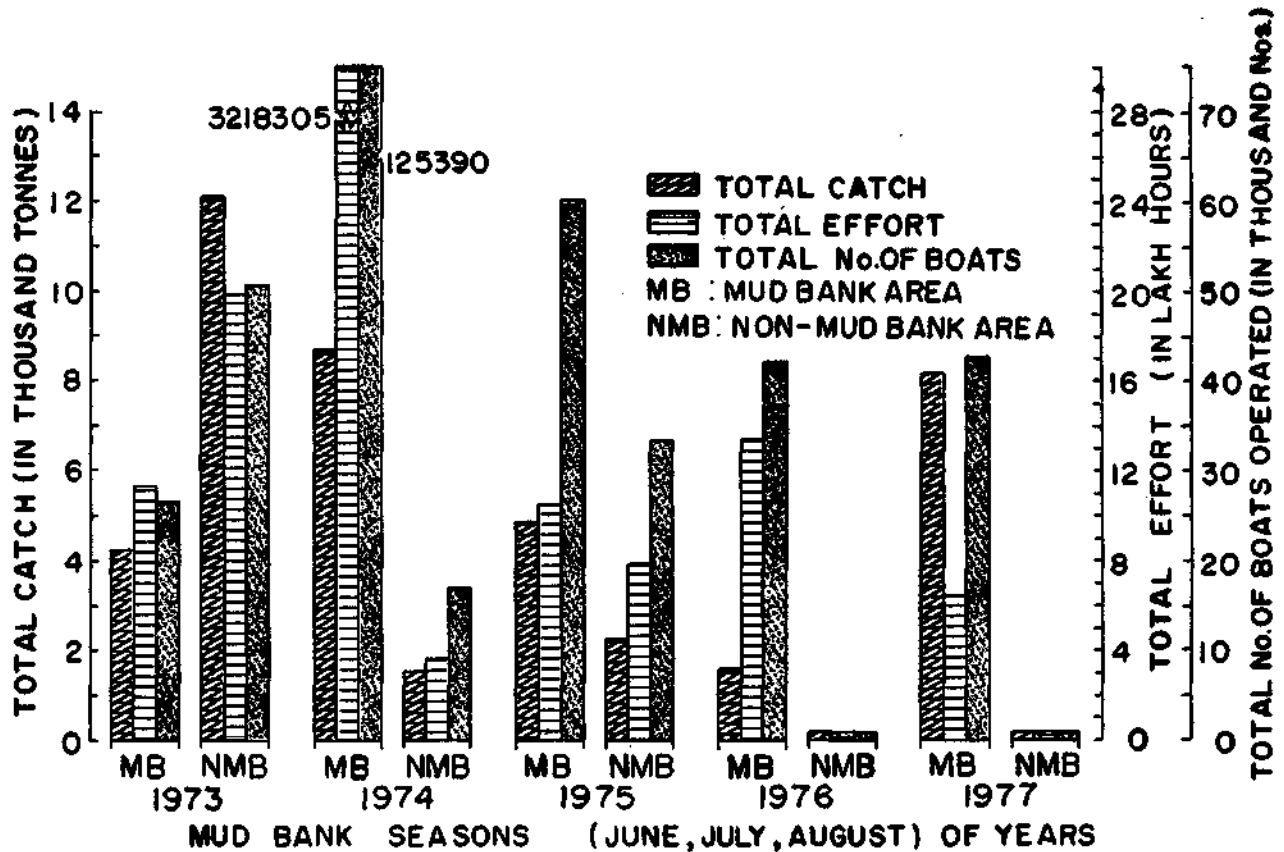


Fig. 4. Total fish landed, total effort and number of canoes operated in the mudbank and non-mudbank areas of Zone-2 during the mudbank seasons of years 1973-1977.

Normally, fishing in the mudbank is done from the early hours of day till noon. But, on heavy fishing days fishing continues through out the day. The authors themselves have witnessed the fishing operations on many occasions and collected information on the fishing pattern prevailing in the mudbank regions. The fishing is generally confined to the peripheral region of the mudbank. When catches are heavy, the boats have been observed to come to the shore to unload their catches and return to the same area to resume the fishing operations. Because of the legal prohibition on mechanised vessels, the authors could not conduct any exploratory fishing operation in the mudbank. But it has been observed that the fishery, though intense at times, is in no way a permanent feature of the mudbanks, because there are many a days when the boats return, after hours of scouting, without even a single fish. However, on such days, weather

permitting, fishermen go farther from the mudbank and bring sometimes heavy catches from places north and south of the mudbank (Plate: 2&3A). Catamarans from Tamil Nadu have been observed to move far off to places outside the mudbank area for hook-and-line fishing. On days of rough weather, fishing operations are at times carried out very close to the shore, inside the mudbank proper.

Specieswise composition of the fish landings from the mudbank and non-mudbank areas of Alleppey during the years 1967-70, presented in Table 1, shows that *Metapenaeus dobsoni*, *Sardinella longiceps*, *Leiognathus* sp., *Stolephorus* spp. (*Anohoviella*) and *Ambassis* sp. form the bulk of the landings in the mudbank as well as in the non-mudbank areas during this period.

Table 2 shows the total annual landings at the Alleppey coast covering both the mud-

bank and non-mudbank regions for a period of ten years (1966-75). The total landings of the mudbank area, as can be seen from these data, has dwindled steadily from 1971, except for a reversal in 1973, and that of the non-mudbank area increased substantially from the earlier years.

Catch, effort and units in operation

The total fish landed, effort expended and the number of canoes operated during the S. W. monsoon both at the mudbank and non mudbank areas of Zones 1 and 2 in the years 1973-77 are shown in the figures 3 and 4.

The highest rate of catch (catch per unit effort) for the mudbank area in Zone 1 was in 1975, while that for the non-mudbank area was in 1976 (fig. 5). In Zone 2, the highest catch per unit effort was recorded in 1977 for the mudbank area, and for non-mudbank area it was in 1973. In Zone 1 the catch per unit effort was more for the mudbank area than for non-mudbank area in 1973 and 1975; but in 1974, 1976 and 1977 it was the reverse. In Zone 2,

the non-mudbank area had a higher catch rate than the mudbank area in 1973 and 1974, while, in all the other years under consideration, the catch per unit effort was higher in the mudbank area. However, the overall catch per unit effort was on the higher for the non-mudbank area in Zone 1 (Purakkad) and for the mudbank area in Zone 2 (Nattika).

Changing pattern of fish distribution

The pattern of fish distribution in the coastal areas during the monsoon season has been observed to change very frequently, even from day to day. This phenomenon was then not only confined to the mudbank area but also to other areas outside it, obviously because of the shoaling behaviour of the fishes. The daily changing pattern of the fish landed at the mudbank area of Alleppey was studied for 13 days in July 1971, and the results are given in fig. 6. Of the major constituent species at this time, *M.dobsoni* dominated the catch for 6 days, During these six days, *P.indicus* ranked second for one day, and *Leiognathus* spp.

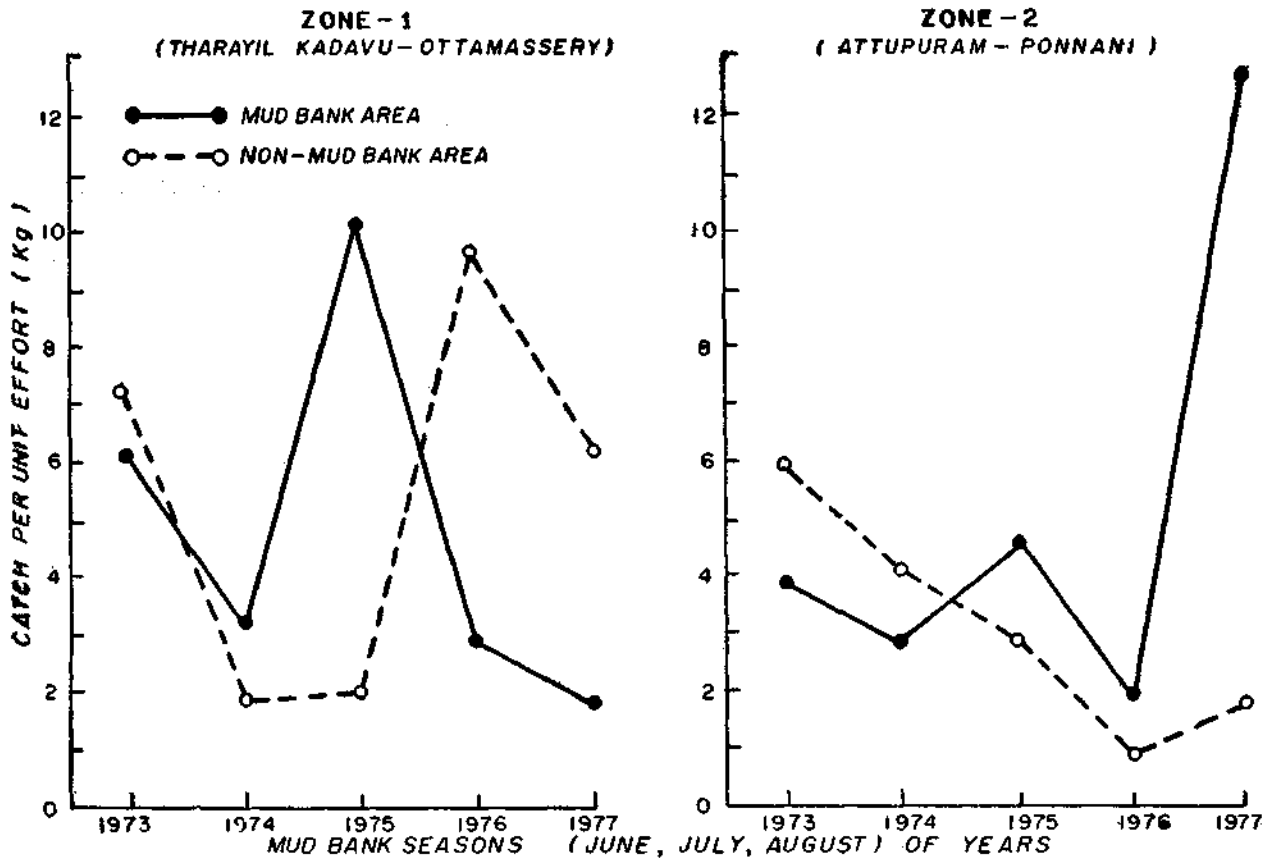


Fig. 5. Catch-per-unit- effort of mudbank and non-mudbank areas of Zones 1 and 2 for the period 1973-1977

and *Stolephorus* spp. for two days each. On the remaining day, the catch was of a mixed type, without having any species predominance. Eventhough there were some gaps in the observations, the overall figure emerged out was sufficient to show the daily changing pattern of the fishery.

SPECIES	JULY-1971													
	DATE	1	5	13	14	16	17	18	23	25	26	28	29	30
METAPENAEUS DOBSONI		•	+	•	•							•		•
PEMAEUS INDIGUS		+												
SARDINELLA LOMICEPS			•											
LEIOGNATHUS SPP				+	+	•	•				•			
STOLEPHORUS SPP								•	•		+			•
MISCELLANEOUS						•	•	•	•	•			•	•

• MOST ABUNDANT SPECIES + SECOND ABUNDANT SPECIES ✖ NO DATA AVAILABLE FOR MISSING DATES

Fig. 6: The changing pattern of fishery at the Alleppey mudbank in July 1971.

Relative abundance of fishes in mudbank area and in non-mudbank area

An attempt was made to compare the distribution patterns of fishes at the mudbank and non-mudbank areas of the two zones, based on the landing figures, eventhough the mudbank areas were fished almost every day while the non-mudbank areas were fished only when calm weather prevailed. The catch distribution, species composition and their percentage abundance for the mudbank and non-mudbank areas did not differ much (fig. 7&8). It is obvious from the figures, that except in July (1975) and August (1977) for Zone 1 and in June (1975) and August (1977) for Zone 2, the pattern did not show much variations.

Infrastructure

With the onset of a mudbank the fishing village, all on a sudden, turns into a place of hectic activity (plate: 3). Thousands of fishermen and people associated with fish marketing and processing industry assemble here. Fortune seekers, too, other than fishermen, encamp at the mudbank area. New hotels and tea stalls come up. Pedlars find their job thriving. The law-and-order department becomes more vigilant. To meet the fishing requirements, an elaborate infra-structure is then naturally needed. Sufficient number of crafts, gears, preservation and marketing facilities, and mean of quick transportation are essential. Above

all, every fisherman has to have a reasonable price for his commodity. It will be worthwhile to examine how far these needs are met with during the mudbank fishery.

The ice plants established in the vicinity of mudbank areas of course ensures steady supply of ice. At times, when there are heavy landings, quantities of ice are brought also from distant places. As there are very good transportation facilities all along the Kerala coast quick movement of the catches by insulated and ordinary trucks is not ordinarily a major problem. In spite of all these, the price of fishes falls very low on days of heavy landings.

Socio-economics

Majority of the fishermen who engage in fishing at the mudbank come from far-off places. They come with their own or hired crafts and gears, At the mudbank region, they usually stay with their relatives or friends, or in rented tenements on the open beach. These people are not a homogenous group; they belong to various castes and religions and speak different languages, but, they nevertheless work in perfect harmony.

The income of the fishermen at the mudbank area is never steady, like any where else. On days of good fishing it is not uncommon for a fisherman to get Rs. 300/- or even more per day. On the other hand, on many days they get nothing since they return without any catch at all. However, of late, several canoes fitted with out-board engines are under operation in the Alleppey region enabling them to fish further out with better results.

Majority of the fishermen hire boats and nets for operation in the mudbank regions' and, therefore, a major portion of their income has to be disbursed as rent for the boat and net. Besides, fishermen borrow good amounts of money from money lenders or fish agents (at usurious rates) anticipating good income from mudbank. This takes a heavy toll, too, apart from the sad fact that the money lenders usually decide the price of catches. Thus it is not unusual that the fishermen who come to the mudbank with the hope of getting a good harvest at times go back with empty hands. Of course, there are rare exceptions. A few diligent fishermen earn enough from mudbanks even to purchase boats and nets for themselves.

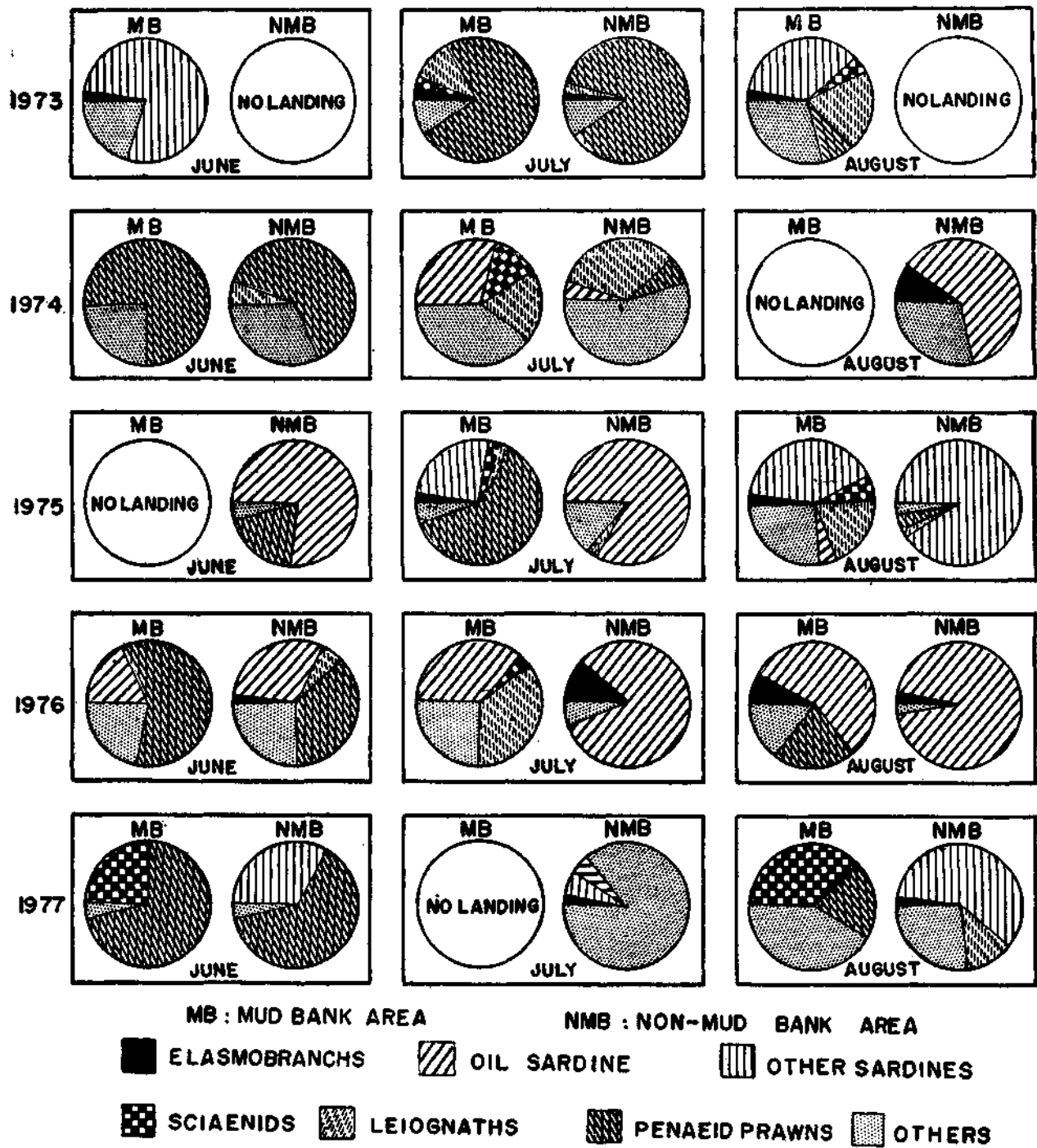
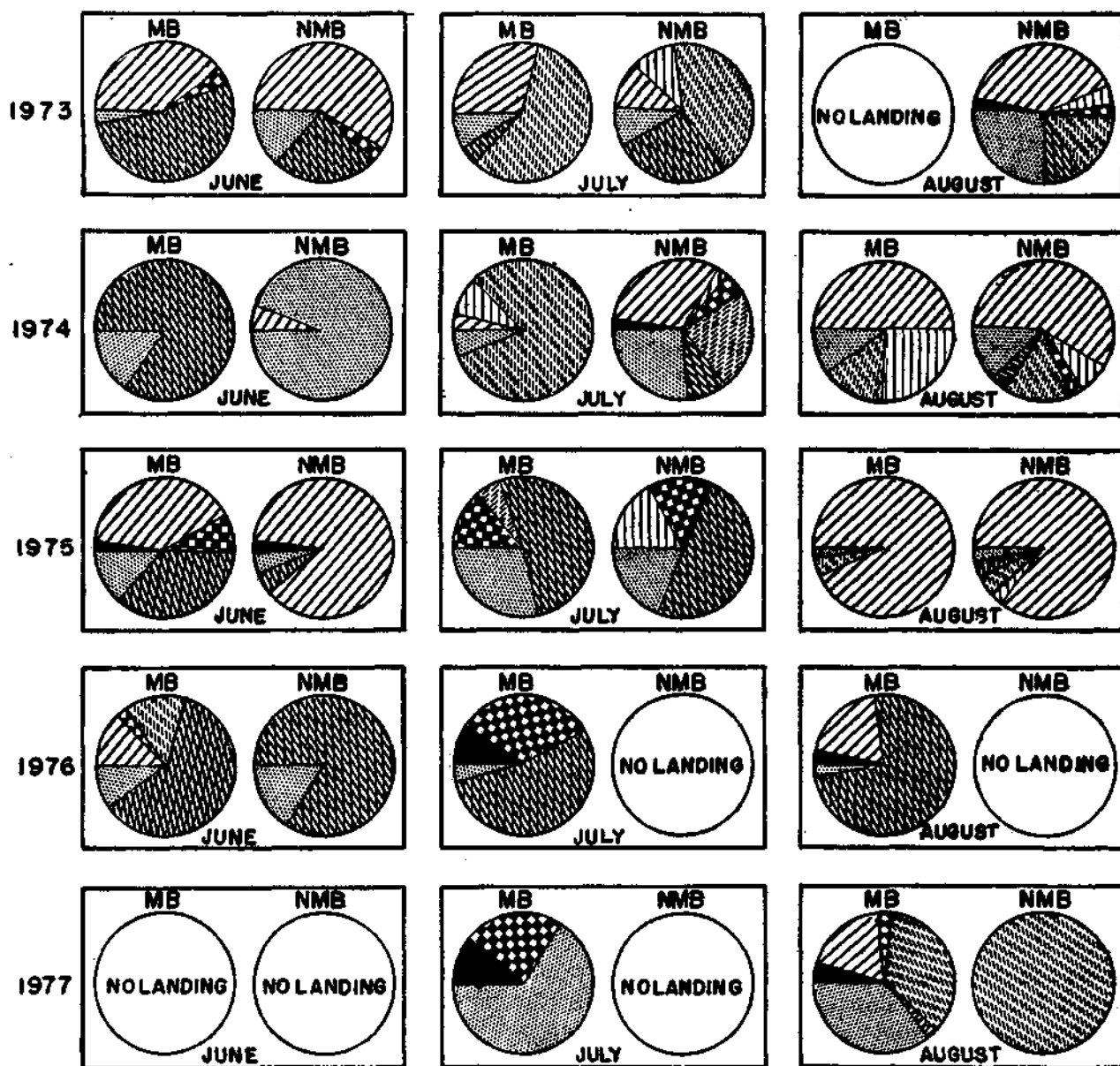


Fig. 7: Relative abundance of important fishes landed at the mudbank and non-mudbank areas of Zone 1 during the years 1973-1977.



MB : MUD BANK AREA

NMB : NON-MUD BANK AREA

■ ELASMOBRANCHS ▨ OIL SARDINE ▩ OTHER SARDINES
 ▩ SCIAENIDS ▨ LEIOGNATHS ▨ PENAEOID PRAWNS ▨ OTHERS

Fig. 8: Relative abundance of important fishes landed at the mudbank and non-mudbank areas of Zone 2 during the years 1973-1977.

DISCUSSION

It can be seen from the ten years' data (Table 2) that the popular belief that mudbanks are, as it were great fish bowls, abounding in fish which can be caught easily needs rethinking. The abundance of species, like *M. dobsoni* (1967, 69 and 70), *S. longiceps* (1967, 69 and 70), *Leiognathus* spp. (1969, 70), *Stolephorus* spp. (1969, 70), *Ambassis* sp. (1969, 70) and *P. indicus* (1970), that is seen in the mudbanks many a days in the months of July-August (Table 1) is in no way an exclusive feature of the mudbank, but is found all along the coast during the monsoon months. It has been found by many authors that the in-shore fishes, especially prawns, move from deeper waters to closer to shore during the S.W. monsoon, probably due to the process of upwelling (Banse 1959). During the monsoon, the current has been observed to be southerly. The general tendency of fish being to swim against the prevailing current, it is possible that a good part of these fishes are then moving in shoals northward and a portion, on passing through the mudbank area, are easily caught by the numerous canoes operating in and outside the mudbanks. If so, it is also possible that a shoal of a particular composition, after its passing, is followed by another of entirely different composition, which might account for the abrupt changes in the composition of fish landed. The overall picture obtained thus seems to support the hypothesis that the catches landed at the mudbank area are from shoals which are on the move, and they are caught only at this area because at this time fishing is possible only at this region. While the data in general show (Table 2 and fig. 4) a higher landing for mudbank areas, fig. 6 shows the day-to-day variation in the catches of the mudbanks indicating the probability of the existence of a fishery resource along the west coast during the monsoon months. This is furthermore indicated by the fact that, whenever weather permits fishing, the fishermen land sizable quantities of the same species from the non-mudbank areas as well; only that the fishermen operating at the mudbank area have an added advantage in fishing at the periphery and occasionally inside the mudbank even when fishing is not generally possible. It may also be mentioned that fishes caught elsewhere in non-mudbank areas on calm days are often landed at the

mudbank area due to the good marketing facility then available only in the mudbank area, thus raising the catch figures wrongly attributed to mudbank. For example, on calm days, fishermen stationed at the mudbank have been observed to move out to places like Thrikkunnapuzha, Kalikadu (Kayamkulam), etc., and bring heavy catches of prawns and fishes. These are also landed at the mudbank area. Thus the higher landing figures generally available for the mudbank area includes the catches not only of the mudbank, but also of far-away areas which have no mudbank condition what so ever (Fig. 1 and 2).

A low overall total marine landing figure of 1970 monsoon fishery (table 2) as well as a very poor catch in the mudbank areas in 1971 made the press to come out with headlines. In fact, there was a perfect mudbank formed in 1971, though the fishery associated with it suffered a set back. But it is interesting to note that the non-mudbank area had at this time a very good fishery. All through from 1971, except 1972 and 1973, the fishery of the mudbank area was of a low magnitude. In the year 1974 it amounted only to a very meagre amount of 47.17 tonnes. It may thus be seen from this data that the popular opinion about the mudbank fishery is baseless; and to think that an area of 10-25 km² within a period of three months to produce a fishery of its own or even to 'attract' fishes in such large numbers is beyond all scientific reasons. 1971, a year of good mudbank formation, had a landing figure of 7415.20 tonnes for mudbank and non-mudbank, whereas the year 1973, when the mudbank was poorly formed, had an all-high figure of 13632.54 tonnes for both mudbank and non-mudbank. It may be pointed out that of the 7415.20 tonnes in 1971, the mudbank contribution was only 982.57 tonnes. During the years 1973-77 the highest figures for mudbank (10425.21 tonnes) and non-mudbank (14231.55 tonnes) were recorded in 1973 and 1976, respectively. The lowest was in 1977 for both mudbank (47.81 tonnes) and non-mudbank (2884.70 tonnes) in Zone 1 (Fig. 3). In Zone 2, the highest figure recorded for mudbank was in 1974 (8776.84 tonnes) and for the non-mudbank areas it was in 1973 (12100.61 tonnes). The lowest figure recorded for the regions were respectively in 1976 (2638.19 tonnes) and 1977 (0.25 tonnes) (Fig. 4).

In zone 1, the catch per unit effort (CPUE) for the mudbank (Fig. 5) was 4.6 kg and that for the non-mudbank was 5.4 kg, showing a higher CPUE for non-mudbank areas, but in zone 2, the CPUE was 5.2 for mudbank and 3.0 for non-mudbank, showing the reverse. The variation in CPUE clearly shows that the catch is determined by the fishing facility, man power and gear and craft rather than the mudbanks. (Fig. 3 & 4). It is also seen that, as the monsoon of 1973-77 was such as to favour fishing all along the coast, the non-mudbank, cover-

ing a large area and having more canoes and man-power in operation, was able to dominate with the catch; the overall landing figures show a higher catch for the non-mudbank areas (45301.53 tonnes) and lower for the mudbank areas (41605.11 tonnes). The occurrence of the stock remaining the same, the yield would have most probably shown a considerable reversal had the monsoon been more active so as to prevent fishing in the non-mudbank regions.