Bay of Bengal Programme

Fishing Technology

FISHING TRIALS WITH BEACHLANDING CRAFT

AT THIRUMULLAIVASAL, TAMILNADU, INDIA 1989-1991

BOBP/WP/75

FOOD AND AGRICULTURE ORGANISATION OF THE UNITED NATIONS

BAY OF BENGAL PROGRAMME
Small-Scale Fisherfolk Communities

BOBP/WP/75

Fishing Trials with Beachianding Craft at Thirumullaivasal, Tamil Nadu, India 1989-1991

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Based on the experience gained in small-scale offshore fishing in Uppada, Andhra Pradesh, India (BOBP/WP/56), and the need to diversify and develop small-scale fisheries in the offshore areas off the Coromandel Coast of Tamil Nadu, India, a subproject for the commercial fishing of pelagic species was established in 1989 by the Fisheries Department of Tamil Nadu with technical and financial support from the Bay of Bengal Programme. It was executed in Thirumullaivasal, Thanjavur District, from February 1989 to January 1991 with one beachianding craft (BLC)of the IND-20 type. A second boat of the same type became available in July 1990.

The purpose of the subproject was to demonstrate to fisherfolk and Fisheries Officers the technical and economic feasibility of small-scale offshore fishing by using the BLC and employing diversified fishing gear. It was hoped that the demonstration would lead to commercial exploitation of less exploited resources and produce new sources of earnings for the fisherfolk who own and operate traditional as well as other introduced motorized fishing craft. This paper records the trials over a two-year period and the conclusions drawn from them.

The Bay of Bengal Programme (BOBP) is a multi-agency regional fisheries programme which covers seven countries around the Bay of Bengal — Bangladesh, India, Indonesia, Malaysia, Maldives, Sri Lanka, Thailand. The Programme plays a catalytic and consultative role : it develops, demonstrates and promotes new techniques, technologies or ideas to help improve the conditions of small-scale fisherfolk communities in member-countries. The BOBP is sponsored by the governments of Denmark, Sweden and the United Kingdom, by member-governments in the Bay of Bengal region, and also by AGFUND (Arab Gulf Fund for United Nations Development Organizations) and UNDP (United Nations Development Programme). The main executing agency is the FAO (Food and Agriculture Organization of the United Nations).

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The two IND-20s anchored in shallow water in Thirumullaivasal (above) and one of them being beached (below)

1. *INTRODUCTION*

With a coastline of about 1000 km stretching along the Coromandel Coast, the Palk Bay and the Gulf of Mannar, Tamil Nadu State in India has a continental shelf area of about 41,000 km^2 and an exclusive economic zone of around 197,000 km2. While the continental shelf extends 40-70 n miles in the Gulf of Mannar, it extends only 12-20 n miles along the Coromandel Coast, making access to offshore resources easy with small motorized fishing craft operating from the coast.

The present fishing fleet along this coast comprises of about 40,000 fishing craft, ranging in size from 7 to 14 metres and using a wide diversity of fishing gear. Of the fleet, about 7000 fishing craft are mechanized and include larger, introduced fishing craft with diesel inboard engines and smaller traditional craft with diesel inboard engines, diesel longtail engines and outboard motors.

The present fishing operations are concentrated in the coastal area and, therefore, most of the marine catch is taken within a depth range of 50 m and over an area of only 23,000 m². There are no offshore fishing operations carried out for pelagic species by the small-scale fisheries sector.

While the number of fishermen and fishing units has been increasing steadily and becoming more effective, through training of fishermen, the introduction of new fishing gear – high opening bottom trawls, trammelnets and monofilament gillnets – motorization of small fishing craft and introduction of larger trawlers, the production has remained more or less constant over the last decade. Therefore, it would seem, that most of the coastal fisheries resources have been fully exploited or may even be, in some areas, over-exploited.

At the same time, the investigations, although limited, of the offshore resources off the Coromandel Coast have indicated underexploited resources of pelagic and demersal species. Besides, the promising results of Tuna drift longlining by FSI, CIFTNET and chartered vessels off the Coromandel Coast and the experience of Sri Lankan small-scale drift netters-cum-drift longliners are indications of the possibility of extending the small-scale fishing sector into the offshore area to fish for pelagic species. Catches of large Flyingfish (using surface gillnets) and Shark (using bottomset longlines) in offshore areas off Madras have also been encouraging. What have, so far, been the main deterrents to the exploitation of these resources are

- the low demand for, and price of, pelagic species, and
- the lack of suitable craft and skilled crew to conduct offshore fishing.

The beachlanding craft (BLC) of the IND-20 type has proved suitable in Andhra Pradesh and Orissa where the feasibility of offshore fishing for large pelagic species has been demonstrated.

Based on the experience gained in small-scale offshore fishing in Uppada, Andhra Pradesh (BOBP/WP/56) and the need to diversify and develop small-scale fisheries in the offshore areas off the Coromandel Coast of Tamil Nadu, a subproject for the commercial fishing of pelagic species was established in 1989 by the Fisheries Department of Tamil Nadu with technical and financial support from BOBP. It was executed in Thirumullaivasal, Thanjavur District*, from February 1989 to January 1991 with one BLC (IND-20). A second boat of the same type became available in July 1990.

The purpose of the subproject was to demonstrate to fisherfolk and Fisheries Officers the technical and economic feasibility of small-scale offshore fishing using the BLC and employing diversified fishing gear. The intended beneficiaries were the fisherfolk who own and operate traditional as well as other introduced motorized craft. It was hoped that the demonstration would lead to commercial exploitation of less exploited resources and produce new sources of earnings for these fisherfolk.

* Now Quaid-E-Moilleth District

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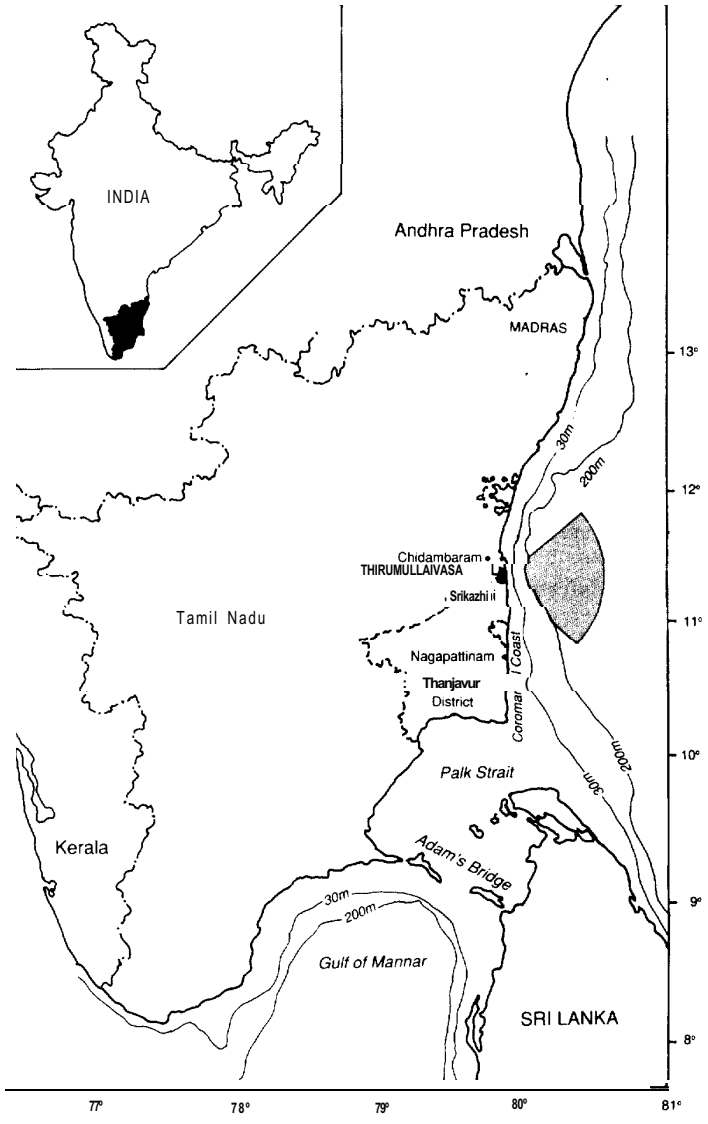
2. SELECTION OF FISHING VILLAGE

Considering the operational range of the BLC and the width of the continental shelf, Thanjavur District was considered a suitable area for demonstrating small-scale offshore fishing. A rapid appraisal of the fishing areas, shore facilities and fishing communities was carried out in ten fishing villages of this district after which Thirumullaivasal, about 280 km south of Madras, was selected as the operational base for the fishing demonstration (see Figure 1 and for background information on this fishing village Appendix I).

The main reasons for the selection were :

- Proximity of offshore areas from the shore, the continental shelf extending up to only about 15 n miles.
- Known availability of large pelagic species. Commercial landings of large pelagic species by Sri Lankan fishermen/refugees in Nagapattinam, a nearby fishing port, had been reported a few years before.
- The village is located near an open beach and lagoon, therefore requiring a fishing craft suitable for beaching or negotiating very shallow water outlets.
- The access to the village by road was good.
- An ice plant was available in the village.
- Fresh water, salt, fuel and fishing gear supplies wereeasily available
- Workshop facilities for engine repairs existed in Sirkazhi, 13 km from Thirumullaivasal.
- There were fish merchants present at the landing site, who ensured marketing and processing of the catch.

Fig. 1. Map of coastal area showing operational base and fishing area



- Diversified types of fishing craft (log *kattumaram,* FRP motorized open boats and mechanized trawlers) were being used in this village.
- Some fishermen had experience operating motorized fishing craft.
- Accommodation for the project staff was available in the village.
- And, most important of all, the fisherfolk community, of about 600 full-time fishermen, was aware of the growing need for diversified fishing activities in areas further offshore and, consequently, showed interest in cooperating in the trials.

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3. *THE CREW*

A local crew of four fishermen from Thirumullaivasal were recruited to man the BLC. The crew had no previous experience in the operation and maintenance of beachianding craft and of an engine fitted in a liftable box drive. They were not familiar with the operation of trolling lines, drift longlines and flyingfish gilinets. They were also reluctant to operate in offshore areas with such a small fishing craft. Except for a few fishermen, past fishing experience had been confined to the coastal area.

Training in operation of the BLC, its engine and and fishing gear was, therefore, necessary and was imparted by the BOBP Masterfisherman, a fisherman/leader and an engineer during the early stages of the subproject.

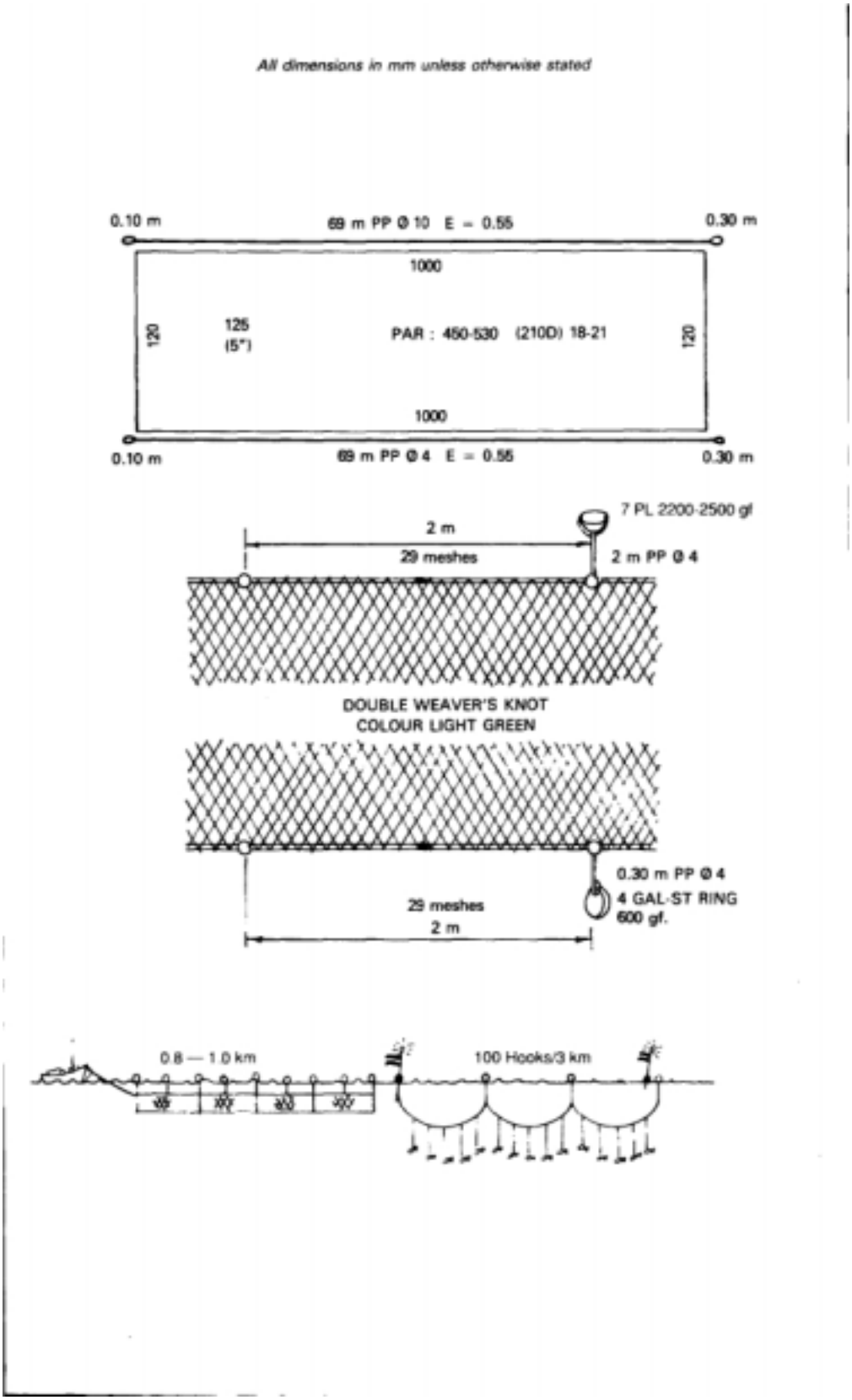
The crew worked on a catch share basis. After deducting operational costs from the gross revenue, the crew share was 33 per cent of net revenue when operating driftnets and *50* per cent when operating drift longlines or trolling lines and gilinet for Flyingfish. The difference in crew share was according to traditional sharing practices and because of higher investment and risk for the boat-owner when operating drift nets. However, in view of the exploratory nature of the fishing, each crew member were guaranteed a fixed minimum daily wage of Rs. *45* whenever there was a low catch, thereby ensuring each of them an income on par with commercial fishing craft.

4. *FISHING GEAR AND THEIR OPERATION*

To exploit large pelagic species with small fishing craft, driftnetting and drift longlinirig were fishing methods proven in earlier trials off Uppada, Andhra Pradesh, and Nagapattinam, Tamil Nadu. Bottomset longlining for Shark was a fishing method proven off the Madras coast. Trolling was a complementary fishing method for use to and from the fishing ground. It was also occasionally used as the main fishing gear to catch Seerfish and small Tuna. Small mesh gillnetting had proved to be appropriate for capture of large Flyingfish off Besant Nagar in Madras.

Beachianding craft IND-20 at sea with sail

Fig. 2. Driftnet



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The BLC was, therefore, equipped with the following fishing gear

- 16 driftnets, each 1000 mesh long, 125 mm stretch mesh, twine size 210d18-21 (see Figure 2 facing page);
- 20 bundles of drift longlines with five hooks each, for Shark (see Figure 3);
- 10 multihook and single hook trolling lines;
- 20 monofilament gillnets 1800 mesh long, 45-50 mesh deep; *50-54* mm stretch mesh, for large Flyingfish (see Figure 4 overleafl; and
- 3 monofilament gillnet, 2800 mesh long, 100 mesh deep, 32 mm stretch mesh for small Flyingfish (see Figure 5 on page 6).

As bait for Shark drift longlining, cut pieces of fresh bloodfish were mainly used. They were collected from the catch of driftnets and trolling lines and kept in ice when caught the previous day. Bait fish was purchased only on a few occasions, when drift longlining alone was carried out.

4.1 *Driftnetting and drift longlining for large pelagic species*

The large mesh driftnets were laced to one another so as to form a fleet of nets floating close to the surface (max. 2 m deep) (see Figure 2). The drift longlines were also attached one to another to form a longline with the hooks hanging 15-25 m below the surface.

Fig. 3 Drift longlines (Shark)

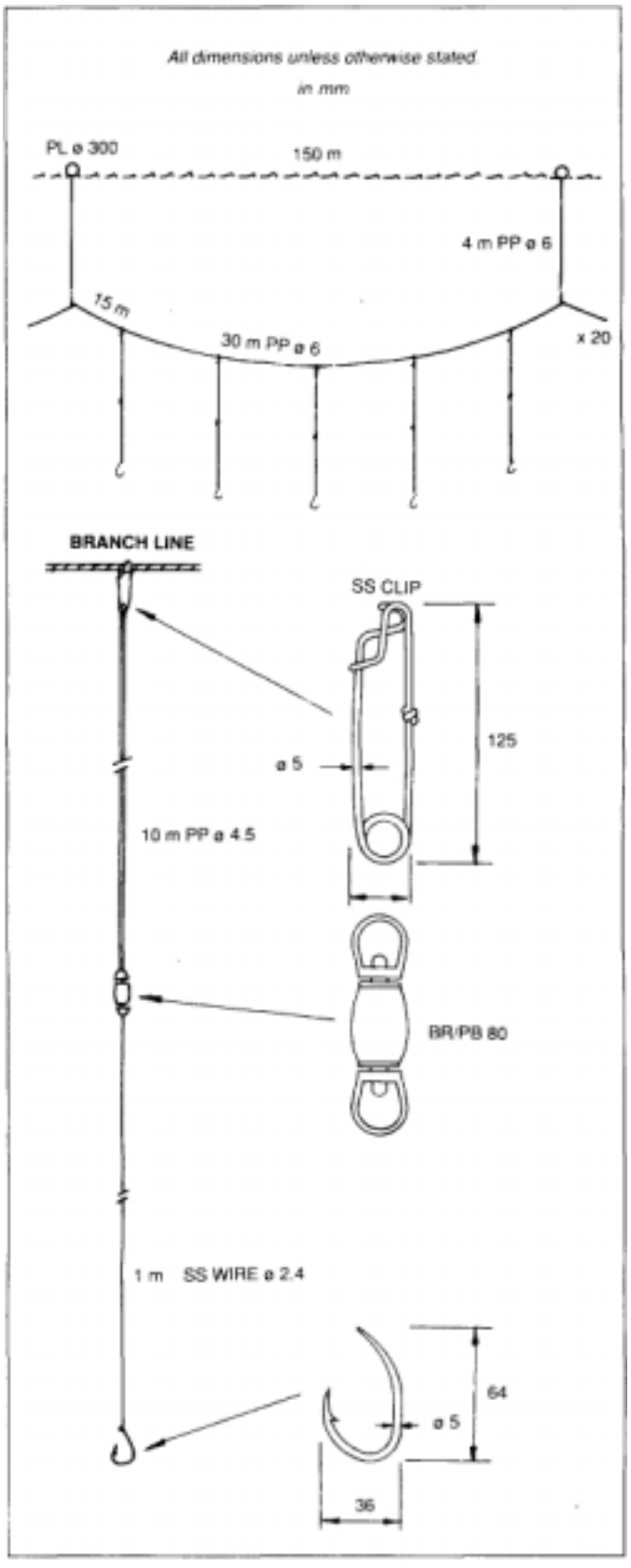

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Fig. 4. Gillnet (for large flyingfish)

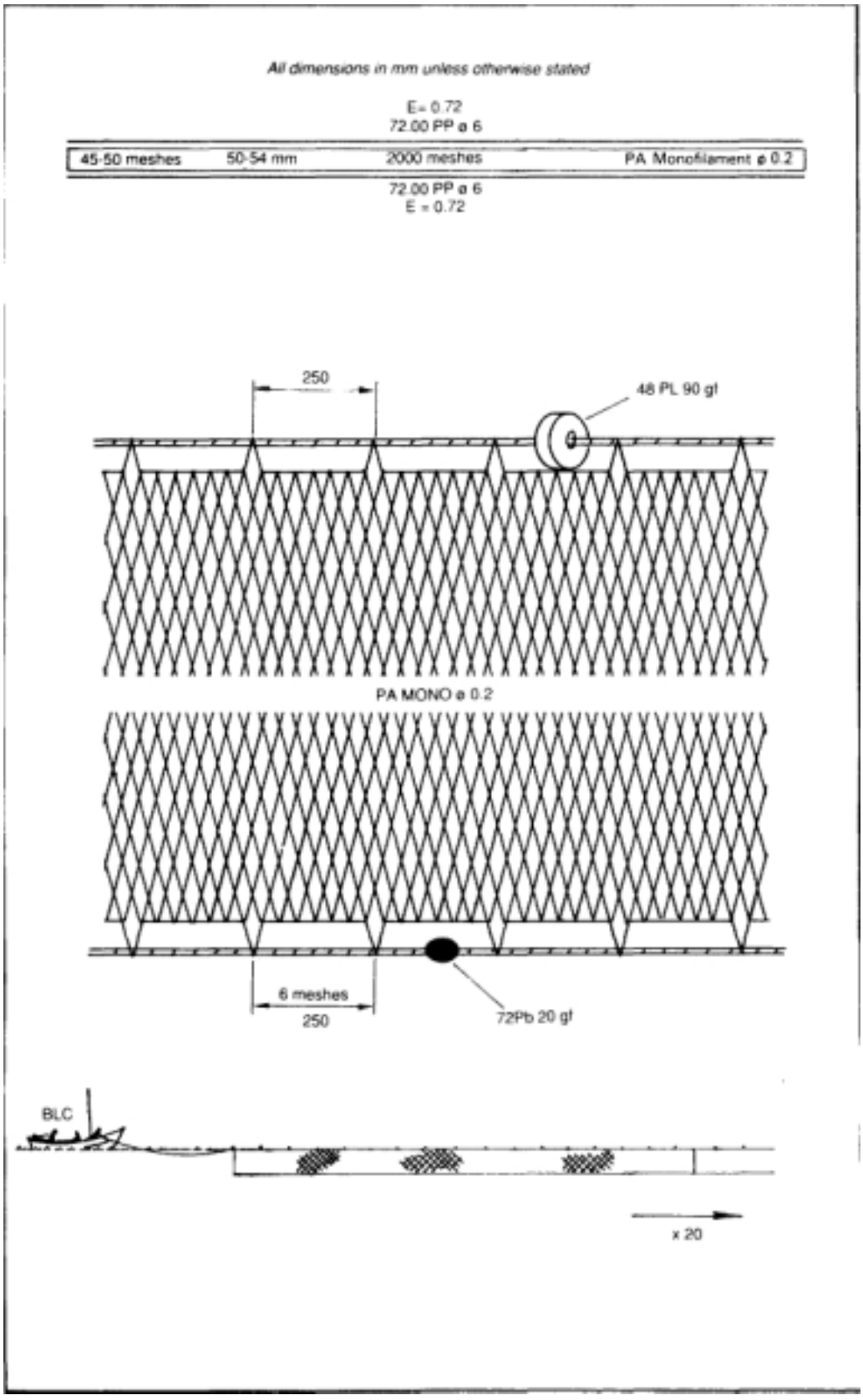

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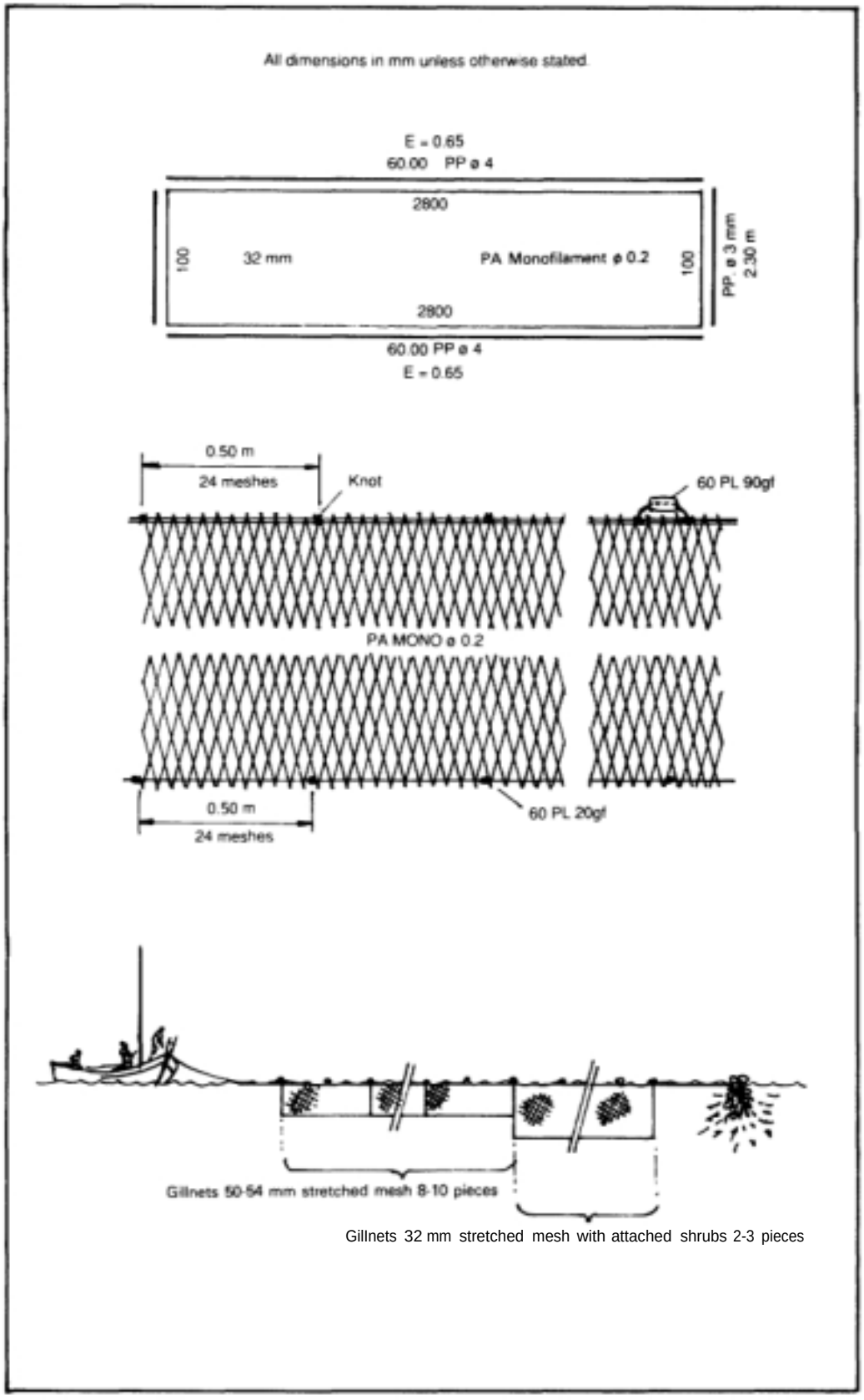
Fig. 5. Gillnet (for small flyingfish)



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When the drift longlines and driftnets were used together, the drift longlines were shot first and then attached to a buoy, then the driftnets were attached to the tail end of the drift longlines and cast, their free end finally being tied to the fishing craft. When operated independently, the drift longlines/driftnets were attached to the fishing craft.

On reaching the selected fishing area, the driftnets and drift longlines were generally cast for fishing before sunset. The fishing craft and the driftnets and/or drift longlines were thereafter allowed to drift. Soaking time varied from 6 to 12 hours, depending on fishing conditions, but never exceeded eight hours for the driftnets and 12 hours for the drift longlines. Then hauling operations commenced in a reverse way -the driftnets being hauled in first, then the drift longlines. As the driftnet and/or drift longlines were hauled on board, the fish were removed from the nets or hooks and the nets and/or lines were neatly stacked in readiness for storing in the fishing gear hold. The fish were kept on the deck till the hauling operation was completed, then transferred to the ice box for preservation; sometimes they were kept in the fishing gear hold or on deck.

A good catch of shark at Thirumullaivasal

*4.2 Gillnetting for large Flyingfish (*Cyselurus *sp.)*

As in the case of the large mesh driftnets, the gillnets to gill large Flyingfish were attached one to another so as to form a long wall of net floating on the surface and hanging 2.5 m deep in the water (see Figure 4). These gillnets were generally put out for fishing early in the morning Soaking time varied from 1 to 2 hours, depending on fishing conditions. Fishing, hauling in and storing operations were the same as in the case of fishing for large pelagics, only, in this case, the gear was sometimes reshot immediately, if conditions permitted.

The same fishing operation was sometimes done up to three times before returning to the village early in the afternoon to dispose of the catch. The Flyingfish were kept in iced sea water in the fish hold or on deck.

*4.3 Gillnetting for small Flyingfish (*Herundichthys, coromandelenis)

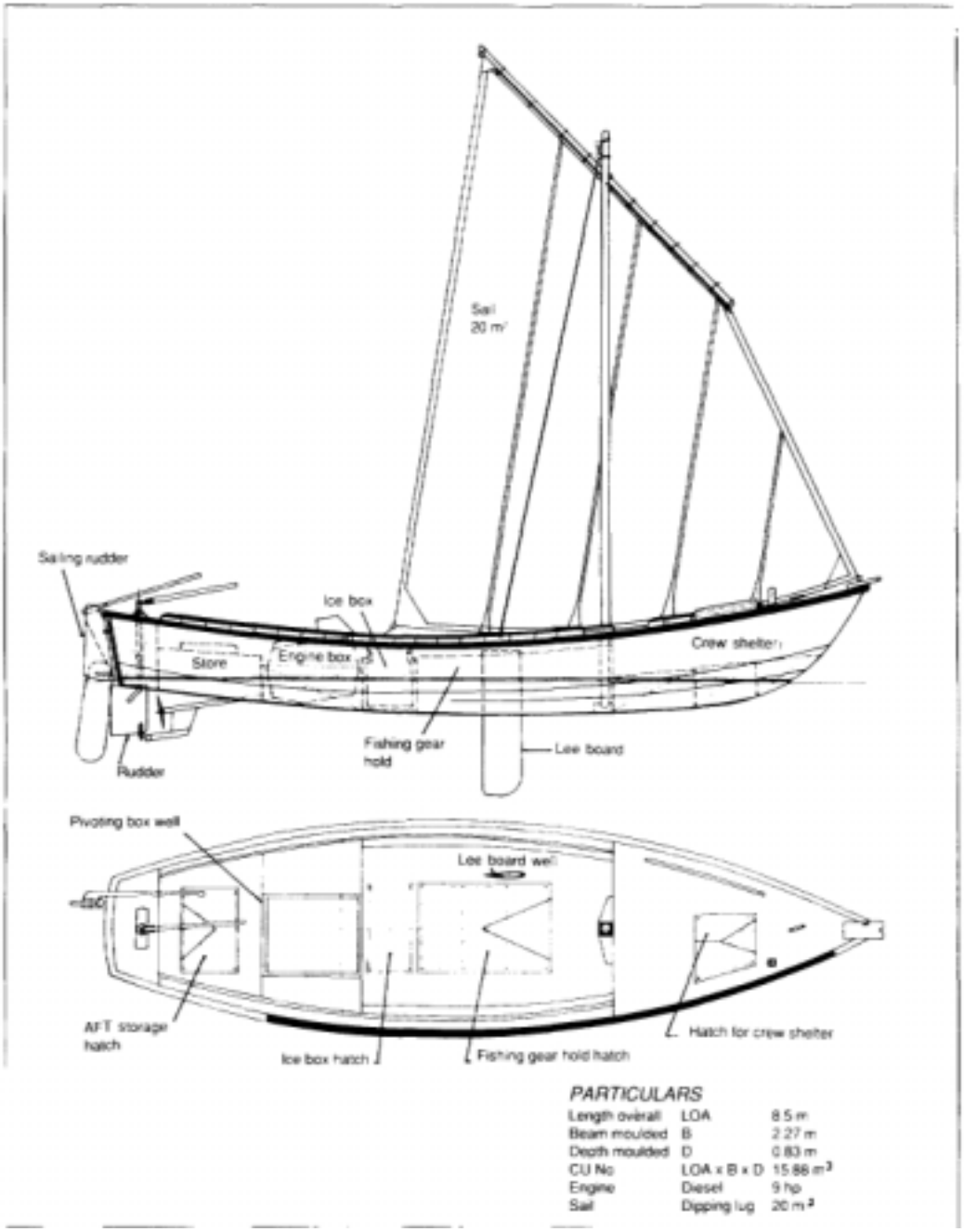
During the spawning season along the Coromandel Coast, gillnets for large Flyingfish were combined with small mesh gillnets (33 mm stretched mesh) to which lures of shrub leaves were attached. These lures attracted the small Flyingfish (see Figure 5).

5. *FISHING CRAFT*

The FRP beachianding craft IND-20 used in Andhra Pradesh for offshore fishing was selected for the commercially-oriented fishing trials in Thirumullaivasal. The main particulars and general arrangements are given in Figure 6. It is a small, fuel-efficient type of fishing craft suited for carrying out diversified fishing operations upto about 35 n miles from the shore.

This BLC is capable of operating from shallow water outlets and open beaches because of its design and liftable propulsion system. It is also equipped with an efficient emergency sail rig, for use in case of engine breakdown. The BLC compared favourably with the newly introduced motorized FRP boats.

Fig 6. The FRP beachianding craft IND-20



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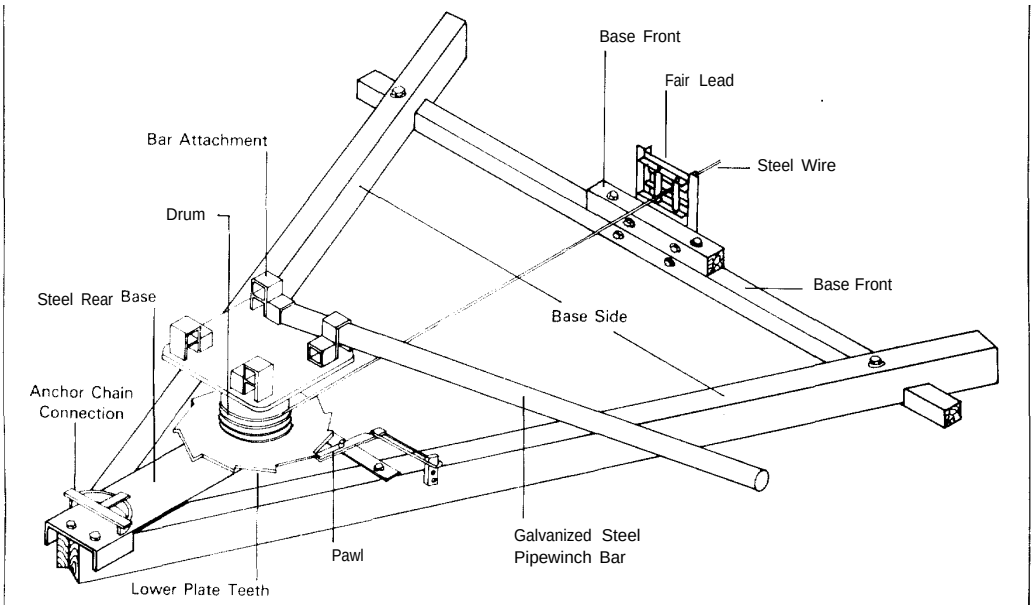
The BLC used in Thirumullaivasal was fitted with a VST watercooled engine box type liftable propulsion system that had been tested in Andhra Pradesh, but trials with different types of water pumps were still being carried out when the fishing craft was transferred. These technical trials continued in Thirumullaivasal and resulted in significant loss of fishing days in the early part of the trials because of technical problems and breakdown time. The lesson is that new fishing craft used for commercially-oriented fishing trials should always be fully tested and proved reliable prior to commercial demonstration; otherwise, as experienced in Thirumullaivasal, besides disrupting the fishing operations, the technical problems may be misinterpreted by the fishermen as failures.

To haul the BLC on to the beach, a manual steel winch that had been developed in Madras to haul the *dhonis* of the Maldives on to the beaches, and which had proved successful there, was used (see Figure 7). More technical details of the winch may be found in BOBP/WP/71 *Boat hauling devices in the Ma/dives.*

Fig 7. Steel Winch



Details are given in full scale drawings,

Considering the frequency of hauling operations of BLC, the number of craft (6) which can be serviced with one winch, its durability and costs, a manual steel winch of this type is considered worthwhile, though not essential, to assist in beach-based operations of small craft in a remote fishing village like Thirumullaivasal. The village fishing community also thought so and on completion of the trials purchased the steel winch from the project.

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Hauling the BLC on to the beach (below) in Thirumullaivasal with a steel winch (above)

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6. OPERATIONAL ARRANGEMENTS

Thirumullaivasal is a traditional fishing village located near a lagoon and an open beach. It has all the basic services and supplies (ice, fuel, water, fishing gear etc.) needed for operation of small fishing craft. Most of the time, the catches were auctioned on the beach. Sometimes they were sold at an agreed price to a fish merchant.

Fishing operations were carried out 10-35 n miles from shore (refer Figure 1). Driftnetting and drift longlining for large pelagic species were usually carried out beyond the edge of the continental shelf, up to 35 n miles from shore. There was no interaction with any other fisheries in this area. Gilinetting for Flyingfish was carried out 10-20 n miles from shore. Trolling lines were operated to and from the fishing ground and used as the main fishing method in all areas, coastal as well as offshore. Both the gillnetting and the trolling was often done in areas where *kattumaram* and motorized FRP boats were operated.

BOBP technical staff, when on board, showed the fisherman leader and crew how to make observations and record the information required for monitoring the fishing operations. On shore, the BOBP Community Development Worker and the national project staff in charge of the trials kept records of fishing data, expenditure and earnings.

The BOBP Community Development Worker and the national project staff cooperated in

- Preparing the community to participate in the trials,
- Training fishermen in various aspects of the operations,
- Encouraging people's participation,
- Anticipating and solving problems arising out of the trials, and
- Assisting in finding sources of credit.

7. FISHING RESULTS

One beachlanding craft of the IND-20 type was operational from February 1989 to January 1991. The second year of operation was carried out to consolidate the results of the first year and improve the feasibility assessement.

A second BLC, was also operated to provide more fishermen with exposure to BLC offshore operations. This craft operated from July 1990 to January 1991. The results of the operation of this fishing craft during this short period were very similar to those of the first BLC and are, therefore, not presented in this report. In the records given below, 1989 refers to Feb. 89 – Jan. 90 and 1990 to Feb. 90 – Jan. 91.

7.1 *Sea time*

There were 364 fishing days (or trips) during the two years of demonstration, 194 days during 1989 and 170 in 1990. During this period, the BLC performed much better, in terms of sea time, than the local FRP motorized driftnetters. This better performance was achieved on account of

- Better safety and comfort of crew. Unlike the FRP motorized driftnetters, the BLC is a decked boat carrying an emergency sail rig.
- Diversification of fishing gear. While the FRP motorized boats mainly use driftnets, the BLC used several fishing gear, resulting in increased fishing opportunities and, therefore, greater incentives for crew to go fishing.

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The reasons for the time spent ashore are given in Table 1.

Table 1 : Reasons for not going fishing (days)

	1989	
Fishing craft repairs and maintenance		
Propulsion unit repairs and maintenance	53	13
Fishing gear repairs	2	—
Bad weather	38	61
Festival and weekly holiday	49	
Poor catch	5	17
Other reasons	22	32
TOTAL	170	194

The high number of days lost on engine repairs during the first year is mainly attributed to the trials of a new, indigenous freshwater cooling system and NOT to the overall performance of the engine and liftable box drive. The technical problems with the freshwater cooling system were solved at the end of the first year and, given the prevailing operational conditions, resulted in a normal number of days being spent on repairs and maintenance of the engine during 1990.

The leadership and technical support provided by the BOBP staff in the operation of the BLC during 1989 is reflected by the fewer number of days lost — because of rough weather, holidays, poor catch and other reasons — and higher sea time in 1990.

With the local fishermen engaged in the operation of the BLC not being of the most entrepreneurial type, which is what is required for such diversified fishing operations, and with there also being conflicts among them on a few occasions, thereby affecting fishing operations, it is realistic to assume that better performances can be achieved by privately owned and operated beachianding craft. These, it is estimated, can be commercially operated during 200 days in a year in this area.

7.2 *Fishing effort*

The BLC was operated as a day-boat using either one fishing gear or a combination of two or three. Large mesh driftnet was the most extensively used gear — in total 161 days during the two years. The gillnet for Flyingfish comes second with 109 days, drift longline third with 79 days, of which 57 were together with the driftnets, and trolling line fourth with 72 days. The breakdown by year is given in Table 2.

Table 2 : Fishing effort by gear (days)

Fishing Gear	*1989*	*1990*	*TOTAL*
Driftnet (Tuna)	91	70	161
Drift longlines (Shark)	52	27	79
Gillnets (Flyingfish)	46	63	109
Trolling lines (Small tuna, Seerfish)	37	35	72

The extensive use of the large mesh driftnet is attributed to the exploratory nature of the offshore fishing operations. Driftnets, it was believed, were the appropriate fishing gear to explore for large pelagic species. The full complement of driftnets (16 pieces) were used all the time, indicating that the fishing craft was used to its maximum potential from the viewpoint of carrying capacity.

Drift longlines were used alone only on 22 days, 20 of which were during the first year. This low fishing effort was mainly influenced by the lack of skill of the fishermen and, to some extent, the availability of bait fish. Their use of drift longlines was dependent on the availability of bait fish from driftnets and trolling lines. Given the higher price for Shark, more drift longlines — 30-40 bundles instead of 10-20 — should, perhaps, have been used to maximize earnings.

The significantly increased use of gillnets for Flyingfish (about 35 per cent) during the second year was attributed to the high catches in the first year, good prices and the fishermen's familiarity with the small Flyingfish fishery. The *kattumaram* fishermen, operating the BLC, were quick to realize the potential of this fishing craft for this fishery.

The trolling days have been more than anticipated, mainly due to good catches of Seerfish in the coastal areas and the reluctance of the crew to venture further offshore with other fishing gear.

The selection of fishing gear to be operated was on a trial-and-error basis, depending on the anticipated availability of fish and not on any established fishing pattern nor on predetermined schedules.

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7.3 *Catches*

A total of 40 t of mixed species were caught during 364 fishing days, 39 per cent from gilinet (Flyingfish), *25* per cent from large mesh driftnét (Tuna), 22 per cent from drift longlines (Shark) and 14 per cent from trolling lines (Tuna and Seerfish).

In terms of value, the gillnet (flyingfish) still ranks first but by a smaller margin. Shark ranks second and Tuna third. Details are given in Table 3.

Table 3: Catches by gear (Kg and IRs*)

Type of		*1989*	5b	*1990*		*Total*	
No. of days		194		170		364	
Driftnet	Wt(kg)	6387	25	3612	25	9999	25
(Tuna)	VaI(Rs)	42582	30	19171	17	61753	24
Diift longline	Wt(kg)	6480	25	2364	16	8844	22
(Shark)	Val(Rs)	44285	32	26759	23	71044	28
Gilinet	Wt(Kg)	8949	35	6677	46	15626	39
(Flyingfish)	VaI(Rs)	33966	24	50076	44	84042	33
Trolling line	Wt(Kg)	3871	15	1905	13	5776	14
	VaI(Rs)	19508	14	18682	16	38190	15
TOTAL	W1(Kg)	25687	100%	14558	100%	40245	100%
	VaI(Rs)	140341	98%	114688	100%	255029	100%

US $ = IRs. 28 appx.

Catch laid out for the beach auction at Thirumullaivasal

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7.4 Catch rates

The highest average catch rate over the two-year period was recorded for Flyinglish caught by gilinets at 143 kg/day. The corresponding rate for Shark was 112 kg/day and for Tuna 62 kg/day. By value, however, the Shark catches were the most rewarding. Details are given in Table 4.

Table 4 : Catch rates by fishing gear (kg and Rs/day)

Fishing gear	*1989*		*1990*		*Total*	
	kg/day	*Rs/day*	*kg/day*	*Rs/day*	*kg/day*	*Rs/day*
Driftnet (Tuna)	70	468	52	274	62	384
Drift longline (Shark)	125	852	88	991	112	899
Gillnet (Flyingfish)	195	738	106	795	173	771

Catch rates were significantly higher in the first year than in the second year for all fishing gear. No specific reasons, other than lower availability of targetted species or less effective fishing operations, can be attributed for this trend. The prices, other than for Tuna, on the other hand, went up considerably. The price of Shark increased by 70 per cent and that of Flyingfish doubled.

With regard to seasonal variations in the catch rates it is very clear that the Flyingfish season is limited to the period April-July and that good catch rates can be expected throughout the season. It also appears that reasonably good catches of Shark can be expected throughout the year. It was only in the middle of the Northeast Monsoon and in the middle of the Flyingfish season that no drift longlining was carried out.

The different catches were generally low and particularly so during September-November and in January. Driftnetting was not done during the peak of the Flyingfish season. The details are given in Table 5.

Table 5 : Seasonal variation of catch rate by fishing gear (kg/day)

Fishing Gear	*Year*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*
Driftnet	1989	103	124	27	NO.	NO.	68	123	21	11	32	120	22
	1990	54	104	47	NO.	NO.	66	48	25	12	23	44	11
Drift longline	1989	NO.	79	40	95	NO.	NO.	NO.	137	55	NO.	65	226
	990	70	NO.	NO.	NO.	NO.	99	55	150	410*	NO.	NO.	66
Flyingfish gillnet	1989	NO.	NO.	18	217	188	316	NO.	NO.	NO.	NO.	NO.	NO,
	1990	NO.	NO.	132	100	134	24	NO.	NO.	NO.	NO.	NO.	NO.

* One-day catch

NO. No Operation

In terms of weight, Flyingfish species were the the biggest catch (39%), followed by Tuna (27%), Shark (21%) and Seerfish *(5%)*. Bilifish and miscellaneous varieties respectively were a low 3 per cent and 5 per cent respectively. No accurate details on specieswise catch composition of each group were recorded. In terms of value, Flyingfish species were again the highest (33%) followed by Shark (30%), Tuna (17%) and Seerfish (14%). Details are given in Table 6.

Table 6 : Species composition by **weight (kg) and value (Rs)**

Species	*Wt (Kg)*		*Value (Rs)*	
Tuna	11030	27	43193	17
Shark	8529	21	75913	30
Billfish	1272	3	4835	2
Seerfish	1919	5	36363	14
Flyingfish	15573	39	83882	33
Others	92	5	l0843	4
TOTAL	40245	100	255029	100

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It is of interest to note that the best earnings were from Flyingfish caught over a four-month fishing season, followed by Shark occasionally caught in driftnets and targetted with drift longlines on a few days. Driftnets for Tuna, with the highest fishing effort, generated relatively low earnings.

Gillnet for Flyingfish and drift longlines for Shark in offshore areas appear to be the best contribution for commercial operations. The good earnings from Seerfish also suggest that when Seerfish are abundantly available in coastal areas, it will be a prime target species using driftnets and trolling lines, thus resulting in some interaction with *kattumaram* and FRP motorized driftnetters.

8. *ECONOMIC PERFORMANCE*

The total earnings from sale of the fish was Rs 255,000. The difference between the two years was only Rs 25,000. The net cash flow to the boat owner was Rs 107,000 after deduction of operational costs (Rs 39,000), crew share (Rs 100,000) and repair costs (Rs 12,000). The details are given in Table 7

The average monthly remuneration of each fisherman engaged in BLC operation was Rs. 1043. It ranges from 87 Rs./month to 2402 Rs./month. The low monthly earning of Rs. 87 coincided with the peak of the Northeast Monsoon and was due to the very low fishing activity.

Even considering the fact that the BLC spent about twice the number of hours at sea that were spent by kattumaram, the earnings/hour of a fisherman working on the BLC is believed to compare favourably with other fishing activities. The interest shown by fishermen to work on the BLC confirms this statement.

The total investment in the BLC, including fishing gear, is Rs.178,000 and the yearly depreciation is estimated at Rs 29,000. A breakdown is given in Table 8.

Considering the depreciation, the yearly net return to the boat owner is Rs. 22,595 (5 1,880-29,285) which is 12.7 per cent of the investment (accounting rate of returns). The fishing trials of two years with the BLC in Thirumullaivasal therefore show some promise. The findings of the trials are also applicable to other motorized fishing craft of similar size. For example, with a little improvement, the harbour-based motorized Pablo boat (9 m in length), operating small trawls and gillnets in coastal areas, could operate in more offshore areas.

However, because of the relatively high investment cost, lack of credit and the mode of operation in offshore areas, only fishermen and/or fishing craft owners with adequate financial resources and good management and operational skills can safely acquire new BLC or similar craft. One BLC used in the trials was sold in 1991 through competitive bidding to a small-scale fishing entrepreneur for Rs 95,000, including the gear. The second BLC, modified for installation of the new BOB Drive with rubber bellows, was demonstrated in Orissa and Andhra Pradesh and then sold, without fishing gear, for Rs. 1 ,25,000. Another BLC IND-20 was bought by a small-scale fishing entrepreneur from the APFC boatyard in Kakinada, A.P. Both BLCs are being successfully employed in the Thirumullaivasal area.

Table 7 : Costs and earnings data for two years (Rs)

I.	Total sales value	255,029
2.	Variable Operational Costs	38,703
	— Fuel I (Diesel)	14,337
	— Fuel 2 (Kerosene)	286
	— Lub Food	2080
	— Ice	2930
	— 0th ers	‘627
3	Cashflow before payment to crew and boat owner (1-2)	216,326
4.	Share to crew members	100,159
5.	Gross cash flow to boat owner (3-4)	116,167
6.	Repairs	12,408
	— Craft	2,060
	— Engtne	5,430
	—Sail	140
	— Fishing Gear	2748
	— Others	2:030
7.	Nett cashflow to boat ownes (5-6)	103,759

Table 8 : Investment and depreciation

	Investment (Ru)	Depreciation (Years)	Depreciation (Ru/Year)
Hull	72,000	2	6,000
Diesel hp)	44,000	7	6,285
Sail rig	2,000	I	2,000
Fishing gear	60,000	4	5,000
TOTAL	178,000		29,285

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APPENDIX 1

Profile of Thirumullaivasal Village

Thirumullaivasal is located in the Thanjavur District* of Tamil Nadu, 13 km east of Sirkazhi, to which it is connected by a tarred road and a bus every half hour.

Thirumullaivasal comprises two sections, the town area, where mainly businessmen live, and the adjoining fishing village, on the shore and along the lagoon. There is little contact between the fisherfolk and the town people. Whereas the entire fisherfolk community belongs to the Pattinavar Chetty caste and are Hindus, the greater part of the town population is Muslim. There is more contact with the fisherfolk of neighbouring villages.

There are 1700 persons in the fishing village. Of the 470 adult males, *350* are active fishermen and *25* fish part-time. Of the latter group, some are owners of a trawler or FRP boat. These owners do not regularly go out fishing. There are *475* women and *755* children.

Migration in or out of the village does not seem to be common, though many wives come from other fishing communities in the area.

Women undertake fish related activities like fish-drying and fish-selling. They also transport fish from the shore to the trader's storage place by headload. Except for some seasonal labour in agriculture, no alternative income-generating activities are available for men or women.

Widowed fish vendors, who are usually young women who have lost their husbands and now have to support their young children, constitute the most vulnerable group. Their incomes are very low and irregular and depend entirely on the amount and species of fish landed. They market the fish in nearby towns. Twenty women are engaged in fishing vending on a full-time basis and earn a maximum of 300 Rs/month. Forty women undertake fish vending on a part-time basis and their income, varying from *50* to 100 Rs/month, is mostly a secondary income in their households.

A woman head-loader in Thirumullaivasal

Women fish vendor in Thirumullaivasal

* Now Quaid-E-Milleth District

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Thirumullaivasal village and its beach

About ten fishermen own some land, but the income from agriculture is very low as the soil is suitable only for groundnut cultivation, which produces one crop a year. Most fishermen lease out their land. The other landowners are mainly merchants.

A large number of households are dependent on the income of adult males working as crew members on one of the many non-motorized *kattumaram.* These persons do not work for the same fishing craft-owner all the year round, but switch from fishing craft to fishing craft, sometimes daily. The crew members are usually not related to the fishing craft-owners for whom they work and none of theft close relatives own any fishing craft. A peculiar feature is that close relatives of crew members of FRP boats are usually fishing craft-owners. Distant relatives of crew members of motorized *kattumaram* own fishing craft.

It is estimated that about a third of the households own fishing craft. Joint ownership is relevant in the case of trawlers or FRP boats. In these cases, the joint owners operate the fishing craft themselves.

The fish traders in the village also act as money-lenders, providing short-term credit for c6nsumption and long-term credit for the purchase of fishing craft and gear. The latter form of credit obliges the fisherman to sell his catch to the lending trader.

The fisheries infrastructure is satisfactory. Road connections with Sirkazhi, where a railway station is located, are good. From there fish can be transported to Madras, Bangalore and other distant markets.

One of the two ice plants in the village is operative. It has a capacity of about 2 t/day. This is sufficient during much of the year, but when there are good catches, shortages are experienced. Ice has to be purchased from Chidambaram, approximately 40 km away.

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Other publications which include books and other miscellaneous reports.

A list of publications from 1986 onwards is given below. A complete list of publications is available on request.

Reports (BOBP/REP/...)

23. *Summary Report of BOBP Fishing Trials and Demerasal Resources Studies* in Sri Lanka. (Madras, March 1986.)
24. *Fisherwomen's Activities in Bangladesh : A Participatory Approach to Development.* P. Natpracha. (Madras, May 1986.)
25. *Attempts to Stimulate Development Activities in Fishing Communities in Adirampattinam, India.* P. Natpracha, V. L. C. Pietersz. (Madras, May 1986.)
26. *Report of the Tenth Meeting of the Advisory* Committee. Maie, Maldives 17-18 February 1986. (Madras, April 1986.)
27. *Activating Fisherwomen for Development through Trained Link Workers in Tamil Nadu India.* E. Drewes. (Madras, May 1986.)
28. *Small-scale Aquaculture Development Project in South Thailand Results and Impact.* E Drewes. (Madras, May 1986.)
29. *Towards Shared Learning : An Approach to Non-formal Adult Education for Marine Fisherfolk of Tamil Nadu,* India L. S. Saraswathi and P. Natpracha. (Madras, July 1986.1
30. *Summary Report of Fishing Trials with Large-mesh Driftnets in Bangladesh.* (Madras, May 1986.)
31. *In-service Training Programme for Marine Fisheries Extension Officers* in Orissa, *India.* U. Tierze. (Madras, August 1986.)
32. *Bunk Credit for Artisanal Marine Fisherfolk* of *Orissa,* India I!. I ietze. (Madras, May 1987)
33. *Non-formal Primary Education for Children of Marine Fisherfolk in Orissa, India.* U. Titze, Namita Ray. (Madras, December 1987.)
34. *The Coastal Set Bagnet Fishery of Bangladesh .- Fishing Trials and Investigations* S. E. Akerman. (Madras, November 1986.)
35. *Brackishwater Shrimp Culture Demonstration in Bangladesh.* M Karim, (Madras, December 19R6.)
36. *Hilsa Investigations in Bangladesh.* (Colombo, June 1987.)
37 *High-Opening Bottom Trawling in Tamil Nadu Gujarat and Orissa, India A Summary of Effort mnd Impact.* (Madras, February 1987.)
38. *Report of the Eleventh Meeting of the Advisory Committee.* Bangkok. Thailand, March 26-28, 1987. (Madras, June 1987.)
39. *Investigations on the Mackerel und Scad Resources of the Malacco Straits.* (Colombo, December 1987.)
40. *Tuna in the Andaman Sea.* (Colombo, December 1987.)
41. *Studies of the Tuna Resource in the EEZs of Sri Lanka and Maldives.* (Colombo, May 1988.)
42. *Report of /he Twelfth Meeting of the Advisory Committee.* Bhubaneswar, India, 12-15 January 1988. (Madras, April 1988.)
43. *Report of the Thrteenth Meeting of the Advisory Committee.* Penang, Malaysia, 26-2X January, 1989. (Madras, March 1989.)
44. *Report of the Fourteenth Meeting of the Advisory Committee* **Meden,** Indonesia , 22 25 January, 1990. (hladras, April 1990.)
45. *Report of the Seminar on Gracilaria Production and Utilization in* the Bay *of* Bengal *Region.* (Madras, November 1990)
46. *Exploratory Fishingfor Large Pelagic Species in the Maldives,* R.C Anderson and A. Waheed. (Madras, December 1990.)
47. *Exploratory Fishing for Large Pelagic Species in Sri Lanka* R. Maldeniya and S.1 Suraweera. (Madras, April 1991,)
48. *Report of the Fifteenth* .Meeting of *the Advisory Committee.* Colombo, Sri Lanka, 28-30 January, 1991. (Madras, April 1991.)
49. *Introduction of New Small Fishing* Craft in Kerala. O. Gulbrandsen and M.R. Andersen (Madras, January 1992)
50. *Report of the Sixteenth Meeting* of the *Advisory Committee.* Phuket, Thailand , 20-23 January, 1992. (Madras, April 1992.)

<<

51. *Report of the Seminar on the Mud Crab Culture and Trade in the Bay of Bengal Region,* November 5-8, Surat Thani, Thailand. (Madras, September 1992.)

52. *Feeds for Artisanal Shrimp Culture in India — Their Development and Evaluation.* John F Wood, Janet H Brown, Manic H MacLean and Isaac Rajendran. (Madras, September 1992.)

Working Papers (BOBP/WP/...)

27. *Reducing the Fuel Costs of Small Fishing Boats.* O. Gulbrandsen. (Madras, July 1986.)

38. *Credit for Fisherfolk: The Experience in Adirampattinam, Tarni/ Nadu, India.* R. S. Anbarasan and 0. Fernandez. (Madras, March 1986.)

42. *Fish Trap Trials in Sri Lanka.* (Based on a report byT. Hammerman). (Madras, January 1986.)

43. *Demonstration of Simple Hatchery Technology for Prawns in Sri Lanka.* (Madras, June 1986.)

44. *Pivoting Engine Installation for Beachlanding Boats.* A. Overa, R. Ravikumar. (Madras, June 1986.)

45. *Further Development of Beachlanding Craft in India and Sri Lanka.* A. Overa, R. Ravikumar, 0. Gulbrandsen, G. Gowing. (Madras, July 1986.)

46. *Experimental Shrimp Farming in Ponds in Po/ekurru, Andhra Pradesh, India.* J. A. J. Janssen, T. Radhakrishna Murthy, B. V. Raghavulu, V. Sreekrishna. (Madras, July 1986.)

47. *Growth and Mortality of the Malaysian Cockle* (Anadara granosa) *under Commercial Culture : Analysis through Length-frequency Data.* Ng Fong Oon. (Madras, July 1986.)

48. *Fishing Trials with High-Opening Bottom Trawls from Chandipur, Orissa, India.* G. Pajot and B. B. Mohapatra. (Madras, October 1986.)

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50. *Experiences with a Manually Operated Net-Braiding Machine in Bangladesh.* B. C. Gillgren, A. Kashem. (Madras, November 1986.)

51. *Hauling Devices for Beachlanding Craft.* A. Overa, P. A. Hemminghyth. (Madras, August 1986.)

52. *Experimental Culture of Seaweeds* (Gracilaria *Sp.) in Penang, Malaysia.* (Based on a report by M Doty and J Fisher). (Madras, August 1987.)

53. *Atlas of Deep Water Demersal Fishery Resources in the Bay of Bengal.* T. Nishida and K. Sivasubramaniam. (Colombo, September 1986.)

54. *Experiences with Fish Aggregating Devices in Sri Lanka.* K.T. Weerasooriya. (Madras, January 1987.)

.55. *Study of Income, Indebtedness and Savings among Fisherfolk of Orissa, India.* T. Mammo. (Madras, December 1987.)

56. *Fishing Trials with Beachlanding Craft at Uppada, Andhra Pradesh, India.* L. Nyberg. (Madras, June 1987.)

57. *Identifying Extension Activities for Fisherwomen in Visakhapatnam District, Andhra Pradesh, India.* D. Tempelman. (Madras, August 1987.)

58. *Shrimp Fisheries in the Bay of Bengal.* M. Van der Knaap. (Madras, August 1989.)

59. *Fishery Statistics in the Bay of Bengal.* T. Nishida. (Colombo, August 1988.)

60. *Pen Culture of Shrimp in Chilaw, Sri Lanka.* D. Reyntjens. (Madras, April 1989.)

61 *Development of Outrigger Canoes in Sri Lanka.* 0. Gulbrandsen, (Madras, November 1990.)

62. *Silvi-Pisciculture Project in Sunderbans, West Bengal: A Summary Report of BOBP's assistance.* CL. Angell, J. Muir, (Madras, September 1990.)

63. *Shrimp Seed Collectors of Bangladesh.* (Based on a study by UBINIG.) (Madras, October 1990.)

64. *Reef Fish Resources Survey in the Maldives.* M. Van der Knaap, Z. Waheed, H. Shareef, M. Rasheed (Madras, April 1991.)

65. *Seaweed* (Gracilaria Edulis) *Farming in Vedalai and Chinnapalam, India.* Ineke Kalkman, Isaac Rajendran, Charles L Angell. (Madras, June 1991).

66. *Improving Marketing Conditions for Women Fish Vendors in Besant Nagar, Madras.* K. Menezes. (Madras, April 1991.)

67. *Design and Trial of Ice Boxes for Use on Fishing Boats in Kakinada, India.* 1. J. Clucas. (Madras, April 1991.)

68. *The By-catch from Indian Shrimp Trawlers in the Bay of Bengal: The potential for its improved utilization.* Ann Gordon. (Madras, August 1991).

69. *Agar and Alginate Production from Seaweed in India.* J.J.W. Coppen, P. Nambiar, (Madras, June 1991.)

70. *The Kattumaram of Kothapatnam-Pallipalem, Andhra Pradesh, India — A survey of the fisheries and fisherfolk.* Dr. K. Sivasubramaniam. (Madras, December 1991).

71. *Manual Boat Hauling Devices in the Maldives.* (Madras, November 1992.)

72. *Giant Clams in the Ma/dives — A stock assessment and study of their potential for culture.* Dr. J. R. Barker. (Madras, December 1991.)

73. *Small-scale culture of the flat oyster* (Ostrea folium) *in Pulau Langkawi, Kedah, Malaysia,* Devakie Nair and Bjorn Lindeblad. (Madras, November 1991).

74. *A Study of the Performance of Selected Small Fishing Craft on the East Coast of India.* Gardien El Gendy. (Madras, August 1992).

75. *Fishing Trials with Beachlanding Craft at Thirumullaivasal, Tamil Nadu, India. 1989-1992.* G. Pajot. (Madras, November 1992.)

76. *A View from the Beach — Understanding the status and needs of fisherfolk in the Meemu, Vaavu and Faafu Atolls of the Republic of Ma/dives.* The Extension and Projects Section of the Ministry of Fisheries and Agriculture, The Republic of Maldives. (Madras, June 1991).

77. *Development of Canoe Fisheries in Sumatera, Indonesia.* 0. Gulbrandsen and G. Pajot. (Madras, April 1992).

78. *The Fisheries and Fisherfolk of Nias Island, Indonesia. A description of the fisheries and a soclo-economic appraisal of the fisherfolk.* Based on reports by 0. Pajot and P. Townsley. (Madras, December 1991.)

79. *Review of the Beche De Mer (Sea Cucumber) Fishery in the Ma/dives* by Leslie Joseph (Madras, April 1992.)

80. *Reef Fish Resources Survey in the Ma/dives — Phase Two* by R C Anderson, Z Waheed, M Rasheed and A Arif (Madras, April 1992)

81. *Exploratory Fishing for Large Pelagic Species in South Indian Water.* Jean Gallene and Robert Hall. (Madras, November 1992.)

82. *Cleaner Fishery Harbours in the Bay of Bengal* (Madras, April 1992)

83. *Survey of Fish Consumption in Madras. Marketing and Research Group, Madras, India.* (Madras, October 1992).

Manuals and Guides (BOBP/MAG/...)

1. *Towards Shared Learning: Non-formal Adult Education for Marine Fisherfolk.* Trainers' Manual. (Madras, June 1985.)
2. *Towards Shared Learning: Non-formal Adult Education for Marine Fisherfolk.* Animators' Guide. (Madras, June 1985.)
3. *Fishery Statistics on the Microcomputer: A BASIC Version of Hasselblad's NORMSEP Program.* D. Pauly, N. David, J. Hertel-Wulff. (Colombo, June 1986.)
4. *Separating Mixtures of Normal Distributions: Basic programs for Bhattacharya's Method and Their Application for Fish Population Analysis.* H. Goonetilleke, K. Sivasubramaniam. (Madras, November 1987.)
5. *Bay of Bengal Fisheries Information System (BOBFINS): User's Manual.* (Colombo, September 1987.)
8. *Extension Approaches to Coastal Fisherfolk Development in Bangladesh: Guidelines for Trainers and Field Level Fishery Extension Workers. Department of Fisheries, Ministry of Fisheries and Livestock, Government of Bangladesh and Bay of Bengal Programme.* (In Bangla). (Bangladesh, July 1992.)
10, *Our Fish, Our Wealth.* A guide to fisherfolk on resources management. — in 'comic book' style (English/Tamil/Telugu) Kamala Chandrakant with K. Sivasubramaniam and Rathin Roy. (Madras, December 1991.)

Information Documents (BOBP/INF/...)

9. *Food and Nutrition Status of Small-Scale Fisherfolk in India's East Coast States : A Desk Review and Resource Investigation.* V. Bhavani. (Madras, April 1986.)
10. *Bibliography on Gracilaria — Production and Utilization in the Bay of Bengal.* (Madras, August 1990.)
11. *Marine Small-Scale Fisheries of West Bengal : An Introduction.* (Madras, November 1990.)
12. *The Fisherfolk of Puttalam, Chilaw, Galle and Matara — A study of the economic status of the fisherfolk of four fisheries districts in Sri Lanka.* (Madras, December 1991.)
13. *Bibliography on the Mud Crab Culture and Trade in the Bay of Bengal Region.* (Madras, October 1992.)

Newsletters (Bay of Bengal News)

Quarterly

Other Publications

Artisanal Marine Fisherfolk of Orissa: Study of their Technology, Economic Status, Social Organization and Cognitive Patterns. U Tietze. (Madras)

Studies on Mesh Selectivity and Performance: The New Fish-cum-Prawn Trawl at Pesalai, Sri Lanka. BOBP/MIS/3. M.S.M. Siddeek. (Madras, September 1986.)

Motorization of Dinghy Boats in Kasafal, Orissa. BOBP/MIS/4. S. Johansen and 0. Gulbrandsen. (Madras, November 1986.)

Helping Fisherfolk to Help Themselves : A Study in People's Participation. (Madras, 1990.)

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