Bay of Bengal Programme
Fishing Technology

FISHING TRIALS WITH BEACHLANDING CRAFT
AT THIRUMULLAIVASAL, TAMILNADU, INDIA 1989-1991

FOOD AND AGRICULTURE ORGANISATION OF THE UNITED NATIONS
Fishing Trials with Beachianding Craft at Thirumullaivasal, Tamil Nadu, India 1989-1991

By
O. Pajot
Sr. Fishing Technologist, BOBP

and

C.R. Prabhakaradu
Inspector of Fisheries,
DOF Govt. of Tamil Nadu

BAY OF BENGAL PROGRAMME
Madras, India
1992
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 beachlanding 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).

This document is a working paper and has not been cleared by the government concerned or the FAO.

November 1992
1. Introduction

2. Selection of Fishing Village

3. The Crew

4. Fishing Gear and their Operations
   4.1 Driftnetting and drift longlining for large pelagic species
   4.2 Gillnetting for large Flyingfish
   4.3 Gillnetting for small Flyingfish

5. Fishing Craft

6. Operational Arrangements

7. Fishing Results
   7.1 Sea time
   7.2 Fishing effort
   7.3 Catches
   7.4 Catch rates

8. Economic Performance

Tables
   1. Reasons for not going fishing (days)
   2. Fishing effort by gear (days)
   3. Catches by gear (kg and IRs*)
   4. Catch rates by fishing gear (kg and Rs/day)
   5. Seasonal variation of catch rate by fishing gear (kg/day)
   6. Species composition by weight (kg) and value (Rs)
   7. Costs and earnings data for two years (Rs)
   8. Investment and depreciation

Figures
   1. Map of coastal area showing operational base and fishing area
   2. Driftnet
   3. Drift longlines (Shark)
   4. Gillnet (for large Flyingfish)
   5. Gillnet (for small Flyingfish)
   6. The FRP beachlanding craft IND-20
   7. Steel winch

Appendix
   1. Profile of Thirumullaivasal village

Publications of the Bay of Bengal Programme

   (iii)
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 km² 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
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 were easily 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.
- 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.

Fig. 1. Map of coastal area showing operational base and fishing area
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 beachlanding 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 longlining 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 gilnetting had proved to be appropriate for capture of large Flyingfish off Besant Nagar in Madras.
Fig. 2. Driftnet

All dimensions in mm unless otherwise stated

DOUBLE WEAVER'S KNOT
COLOUR LIGHT GREEN

0.10 m  69 m PP Ø 10  E = 0.55  0.30 m

1000

125
(5")

PAR : 450-530  (2100)  18-21

0.10 m  69 m PP Ø 4  E = 0.55  0.30 m

7 PL 2200-2500 gf

2 m  2 m PP Ø 4

29 meshes

0.30 m PP Ø 4

4 GAL-ST RING
600 gf.

29 meshes  2 m

0.8 — 1.0 km

100 Hooks/3 km
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 overleaf); 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. 4. Gillnet (for large flyingfish)**

---

*All dimensions in mm unless otherwise stated*

<table>
<thead>
<tr>
<th>PA Monofilament $\phi$</th>
<th>0.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA MONO</td>
<td>0.2</td>
</tr>
<tr>
<td>48 PL 90 g*</td>
<td></td>
</tr>
<tr>
<td>72 Pb 20 g*</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>0.72</td>
</tr>
<tr>
<td>72.00 PP $\phi$ 6</td>
<td></td>
</tr>
<tr>
<td>45-50 meshes 50-54 mm</td>
<td></td>
</tr>
<tr>
<td>2000 meshes</td>
<td></td>
</tr>
<tr>
<td>72.00 PP $\phi$ 6</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>0.72</td>
</tr>
</tbody>
</table>

---

BLC
Fig. 5. Gillnet (for small flyingfish)

Gillnet 32 mm stretched mesh with attached shrubs 2-3 pieces
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](image)
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 Maldives.*

**Fig 7. Steel Winch**

![Steel Winch Diagram](image)

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

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

<table>
<thead>
<tr>
<th>Reasons for not going fishing (days)</th>
<th>1989</th>
<th>1990</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fishing craft repairs and maintenance</td>
<td>53</td>
<td>13</td>
<td>66</td>
</tr>
<tr>
<td>Propulsion unit repairs and maintenance</td>
<td>2</td>
<td>—</td>
<td>2</td>
</tr>
<tr>
<td>Fishing gear repairs</td>
<td>14</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>Bad weather</td>
<td>49</td>
<td>6</td>
<td>55</td>
</tr>
<tr>
<td>Festival and weekly holiday</td>
<td>9</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>Poor catch</td>
<td>5</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td>Other reasons</td>
<td>9</td>
<td>12</td>
<td>21</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>170</td>
<td>194</td>
<td>364</td>
</tr>
</tbody>
</table>

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 lifttable 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.

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 beachlanding 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 longlines 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>
<thead>
<tr>
<th>Fishing Gear</th>
<th>1989</th>
<th>1990</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driftnet</td>
<td>91</td>
<td>70</td>
<td>161</td>
</tr>
<tr>
<td>Drift longlines (Shark)</td>
<td>52</td>
<td>27</td>
<td>79</td>
</tr>
<tr>
<td>Gillnets (Flyingfish)</td>
<td>46</td>
<td>63</td>
<td>109</td>
</tr>
<tr>
<td>Trolling lines (Small tuna, Seerfish)</td>
<td>37</td>
<td>35</td>
<td>72</td>
</tr>
</tbody>
</table>

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.
7.3 Catches

A total of 40 of mixed species were caught during 364 fishing days, 39 per cent from gilinet (Flyingfish), 25 per cent from large mesh drift net (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*)

<table>
<thead>
<tr>
<th>Type of Fish</th>
<th>1989</th>
<th>1990</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of days</td>
<td>194</td>
<td>170</td>
<td>364</td>
</tr>
<tr>
<td>Driftnet (Tuna) Wt (kg)</td>
<td>6387</td>
<td>3612</td>
<td>9999</td>
</tr>
<tr>
<td>Val (Rs)</td>
<td>42582</td>
<td>19171</td>
<td>61753</td>
</tr>
<tr>
<td>Drift longline (Shark) Wt (kg)</td>
<td>6480</td>
<td>2364</td>
<td>8844</td>
</tr>
<tr>
<td>Val (Rs)</td>
<td>44285</td>
<td>26759</td>
<td>71044</td>
</tr>
<tr>
<td>Gilinet (Flyingfish) Wt (kg)</td>
<td>8949</td>
<td>6677</td>
<td>15626</td>
</tr>
<tr>
<td>Val (Rs)</td>
<td>33966</td>
<td>50076</td>
<td>84042</td>
</tr>
<tr>
<td>Trolling line Wt (kg)</td>
<td>3871</td>
<td>1405</td>
<td>5776</td>
</tr>
<tr>
<td>Val (Rs)</td>
<td>1958</td>
<td>18082</td>
<td>58190</td>
</tr>
<tr>
<td>TOTAL Wt (Kg)</td>
<td>25587</td>
<td>14558</td>
<td>40245</td>
</tr>
<tr>
<td>Val (Rs)</td>
<td>140341</td>
<td>114688</td>
<td>255029</td>
</tr>
</tbody>
</table>

US S = IRs. 28 appx.

Catch laid out for the beach auction at Thirumullaivasal

(14)
7.4 Catch rates

The highest average catch rate over the two-year period was recorded for Flyingfish 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>
<thead>
<tr>
<th>Fishing gear</th>
<th>1989 kg/day</th>
<th>1989 Rs/day</th>
<th>1990 kg/day</th>
<th>1990 Rs/day</th>
<th>Total kg/day</th>
<th>Total Rs/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driftnet (Tuna)</td>
<td>70</td>
<td>488</td>
<td>52</td>
<td>274</td>
<td>82</td>
<td>384</td>
</tr>
<tr>
<td>Drift longline (Shark)</td>
<td>125</td>
<td>852</td>
<td>88</td>
<td>994</td>
<td>112</td>
<td>899</td>
</tr>
<tr>
<td>Gillnet (Flyingfish)</td>
<td>195</td>
<td>738</td>
<td>106</td>
<td>705</td>
<td>173</td>
<td>771</td>
</tr>
</tbody>
</table>

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 targeted 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>
<thead>
<tr>
<th>Fishing Gear</th>
<th>Year</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driftnet (Tuna)</td>
<td>1989</td>
<td>103</td>
<td>124</td>
<td>27</td>
<td>NO.</td>
<td>68</td>
<td>123</td>
<td>25</td>
<td>11</td>
<td>32</td>
<td>120</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1990</td>
<td>54</td>
<td>48</td>
<td>47</td>
<td>NO.</td>
<td>66</td>
<td>68</td>
<td>25</td>
<td>12</td>
<td>23</td>
<td>44</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Drift longline</td>
<td>1989</td>
<td>NO.</td>
<td>79</td>
<td>40</td>
<td>95</td>
<td>NO.</td>
<td>NO.</td>
<td>NO.</td>
<td>137</td>
<td>55</td>
<td>NO.</td>
<td>65</td>
<td>226</td>
</tr>
<tr>
<td></td>
<td>1990</td>
<td>99</td>
<td>NO.</td>
<td>NO.</td>
<td>NO.</td>
<td>NO.</td>
<td>99</td>
<td>55</td>
<td>150</td>
<td>410*</td>
<td>NO.</td>
<td>NO.</td>
<td>66</td>
</tr>
<tr>
<td>Flyingfish gillnet</td>
<td>1989</td>
<td>NO.</td>
<td>NO.</td>
<td>38</td>
<td>217</td>
<td>18</td>
<td>316</td>
<td>NO.</td>
<td>NO.</td>
<td>NO.</td>
<td>NO.</td>
<td>NO.</td>
<td>NO.</td>
</tr>
<tr>
<td></td>
<td>1990</td>
<td>NO.</td>
<td>NO.</td>
<td>132</td>
<td>100</td>
<td>134</td>
<td>24</td>
<td>NO.</td>
<td>NO.</td>
<td>NO.</td>
<td>NO.</td>
<td>NO.</td>
<td>NO.</td>
</tr>
</tbody>
</table>
* One-day catch
NO. No Operation

In terms of species, 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>
<thead>
<tr>
<th>Species</th>
<th>Wt (Kg)</th>
<th>Value (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuna</td>
<td>11830</td>
<td>43183</td>
</tr>
<tr>
<td>Shark</td>
<td>8529</td>
<td>79313</td>
</tr>
<tr>
<td>Bilifish</td>
<td>1272</td>
<td>4835</td>
</tr>
<tr>
<td>Seerfish</td>
<td>2919</td>
<td>36363</td>
</tr>
<tr>
<td>Flyingfish</td>
<td>15753</td>
<td>83882</td>
</tr>
<tr>
<td>Others</td>
<td>92</td>
<td>10441</td>
</tr>
<tr>
<td>TOTAL</td>
<td>40245</td>
<td>258029</td>
</tr>
</tbody>
</table>

(15)
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 targeted 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 (51,880-29,285) 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 Thirumullavasal area.

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total sales value</td>
<td>255,029</td>
</tr>
<tr>
<td>Variable Operational Costs</td>
<td>39,703</td>
</tr>
<tr>
<td>Fuel 1 (Diesel)</td>
<td>14,337</td>
</tr>
<tr>
<td>Fuel 2 (Kerosene)</td>
<td>286</td>
</tr>
<tr>
<td>Lub oil</td>
<td>2080</td>
</tr>
<tr>
<td>Ice</td>
<td>2930</td>
</tr>
<tr>
<td>Other</td>
<td>627</td>
</tr>
<tr>
<td>Cashflow before payment to crew and boat owner (1-2)</td>
<td>216,326</td>
</tr>
<tr>
<td>Share to crew members</td>
<td>100,159</td>
</tr>
<tr>
<td>Gross cashflow to boat owner (3-4)</td>
<td>116,167</td>
</tr>
<tr>
<td>Repairs</td>
<td>12,408</td>
</tr>
<tr>
<td>Craft</td>
<td>2,060</td>
</tr>
<tr>
<td>Engine</td>
<td>5,430</td>
</tr>
<tr>
<td>Sail</td>
<td>140</td>
</tr>
<tr>
<td>Fishing gear</td>
<td>2748</td>
</tr>
<tr>
<td>Others</td>
<td>2,030</td>
</tr>
<tr>
<td>Net cashflow to boat owner (5-6)</td>
<td>103,759</td>
</tr>
</tbody>
</table>

Table 8: Investment and depreciation

<table>
<thead>
<tr>
<th>Description</th>
<th>Investment (Ru)</th>
<th>Depreciation (Years)</th>
<th>Depreciation (Ru/Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hull</td>
<td>72,000</td>
<td>2</td>
<td>6,000</td>
</tr>
<tr>
<td>Diesel hp</td>
<td>44,000</td>
<td>7</td>
<td>6,285</td>
</tr>
<tr>
<td>Sail rig</td>
<td>2,000</td>
<td>1</td>
<td>2,000</td>
</tr>
<tr>
<td>Fishing gear</td>
<td>60,000</td>
<td>4</td>
<td>5,000</td>
</tr>
<tr>
<td>TOTAL</td>
<td>178,000</td>
<td>29,285</td>
<td></td>
</tr>
</tbody>
</table>
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 now Quaid-E-Milleth District
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 the 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 consumption 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.
PUBLICATIONS OF THE BAY OF BENGAL PROGRAMME (BOBP)

The BOBP brings out the following types of publications:

Reports (BOBP/REP/...) which describe and analyze completed activities such as seminars, annual meetings of BOBP's Advisory Committee, and subprojects in member-countries for which BOBP inputs have ended.

Working Papers (BOBP/WP/...) which are progress reports that discuss the finding of ongoing BOBP work.

Manuals and Guides (BOBP/MAG/...) which are instructional documents for specific audiences.

Information Documents (BOBP/INF/...) which are bibliographies and descriptive documents on the fisheries of member-countries in the region.

Newsletters (Bay of Bengal News) which are issued quarterly and which contain illustrated articles and features in non-technical style on BOBP work and related subjects.

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/...)

27. Activating Fishermen for Development through Trained Link Workers in Tamil Nadu, India. E. Drewes. (Madras, May 1986.)
30. Summary Report of Fishing Trials with Large-mesh Driftnets in Bangladesh. (Madras, May 1986.)
33. Non-formal Primary Education for Children of Marine Fisherfolk in Orissa, India. U. Tierze, 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 1986.)
36. Hilsa Investigations in Bangladesh. (Colombo, June 1987.)
37. High-Opening Bottom Trawling in Tamil Nadu, Gujarat and Orissa, India: A Summary of Effort and Impact. (Madras, February 1987.)
39. Investigations on the Mackerel and Scad Resources of the Malacca 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.)
45. Report of the Seminar on Gracilaria Production and Utilization in the Bay of Bengal Region. (Madras, November 1990.)
46. Exploratory Fishing for Large Pelagic Species in the Maldives. R.C. Anderson and A. Wahed. (Madras, December 1990.)
47. Exploratory Fishing for Large Pelagic Species in Sri Lanka. R. Maldennaya and S.I. Suraweera. (Madras, April 1991.)

(19)
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.)


Working Papers (BOBP/WP/...)


29. Fish Trap Trials in Sri Lanka. (Based on a report by T. Hammerman). (Madras, January 1986.)


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

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


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


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

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

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

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

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

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


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

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

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


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

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


56. Giant Clams in the Maldives — A stock assessment and study of their potential for culture. Dr. J. R. Barker. (Madras, December 1991.)

57. Small-scale culture of the flat oyster (Ostrea folium) in Pulau Langkawi, Kedah, Malaysia, Devakie Nair and Bjorn Lindeblad. (Madras, November 1991.)
79. Review of the Beche De Mer (Sea Cucumber) Fishery in the Maldives by Leslie Joseph (Madras, April 1992.)
80. Exploratory Fishing for Large Pelagic Species in South Indian Water. Jean Gallene and Robert Hall. (Madras, November 1992.)
81. Cleaner Fishery Harbours in the Bay of Bengal (Madras, April 1992)
82. Survey of Fish Consumption in Madras. Marketing and Research Group, Madras, India. (Madras, October 1992).

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

Information Documents (BOBP/INF/...)
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.)
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
Helping Fisherfolk to Help Themselves: A Study in People’s Participation. (Madras, 1990.)

For further information contact:
The Bay of Bengal Programme, Post Bag No. 1054, Madras 600 018, India.
Cable: BAYFISH Telex: 41-8311 BOBP Fax: 044-836102.
Telephone: 836294, 836096, 836188.