Bay of Bengal Programme

Development of Small-Scale Fisheries

FISH TRAP TRIALS
IN SRI LANKA

BOBP/WP/42

SWEDISH INTERNATIONAL DEVELOPMENT AUTHORITY

FOOD AND AGRICULTURE ORGANISATION OF THE UNITED NATIONS

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FISH TRAP TRIALS IN SRI LANKA

BOBP/WP/42

based on the report of
Ted Hammerman
Consultant, Bay of Bengal Programme

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Mailing Address: Post Bag No. 1054, Madras 600 018, India
Street Address : 91 St. Mary's Road, Abhiramapuram, Madras 600 018, India
Cables: FOODAGRI. Telex: MS-311 FISH. Phones: 71294,71296,71587,77760

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This paper documents the operations and findings of experimental fishing with various types of fish traps conducted in Sri Lanka for three months during 1982 (August - December). The fishing trials were carried out by the small-scale fisheries project of the Bay of Bengal Programme in cooperation with NARA (National Aquatic Resource Agency, Colombo).

The trials were part of a wider BOBP-NARA joint project to assess the magnitude and composition of the island's demersal resources and determine the best way to tap them. Three earlier papers (BOBP/WP/6, BOBP/WP/16 and BOBP/WP/40) described the findings of experiments with bottom-set longlines; a paper reviewing past demersal fish resource surveys and the present status of demersal fishery in Sri Lanka is under print, while another paper describing experiments with high-opening bottom trawls is awaited. The experiments with fish traps described in this paper yielded very low catches but documentation of the effort is considered important.

The small-scale fisheries project of the Bay of Bengal Programme began in 1979 and covers five countries bordering the Bay of Bengal -- Bangladesh, India, Malaysia, Sri Lanka and Thailand. Funded by SIDA (Swedish International Development Authority) and executed by the FAO (Food and Agriculture Organisation of the United Nations), the project seeks to develop, demonstrate and promote appropriate technologies and methodologies to improve the conditions of small-scale fisherfolk in member countries.

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1. INTRODUCTION

It is well known that during the last 20 to 30 years, the pelagic fisheries in Sri Lanka have expanded so rapidly that exploitation of demersal fishery resources has gained relatively little attention. Over-exploitation of pelagic stocks is evident; it is therefore, necessary to correct the imbalance in fishing pressure on these two segments of fisheries and to promote increased exploitation of the bottom-dwelling fish resources. With the most productive trawling grounds being limited to the northwest and northeast coasts, and with most other areas studded with rocks and corals, passive fishing methods using stationary gear have to be developed for augmenting the production of demersal fish. Such methods are pre-eminently suited for small-scale fisheries.

During 1982, the BOBP conducted experimental fishing for three months (August to October) with different types of fish traps, with the help of a consultant from the U.S., Mr T Hammerman. Roughly half the period was spent on the east coast with Trincomalee as base.

Table 1 lists the types of traps experimented with; some were imported from the U.S., the rest were fabricated by the consultant at the training centre of the Ministry of Fisheries and at the Ceylon Fisheries Corporation, Colombo, with the help of local fishermen.

2. FISH TRAPPING TECHNIQUES

The equipment required is:

- Hydraulic or mechanical hauler, having an average pulling power of 250 kg. The ideal type of hauler for small-scale fisheries is a hydraulic sheave fitted with a warping head in the centre. This enables multipurpose use and can haul everything from traps to anchor. The cost of a hauler inclusive of the hydraulic system needed to power the hauler may be around US $ 700.

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- Echosounder fish finder. The echosounder must be sensitive enough with sufficient output to mark fish on the recording paper. In the absence of an echosounder a handline can be used but it will take longer to ascertain the availability of fish.

The following guidelines may be observed:

- Look for depressions and valleys on the rocky bottom within the shelf area. Be careful not to place the traps too near the edge of the shelf, as the trap may tumble with the current and get lost.
- If fish caught fairly quick and consistenly in the handlines (such as a strike every 10 minutes), it may be rewarding to operate in that area.
- Use as oily a bait as possible. Light sticks or underwater lights attract bottom fish.
- Buoy the traps well. Use a leader buoy of float about 10 ft before the "high flyer" marker buoy; this will keep the rope vertical in strong current. Place two marks on each buoy.
- Average soaking time may extend from 8 to 24 hours so as to provide ample time to pursue other passive fishing methods.

There are some very basic tenets as to the size, shape and configuration of the trap entrance. In the present fishing trials, all known mouth-opening designs were incorporated; some examples are straight funnel, turned down taper, vertical wedge, double conical, tube type and straight funnel with bait in the middle with double entrance.

Most of the traps used in the trials have been constructed to prevent 'ghost fishing'. Ghost fishing takes place when a trap gets lost; but it continues to catch and kill fish for quite a while. It is, therefore, advisable to build a bio-degradable element into the trap so that if and when the trap is lost, the

Table 1

Types of fish traps and construction material used in fishing trials

Type of trap	Construction material
1. Experimental stackable square trap	Bamboo, covered with steel wire mesh and polyethylene netting.
2. Experimental non-stackable rectangular trap	Steel rod covered with steel wire mesh
3. Experimental non-stackable Z trap	Steel rod covered with steel wire mesh (Florida)
4. Experimental non-stackable heart-shaped trap	Steel rod covered with steel wire mesh (Caribbean)
5. Experimental non-stackable cylindrical trap	Steel rod covered with steel wire mesh
6. Experimental stackable square trap	Steel rod covered with polyethylene netting (Colombo, Sri Lanka)
7. Experimental non-stackable round trap	Steel rod covered with polyethylene netting (Japan)
8. Experimental stackable round trap	Steel rod covered with polyethylene netting (Carolina)
9. Experimental stackable semi-heart shaped trap	Steel rod covered with polyethylene netting (Morton)
10. Traditional non-stackable semi-heartshaped trap	Cane (small) (Trincomalee, Sri Lanka)
11. Traditional non-stackable semi-heart shaped trap	Cane (large) (Trincomalee, Sri Lanka)

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bio-degradable element disintegrates in a short time, eliminating the possibility of fish getting trapped. This is done by securing the frames of the bamboo traps with coir which will eventually disintegrate in salt water. The wire traps have a bio-degradable piece of yarn on the catch dump door. This piece of light wire gauge will last only two-weeks.

The different types of fish traps used are listed in Table 1.

3. BAITING

Initially squid and sardines (or any cheap oily fish) were tried, mixed together in the bait containers or bait holders within the traps. After repeated use, the squid and fish were separated and cyalume chemical lights were used with each bait. The data on the cyalume usage (red, blue or green) showed that light attraction catches were assured. Light sticks were used on the "fish sticks" but the results were not encouraging.

4. FISHING TRIALS

In the middle of the trial period it was found that the currents were a bit too strong because of the long monsoon, so the entire operation was shifted to Trincomalee on the east coast. Here the local fishermen use bread as bait during the winter months. Trials with bread had limited success.

The trials were held from August end to mid-September on the west coast, the headquarters being Colombo at the Ceylon Fisheries Corporation (CFC) harbour. The operations then shifted to Trincomalee on the east coast and continued till the end of the trial period, i.e. 19 October, 1982.

The Colombo-Negombo fishermen were told about the trap fishing operations both orally and by an advertisement in English and Sinhala newspapers. In Trincomalee local fishermen were contacted directly.

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The operations began on the ground where bottom longline operations were held in 1981 (reported in BOBP/WP/16). An average of 14 traps was used at all times; the minimum and maximum number of traps were 10 to 18 respectively. Initially a soaking time of 3 - 4 hours per set was allowed. As the trials progressed, the soaking time was extended to 8 - 10 hours on a day trip and 12 - 13 hours on an overnight trip. The longest trip made was north of Trincomalee due east of Kuchchiveli for three days, when the average soaking time was 12 hours.

The method of buoying the gear was changed from a single status to double; one mainline was attached to the buoy while two traps were gauged together at the bottom. This method stopped the movement of traps at the bottom and prevented loss of gear.

5. RESULTS

A summary of the cases recorded of the trap fishing trials is given in Table 2. In view of the very poor catches, it was not considered worthwhile to analyse the raw data for details. Operation of different types of traps and at different times and areas and the type of data collected permit only broad generalization of the outcome.

Off Colombo the most common varieties of fish caught were the emperor fish Lethrinus miniatus and L. Nebulosus, the groupers Epinephelus tauvina, and the trigger fish. Off Trincomalee the most common varieties of fish were the same, besides "Ranna" (Lutjanus kasmira and L. lincolatus). The size and weight ranges of fish caught are listed in Table 3.

The results of these trials were rather discouraging for further experimentation. Though the trials were commercially oriented, it does not appear to be possible to popularise this method of fishing. Like at present, the use of fish traps in the future may be possible only inshore at a subsistence level and/or as a

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Table 2

Summary of catch results of fish trap trials

No.	Type of trap	Weight of catch (gm)	No. of traps set	No. of hours set	Catch/ trap set (gm)	Catch/ trap/hour set (gm)
1.	Experimental stackable square trap	86,550	139	284.5	622.66	2.18
2.	Experimental non-stackable rectangular trap	23,217	88	248.5	262.90	1.06
3.	Experimental non-stackable Z trap	3,000	4	20.5	750.00	36.58
4.	Experimental non-stackable heart-shaped trap	20,000	13	103.0	153.85	1.49
5.	Experimental non-stackable cylindrical trap	2,200	13	130.0	169.23	1.30
6.	Experimental stackable square trap	25,183	27	88.5	932.70	10.54
7.	Experimental non-stackable round trap	0	8	36.8	0	0
8.	Experimental stackable round trap	12,067	18	126.8	759.27	5.99
9.	Experimental stackable semi heart-shaped trap	113,200	145	405.3	780.69	1.93
10.	Traditional non-stackable semi heart-shaped trap	3,500	2	33.0	1750.00	53.03
11.	Traditional non-stackable semi-heart-shaped trap	16,500	3	44.0	5500.00	125.00

supplementary fishing method from such of those crafts which undertake other demersal fishing methods such as bottom set longline and vertical handline.

TABLE 3

SIZE RANGE OF FISHES CAUGHT IN THE TRAPS

	Size range	
	Length (cm)	Weight (gm)
L. Nebulosus	30 - 62	300 - 3500
L. Miniatus	22 - 27	250 - (average)
E. Areolatus	26 - 44	200 - 1000
E. Tauvina	39 - 54	750 - 2500
E. Sonnareti	21 - 30	250 (average)
Ranna	22 - 27	100 (average)
Red mullets (small)	18 - 29	100 - 400
Trigger fish	17 - 33	300 (average)

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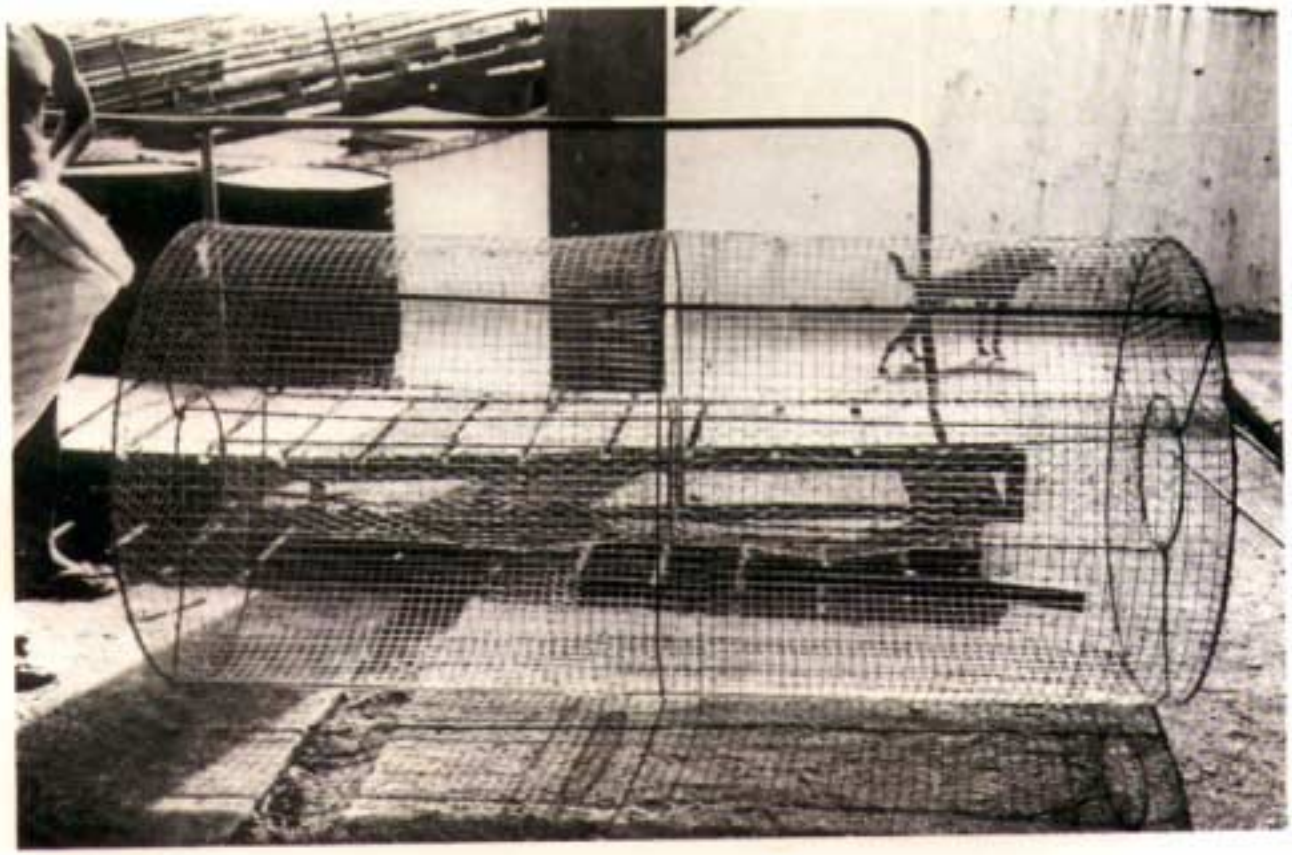
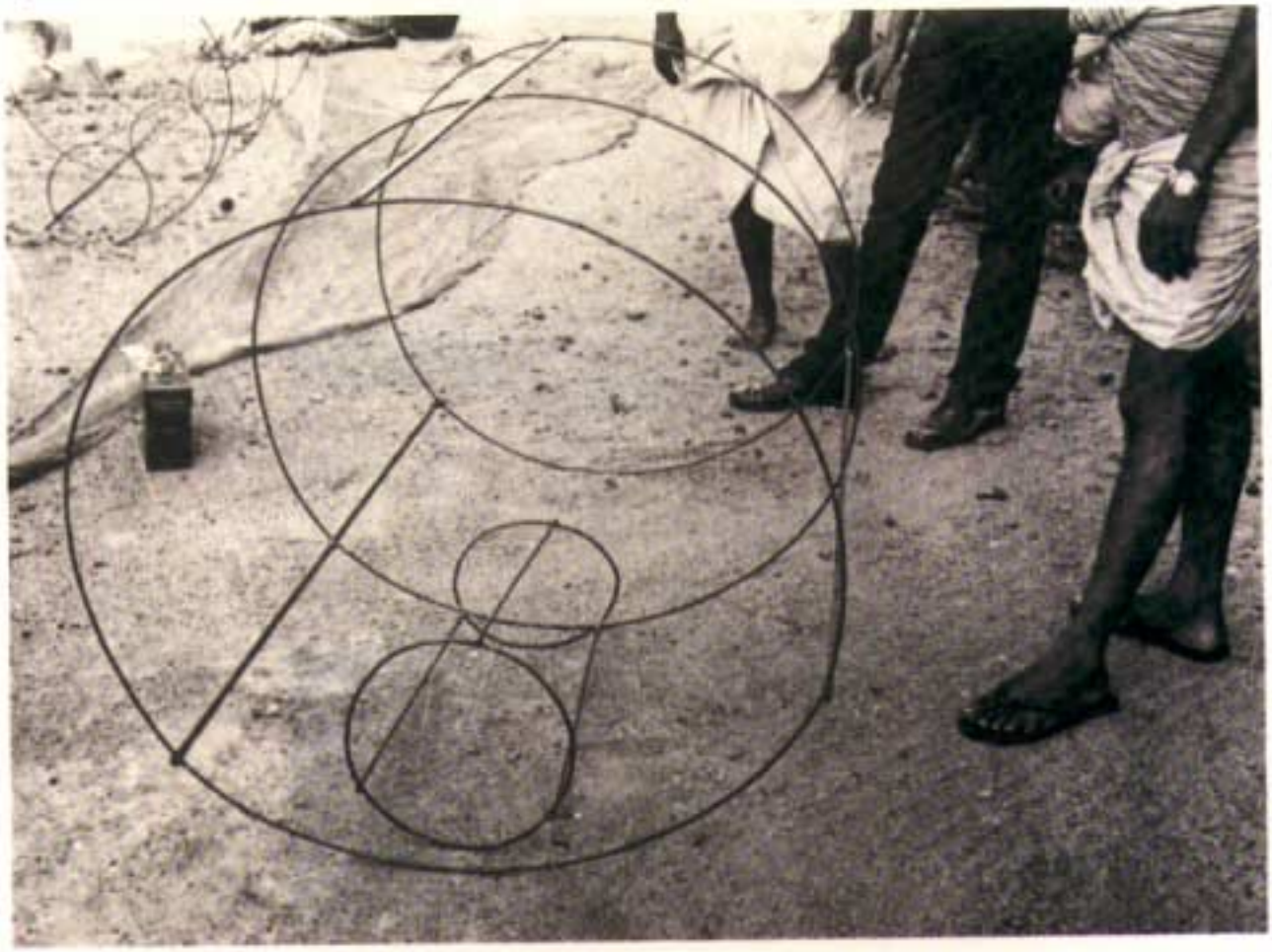
FISH TRAP TRIALS IN PICTURES



Cylindrical chicken wire galvanized trap, designed by consultant Hammerman.



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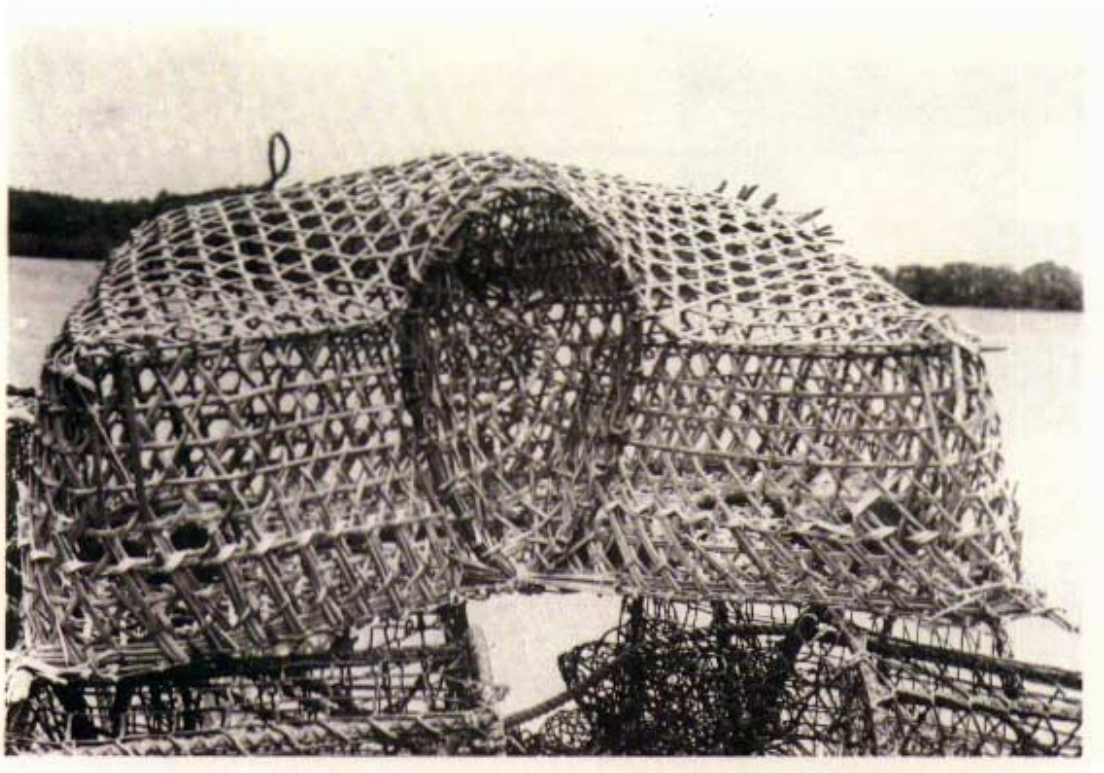
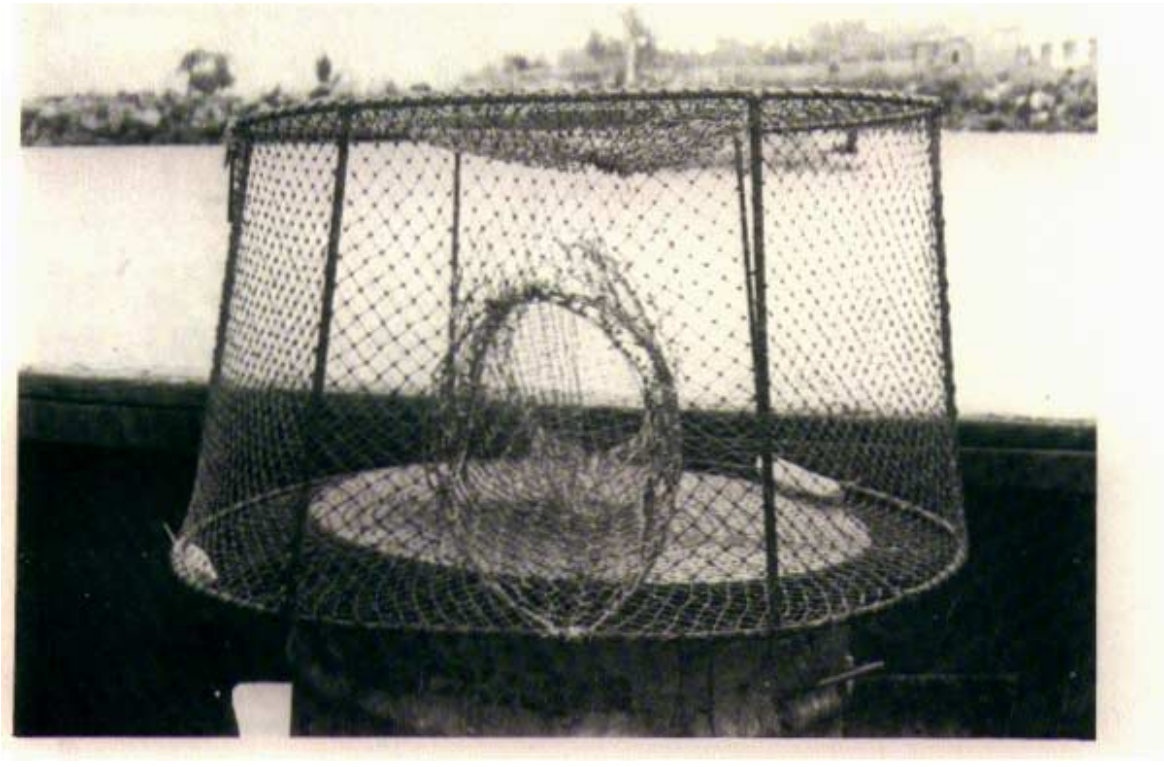


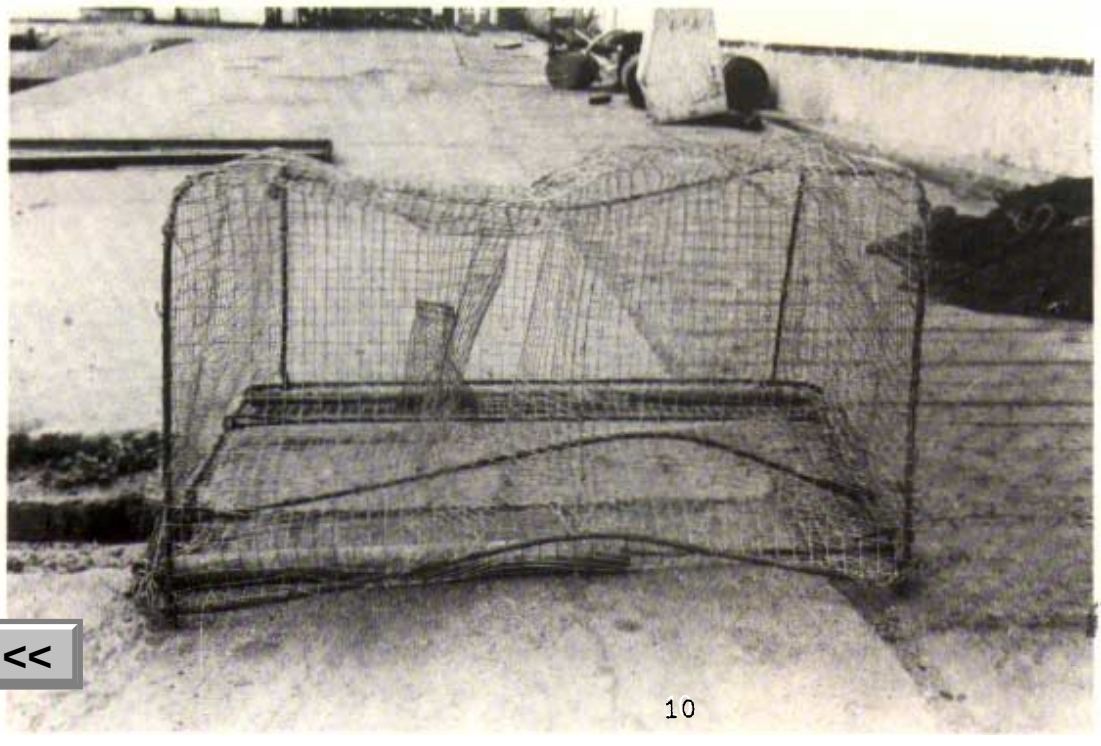
Traditional non-stackable semi-heart-shaped trap made of Trincomalee cane.

Experimental non-stackable round trap made of steel rod and covered with polyethylene netting.



Experimental stackable round trap made from steel rod covered with polyethylene netting.

Experimental non-stackable heartshaped trap, made of steel rod and steel wire mesh.



Experimental stackable square trap made of bamboo, covered with steel wire mesh and polyethylene netting.

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Experimental stackable semi-heart trap made from steel rod covered with polyethylene netting.

Publications of the Bay of Bengal Programme (BOBP)

The BOBP brings out six types of publications:

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

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

Miscellaneous Papers (BOBP/MIS/...) concern work not originated by BOBP staff or consultants -- but which is relevant to the Programme's objectives.

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

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

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

A list of publications follows:

Reports (BOBP/REP/...)

1. Report of the First Meeting of the Advisory Committee. Colombo, Sri Lanka, 28-29 October 1976. (Published as Appendix 1 of IOFC/DEV/78/44.1, FAO,Rome,1978)

2. Report of the Second Meeting of the Advisory Committee. Madras, India, 29-30 June 1977. (Published as Appendix 2 of IOFC/DEV/78/44.1, FAO,Rome,1978)

3. Report of the Third Meeting of the Advisory Committee. Chittagong, Bangladesh, 1-10 November 1978. Colombo, Sri Lanka, 1978. (Reissued Madras, India, September 1980)

4. Role of Women in Small-Scale Fisheries of the Bay of Bengal. Madras, India, October 1980.

5. Report of the Workshop on Social Feasibility in Small-Scale Fisheries Development. Madras, India, 3-8 September 1979. Madras, India, April 1980.

6. Report of the Workshop on Extension Service Requirements in Small-Scale Fisheries. Colombo, Sri Lanka, 8-12 October 1979. Madras, India, June 1980.

7. Report of the Fourth Meeting of the Advisory Committee. Phuket, Thailand, 27-30 November 1979. Madras, India, February 1980.

8. Pre-Feasibility Study of a Floating Fish Receiving and Distribution Unit for Dubla Char, Bangladesh. G. Eddie, M.T. Nathan. Madras, India, April 1980.

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10.2 Report of the Consultation on Stock Assessment for Small-Scale Fisheries in the Bay of Bengal. Chittagong, Bangladesh, 16-21 June 1980. Volume 2: Papers. Madras, India, October 1980.

11. Report of the Fifth Meeting of the Advisory Committee. Penang, Malaysia, 4-7 November 1980. Madras, India, January 1981.

12. Report of the Training Course for Fish Marketing Personnel of Andhra Pradesh. Hyderabad, India, 11-26 November 1980. Madras, India, September 1981.

13. Report of the Sixth Meeting of the Advisory Committee. Colombo, Sri Lanka, 1-5 December 1981. Madras, India, February 1982.

14. Report of the First Phase of the "Aquaculture Demonstration for Small-Scale Fisheries Development Project" in Phang Nga Province, Thailand. Madras, India, March 1982.

15. Report of the Consultation-cum-Workshop on Development of Activities for Improvement of Coastal Fishing Families. Dacca, Bangladesh, October 27-November 6, 1981. Madras, India, May 1982.

16. Report of the Seventh Meeting of the Advisory Committee. New Delhi, India, January 17-21, 1983. Madras, India, March 1983.

17. Report of Investigations to Improve the Kattumaram of India's East Coast. Madras, India, July 1984.

18. Motorization of Country Craft, Bangladesh. Madras, India, July 1984.

19. Report of the Eighth Meeting of the Advisory Committee. Dhaka, Bangladesh, January 16-19, 1984. Madras, India, May 1984.

20. Coastal Aquaculture Project for Shrimp and Finfish in Ban Merbok, Kedah, Malaysia. Madras, India, December 1984.

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21. Income-Earning Activities for Women from Fishing Communities in Sri Lanka. Edeltraud Drewes. Madras, India, September 1985.

22. Report of the Ninth Meeting of the Advisory Committee. Bangkok, Thailand, February 25-26, 1985. Madras, India, May 1985.

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1. Investment Reduction and Increase in Service Life of Kattumaram Logs. R. Balan. Madras, India, February 1980.

2. Inventory of Kattumarams and their Fishing Gear in Andhra Pradesh and Tamil Nadu. T.R. Menon. Madras, India, October 1980.

3. Improvement of Large-Mesh Driftnets for Small-Scale Fisheries in Sri Lanka. G Pajot. Madras, India, June 1980.

4. Inboard Motorization of Small G.R.P Boats in Sri Lanka. Madras, India, September 1980.

5. Improvement of Large-Mesh Driftnets for Small-Scale Fisheries in Bangladesh. G Pajot. Madras, India, September 1980.

6. Fishing Trials with Bottom-Set Longlines in Sri Lanka. G Pajot, K T Weerasooriya. Madras, India, September 1980.

7. Technical Trials of Beachcraft Prototypes in India. O Gulbrandsen, G.P. Gowing, R Ravikumar. Madras, India, October 1980.

8. Current Knowledge of Fisheries Resources in the Shelf Area of the Bay of Bengal. B T Antony Raja. Madras, India, September 1980.

9. Boatbuilding Materials for Small-Scale Fisheries in India. Madras, India, October 1980.

10. Fishing Trials with High-Opening Bottom Trawls in Tamil Nadu, India. G Pajot, John Crockett. Madras, India, October 1980.

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13. Trials of Two-Boat Bottom Trawling in Bangladesh. G Pajot, J Crockett. Madras, India, October 1981.

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19. Coastal Village Development in Four Fishing Communities of Adirampattinam, Tamil Nadu, India. F W Blase. Madras, India, December 1982.

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22. The Impact of Management Training on the Performance of Marketing Officers in State Fisheries Corporations. U. Tietze. Madras,India, June 1983.

23. Review of Experiences with and Present Knowledge About Fish Aggregating Devices. M. Bergstrom. Madras, India, November 1983.

24. Traditional Marine Fishing Craft and Gear of Orissa. P. Mohapatra (Under preparation)

25. Fishing Craft Development in Kerala: Evaluation Report. O Gulbrandsen. Madras, India, June 1984.

26. Commercial Evaluation of IND-13 Beachcraft at Uppada, India. R Ravikumar. Madras, India June 1984.

27. Reducing Fuel Costs of Fishing Boats in Sri Lanka. O. Gulbrandsen (Under preparation)

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29. Artisanal Marine Fisheries of Orissa: a Techno-Demographic Study. M H Kalavathy and U Tietze. Madras, India, December 1984.

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30. Mackerels in the Malacca Straits. Colombo, Sri Lanka, February 1985.

31. Tuna Fishery in the EEZs of India, Maldives and Sri Lanka. Colombo, Sri Lanka, February 1985.

32. Pen Culture of Shrimp in the Backwaters of Killai, Tamil Nadu: A Study of Techno-economic and Social Feasibility. Rathindra Nath Roy. Madras, India, January 1985.

33. Factors that Influence the Role and Status of Fisherwomen. Karuna Anbarasan. Madras, India, April 1985.

34. Pilot Survey of Set Bagnet Fisheries of Bangladesh. Abul Kashem. Madras, India, August 1985.

35. Pen Culture of Shrimp in the Backwaters of Killai, Tamil Nadu. M Karim and S Victor Chandra Bose. Madras, India, May 1985.

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37. A Review of the Biology and Fisheries of Hilsa ilisha in the Upper Bay of Bengal. B T Antony Raja. Madras, India, September 1985.

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39. The Organization of Fish Marketing in Madras Fishing Harbour. M H Kalavathy. Madras, India, September 1985.

40. Promotion of Bottom Set Longlining in Sri Lanka. K T Weerasooriya, S S C Pieris, M Fonseka. Madras, India, August 1985.

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42. Fish Trap Trials in Sri Lanka. Ted Hammerman. Madras, India, January 1986.

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2. Consultation on Social Feasibility of Coastal Aquaculture. Rathindra Nath Roy (Ed.) Madras, India 26 November-01 December,1984. Madras, India, November 1985.

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20 issues quarterly from January 1981 to December 1985.

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2. Fish Aggregating Devices: Information Sources. Madras, India, February 1982.

3. Marine Small-Scale Fisheries of India: A General Description. Madras, India, March 1983.

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6. Marine Small-Scale Fisheries of Sri Lanka: A General Description. Madras, India, November 1984.

7. Marine Small-Scale Fisheries of Orissa: A General Description. Madras, India, December 1984.

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