BAY OF BENGAL PROGRAMME

DEVELOPMENT OF SMALL-SCALE FISHERIES

FISHING TRIALS WITH BOTTOM-SET LONGLINES SRI LANKA

BOBP/WP/6

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FISHING TRIALS WITH BOTTOM-SET LONGLINES IN SRI LANKA

BOB P/WP/6

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PREFACE

This paper is the first report of a project to produce better awareness and utilization of Sri Lanka's demersal or bottom-dwelling fish resources. It describes the rationale, the mechanics and the findings of experiments conducted toward this end between October 1979 and March 1980.

Specifically, the experiments were meant to ascertain the suitability of a well-known system of demersal fishery — bottom-set longlining — for Sri Lanka, and to investigate ways of advancing this fishery. The paper may be useful for fisheries planners and officials who are concerned with increasing fish supplies and for fisheries researchers concerned with new and better fishing methods. It may also serve as a guide for eventual extension if the experiments yield conclusive results.

The experiments in demersal fishing are an activity of the Bay of Bengal Programme for the Development of Small-Scale Fisheries, GCP/RAS/040/SWE, in which the Ministry of Fisheries, Sri Lanka, is the cooperating agency. The Programme provided a fishing technologist, Mr. G. Pajot, to supervise the activity and a consultant masterfisherman, Mr. H. H. Juliusson, to conduct fishing trials. The Ministry of Fisheries provided the services of a technical liaison officer, Mr. K. T. Weerasooriya, and a research assistant, Mr. S. S. C. Pieris.

Other agencies involved in the project included Lion Trawlers Industries Limited (a private company that provided the boat and the crew used for the experiments); the Ceylon Fisheries Corporation (CFC), which supplied frozen bait to be used with the bottom longlines; and the Ceylon Fisheries Harbour Corporation (CFHC) which processed fresh bait given by the CFC.

The Bay of Bengal Programme is funded by the Swedish International Development Authority and executed by the Food and Agriculture Organisation of the United Nations. The main aims of the Programme are to develop and demonstrate technologies to improve the conditions of small-scale fisherfolk and the supplies of fish from the small-scale sector to five countries that border the Bay of Bengal Bangladesh,India,Malaysia,SriLanka and Thailand.

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1 INTRODUCTION

Recent surveys of fish resources in the coastal waters of Sri Lanka carried out by the Norwegian research vessel *Fridtjof Nansen* indicate that the annual sustainable yield is in the region of 250,000 tonnes of which about 80,000 tonnes represent demersal and semi-demersal fish.

According to the production statistics, about 16,000 tonne of rock fish, i.e. groupers, snappers, breams, etc. were landed in 1978. Landings of skate were 4,600 tonne and trevally (carang) 10,000 tonne, This amounts to less than half of the estimated potential yield and there is thus potential for a considerable increase of production of demersal fish.

In contrast with the demersal fisheries, the pelagic fisheries have expanded rapidly, drift netting being the most widely practised method. This has also resulted in an uneven distribution of fishing effort. In certain areas there is a heavy concentration of boats and catches are not commensurate with the effort. There is, therefore, a need to direct some of the driftnetting effort to other methods. The demersal stocks may offer such opportunities and many of the existing craft could easily switch to such fishing methods as handlining, bottom-set longlining, bottom-set gillnetting and fish potting.

The continental shelf of Sri Lanka is narrow, with an average width of about 25 km. Accessible trawling grounds of significance are limited; they are located in the North West (Palk Bay and Gulf of Mannar) and North East (Pedro Bank). Most areas of the continental shelf are not suitable for bottom trawling because of scattered rocks and corals, and methods employing stationery gear like lines, gillnets and pots will have to be used. This is an advantage to small-scale fisheries since such gears can be used by existing indigenous and introduced small craft.

Demersal fishing methods presently in use are: trawling by small boats (10-12 m in length), mostly in the northern area; bottom longlining scattered all around the island as a seasonal fishery; handlining, scattered mainly around the south and east coasts; bottom set gillnets, only used in a few places in the north and west. Pots (bamboo) are used only to a very limited extent in shallow waters very near to the coasts.

The question arises: Why is not the demersal fishrng effort higher if the fish is abundantly available? There are a number of possible reasons:

- the estimate of potential is too high.
- the present production is higher than that reflected in the official records.
- other fishing methods are more profitable.
- the best grounds cannot be located by the fishermen.
- physical difticulties with manual hauling of lines in deep waters.
- bait is not available or too expensive.
- fishing gear is not available.
- fishermen are not familiar with the fishing methods.

In order to explore the constraints hampering the expansion of demersal fishing and to promote its development, the Bay of Bengal Programme has initiated a demersal fishing project in Sri Lanka.

The first activity, of which this is the report, was exploratory fishing by bottom set longlining in an area along the south west coast (see map in Appendix 1)—an area which was identified by surveys as rich ground for demersal fish. The purpose was *(i)* to test the commercial feasibility of longlining at different locations in the selected area and *(ii)* to experiment with and observe the performance of echo sounders, line haulers, different types of bait and different gear (lines, hooks).

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2 THE FISHING BOAT, EQUIPMENT AND SUPPLIES

(a) The fishing boat

A 38-footer usually employed in driftnetting was used for the fishing trials (Appendix 2). It is a newly (1977) constructed F.R.P. boat, with a length of 11 m, beam 3 m and Graft 1.2 m. The displacement is about 10 tonne. It is equipped with a 65 hp engine giving a speed of about 7 knots. The boat was selected not for reasons of commercial feasibility, but because it was suitable for experimental work, providing adequate working space and accommodation.

The boat was provided by the owner (Lion Trawlers Industries Limited) under a cooperation agreement with the BOBP. The owner made a fully equipped boat available and undertook to keep it operational for at least 20 days per month. The owner also arranged for crew, fuel, food, etc. The BOBP undertook to supplement the proceeds of fish sales, as required, to ensure an agreed minimum monthly gross revenue to the owner. The BOBP also provided all the fishing gear and equipment, bait, and the services of a masterfisherman experienced in bottom longline fishing.

(b) Equipment

Echo sounder: A low-cost echo sounder was installed on the boat to help locate the fish and identify the bottom conditions. The transducer was fixed to a steel pipe which was mounted to the side of the boat (seen in Appendix 3). The echo sounder was powered by main batteries.

Line hauler: To facilitate the hauling of the longline, a hydraulic hauler was installed. Appendix 2 shows the details. The hauler was an ELEKTRA Combine longline gilinet hauler, driven by a separate petrol engine kept on deck in a watertight box.

(c) Fishing gear

The longlines used in the fishing trials consisted of main lines about 500 metres long to which 40-50 cm branch lines (snoods) with hooks were attached at equidistant intervals of about 1.15 m.

Various fishing gear materials of different characteristics were used for making the longline. Polypropylene (PP), polyester (PES) and polyamide monofilament (PA Mono) of 2-5.5 mm diameter were used for the main lines. Nylon multifilament (PA), PA Mono and PP were used for the branch lines. Kirbed and straight ringed hooks of sizes ranging from 5 to 7 were used. Stones and lines of chains were used as sinkers (Appendix 3).

Nearly all of the fishing gear was especially imported for the trials since it is not readily available in Sri Lanka.

(d) Bait

Three types of bait were used during the trials: squid, sardine and flying fish. All bait was frozen and kept in cold storage in the operational bases. The supply of bait was arranged well in advance of the trials through agreements with CFC and the Institute of Fish Technology. The following quantities were procured:

- Squid .. 1.5 tonne at 2.25 Rs/lb
- Sardine .. 1.0 tonne at 1.50 Rs/lb
- Flying fish .. 0.5 tonne at 3.50 Rs/lb

The prices did not include storage, handling and packing which amounted to about 2900 Rs/tonne (1.5 Rs/lb).

Attempts to obtain fresh bait were given up because regular supplies were difficult to obtain and timely transport was a problem.

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3 FISHING OPERATIONS

After several months of preparation, the fishing trials commenced on 27 October 1979 and were suspended on 6 December. They were resumed on 18 January 1980 and continued until 30 March. During these periods, 68 fishing days were recorded and 92 longlining operations were conducted. A total of nearly 100,000 hooks were used, the average per operation being 1,100 hooks.

Fishing area: The operational bases for the trials were Galle and Beruwala, and fishing grounds from Galle in the south to Panadura in the north were covered. The surveys by *R.V. Dr. Fritdjof Nansen* had indicated a relatively heavy concentration of demersal fish in this area. The geographic locations of the bases and fishing grounds are given in Appendix 1.

Baiting: The baiting was carried out ashore. The frozen bait was cut and put on the hooks. About 1.5 kg of bait was required for the baiting of 100 hooks. While baiting, these lines were coiled into tubs each containing 300-500 hooks. Tubs of the baited lines were kept in the chill room until departure for fishing.

Fishing: Most of the fishing trips started around midnight and lasted for 10-12 hours. The lines were usually shot early morning 0400-0500 hours and kept in water for 1-2 hours before hauling.

The shooting was done at a speed of about 4 knots, and retrieval by hydraulic hauler at a speed of 35-45 m/min. After bringing the fish on board by gaffing, it was stored in ice in the fishhold.

Records: A log book was maintained to record details concerning the duration of a fishing trip, fishing locations, shooting time, hauling time, type and number of hooks and bait used. After landing, the fish was counted and weighed by species. Detailed separation of species did not take place until end January and onwards because of lack of experienced staff for identifying the species. Detailed records of catch in relation to the different types of bait and hooks were not maintained; only qualitative estimates based on visual observations were made.

Sales: The landed fish was sold to the CFC at fixed prices.

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4 FINDINGS

The fishing trials were disappointing from a fish production point of view. The entire operation yielded only 4.5 tonne—far below the initial expectations. The daily catches varied from zero to a maximum of 229 kg. The average catch rate over the whole period was 4.6 kg per 100 hooks, the highest being 24.8 kg per 100 hooks and the most frequent 2-3 kg per 100 hooks. Only 11 operations, i.e. 10% of the total, yielded more than 10 kg per hook—which can be considered a minimum for commercially feasible operations. The records are furnished in Table 1.

The poor catch results can be partly attributed to the exploratory nature of the trials conducted at different locations and employing different types of gear and bait. On the other hand, most of the operations were carried out in two main areas and the results are therefore at least indicative of the potential for commercial fishing.

The composition of catch was recorded for the latter part of the trials (33 operations). Groupers, snappers and breams accounted for 84% of the catch, carang for 9% and shark/skate for 3%. Details are given in Table 2. The average weight of the fish was: groupers 3.2 kg, snappers 2.7 kg, breams 2.4 kg, carangs 4.1 kg, shark 3.0 kg and miscellaneous 0.8 kg.

The best hooking time was early morning just before dawn. Repeated sets after sunrise produced very poor results. The soaking time was mainly determined by the activity of the hag fish (shark) in the area. It was observed that if the line is set for more than about two hours, fish already hooked is attacked by the hag fish. Therefore a soaking time of 1.5 to 2 hours seems to be the best.

Fishing grounds: Two main fishing grounds—southwest of Galle and west of Panadura---were explored, and occasional trials were conducted On other grounds within convenient reach of the operational bases. Appendix 1 shows the fishing stations. Table 1 details the catch records at each station.

The results do not indicate that any area or ground is distinctively better than another. The availability appeared to be low in the entire area of operation.

The rocky bottom grounds are relatively small and scattered. When hauling the lines, it was observed that fish was caught only over the rocky patches. On portions of the lines which extended beyond the rocky portions over sandy or muddy bottom, no fish at all were hooked. Since the patches are small, there is no advantage in setting long strings of lines of say 2000 hooks or more. The repeated use of shorter lines, say 500-1000 hooks, set right on the rocky grounds, results in higher catch rates and, of course, in better utilization of bait.

Strong water currents prevail in the area. In order to reduce losses of fishing gear i.e. prevent lines from drifting and getting entangled in protruding corals, the lines should generally be set parallel to the current regardless of the bottom configuration.

Echo sounder: The small depth/fish finder with recording paper used during the trials proved to be very useful in locating the rocky bottom patches before setting the lines. Since these patches are small and scattered, the investment in such a device is probably worthwhile for commercial operation. On the other hand, the echo sounder was of little or no assistance in locating the fish. Fish close to the bottom in deep water were seldom recorded. Therefore a simpler and cheaper echo sounder of the "flashing type", for example, may suffice for determining the bottom configuration.

Line hauler: The hydraulic line hauler used in the fishing operation is well suited for hauling bottom lines from any depth on the continental shelf. However, to reduce loss of fish and fishing gear, smooth manoeuvring along the string of lines is necessary. The gear should be

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picked up as far as possible vertically and with adequate slack. From an economic standpoint, the hauler is far too expensive for small shallow-water craft that employ longlines with a small number of hooks. A mechanically driven or cranked line hauler would do the job on small boats.

Bait: Of the bait species used (squid, sardine and flying fish), squid gives the best yield. The reason appears to be a combination of two factors. First, the fish to be caught prefer squid. Second, the squid does not come off the hooks easily because of its tougher texture. Bait of sardine and flying fish were frequently lost during the shooting of the lines; the bait and branch lines rise vertically due to angular acceleration around the bend in the chute, and hit the sea surface with considerable force.

Almost all fish suitable as bait are marketable as food fish — either in the fresh and dried form — or are exportable in frozen form. Bait is therefore expensive. Countrywide, bait species are seasonally available; but during the period of the fishing trials along the south west coast, it was difficult to obtain bait fish at reasonable prices.

Storage of bait supplies in frozen form is a simple but expensive solution. Furthermore, such a solution is hardly feasible without state patronage.

Lines: Observations of the various types of fishing gear material used and of the performance of the main components of the gear indicate that a main line made out of spun polyester (PES) of 4 mm diameter is well suited for the operations. It is strong enough to resist the rough handling in a mechanical hauler.

Snoods made out of PA nylon hard-laid yarn of R 1520 tex size are suitable for mechanical hauling and fishing on rough ground. Snoods made out of PA monofilament of 1.00-1.20mm diameter are equally good for manual hauling.

Hooks: Kirbed or offset-ringed and straight-turned ringed hooks of size 5-6 are suitable for catching the majority of the species encountered. For reducing excessive loss and easy re-forming, soft tempered hooks are preferred. There does not seem to be any difference in catching efficiency between kirbed hooks and straight hooks.

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5 RECOMMENDATIONS

The negative results of these initial demersal fishing trials must not discourage further efforts to develop the fishery. It requires more than a few months of initial trials to establish the viability of a fishery that is by and large new. The recenily completed surveys, mentioned above, clearly indicate a potential for increased exploitation of demersal resources. At most one may recommend a cautious approach, of not cashing in on the fish before it has been caught. There may still be many hurdles to overcome, and it may not be possible to realize the whole potential because of economic, technical and biological factors.

It is recommended that further trials should be undertaken in the other areas along the coast where the surveys have indicated a heavy concentration of demersal fish.

For such trials it is recommended that small boats, e.g. 3 tonners, be used. These will simulate commercial conditions better, and test the feasibility of technical improvements at an appropriate level. The use of small boats will mean less versatility in experiments. On the other hand, there will be a closer and more direct link between trials and commercial application by existing craft.

In connection with a systematic trial schedule along the coast, studies and experiments should be undertaken to ascertain the technical and economic feasibility of employing low cost echosounders and low cost hauling devices of local manufacture.

The supply of bait is a crucial factor for sustained longline fishing and the trials should, as far as possible, rely upon locally available fresh bait in order to properly assess its usefulness, availability and costs.

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Table 1

RECORDS OF THE FISHING OPERATIONS

Date	Fishing Time (hours)	Area (ref.map)	Water Depth (m)	Hooks (nos.)	Catch (kg)	Catch (fish pieces)	Catch rate (kg/100 hooks)	Hook rate (No. of fish pieces/100 hooks)
27-10-79	0455 - 0700	C6	65	600	65	26	10.8	4.3
	0750-1000	C6	65	600	32	6	5.3	1.0
28-10-79	0450 - 0700	D6	75	500	72	42	14.4	8.4
	0740 - 0945	D6	75	600	34	14	5.7	2.3
29-10-79	0400- 0600	06	75	1450	155	47	10.7	3.2
04-11-79	0440-0645	D6	64	1200	17	10	1.4	0.8
05-11-79	0650-0805	C6	74	1150	21	—	1.8	—
08-11-79	0500-0600	C6	74	600	17	—	2.9	—
09-11-79	0500-0600	C6	72	1200	60	32	5.0	2.7
10-11-79	0500-0615	66	73	900	33	27	3.6	3.0
	0710-0845	B6	73	850	23	16	2.8	2.9
11-11-79	0525-0645	B6	25	1150	25	35	2.2	3.0
15-11-79	0500-0620	B6	75	750	39	25	5.2	3.3
	0540-0745	C6	74	900	44	19	4.9	2.1
16-11-79	0730-0930	C6	60	900	11	—	1.2	—
	0800 - 0930	C5	60	850	0	0	0	0
17-11-79	0510-0730	C6	71	1750	70	37	4.0	2.1
18-11-79	0500-0700	66	68	900	32	24	3.6	2.7
	0720-0910	66	70	850	11	14	1.3	1.6
19-11-79	0530-0800	B6	—	600	0	0	0	0
20-11-79	0530-0715	06	74	600	0	0	0	0
	0730 - 0930	06	67	800	6	7	0.8	0.9
22-11-79	0530- 0645	D6	65	1500	38	13	2.5	0.9
	0730-0910	06	69	600	0	0	0	0
23-11-79	0555-0730	B5	77	300	60	21	20	7
24-11-79	0520-0710	C5	76	900	51	32	5.7	3.6
25-11-79	0545-0715	B5	80	1075	28	14	2.6	1.3
26-11-79	0445-0715	C5	63	900	12	7	1.3	0.8
27-11-79	0520-0715	C6	75	900	9	5	1.0	0.6
	0740-0900	C6	65	300	3	3	1.0	1.0
28-11-79	0605-0745	C6	65	900	20	8	2.2	0.9
29-11-79	0505-0715	C6	68	900	0	0	0	0
	0855 - 1030	C6	28	300	1	2	0.3	0.6
30-11-79	0530-0650	C5	74	900	43	19	4.8	2.1
1-12-79	0550-0730	C6	70	1200	84	37	7.0	3.1
	0740-0850	C6	74	600	40	18	6.7	3.0
2-12-79	0525-0730	C6	70	1200	23	19	1.9	1.6
5-12-79	0545-0555	C6	70	300	0	0	0	0
	0700-0745	C6	70	600	12	10	2.0	1.6
21-1-80	0545-0740	C6	68	300	60	31	20.0	10.3
22-1-80	0545-0750	06	72	1000	64	27	6.4	2.7
23-1-80	0535-0750	C6	—	1000	41	57	4.1	5.7
	0825-0945	C6	73	500	21	21	4.2	4.2
24-1-80	0550-0745	C6	73	1000	47	37	4.7	3.7
25-1 -80	0645 - 0830	A5	55	350	72	22	20.6	6.3
26-1-80	0455-0715	C6	71	1000	37	15	3.7	1.5
	0730-0845	C6	73	500	25	23	5.0	4.6
27-1-80	0535-0740	A4	72	1000	23	17	2.3	1.7
	0825 - 0930	A4	89	500	4	2	0.8	0.4
	1025-1145	A4	60	500	3	3	0.6	0.6
29-1 -80	0510 - 0640	A2	57	500	43	13	8.6	2.6
30-1-80	0400-0730	A2	—	1000	16	8	1.6	0.8

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Table 1

RECORDS OF THE FISHING OPERATIONS *(Continued)*

Date	Fishing Time (hours)	Area (ref.map)	Water Depth (m)	Hooks (nos)	Catch (kg)	Catch (fish pieces)	Catch rate (kg/100 hooks)	Hook rate (No. of fish pieces/100 hooks)
08-2-80	0455-0630	A3	42	1000	22	16	2.2	1.6
09-2-80	0405-0650	A2	59	1000	101	26	10.1	2.6
	0700 - 0905	A2	59	850	26	8	3.1	0.9
10-2-80	0345-0700	A2	56	1500	109	44	7.3	2.9
12-2-80	0600-0710	B1	55	1000	48	22	4.8	2.2
	0800 - 0935	—	55	1000	66	27	6.6	2.7
14-2-80	0450- 0800	A2	54	2350	105	38	4.5	1.6
21 -2-80	0440-0745	A2	62	1500	51	18	3.4	1.2
	0830 - 0930	A2	56	100	3	3	3.0	3.0
22-2-80	0720 - 0835	A2	25	400	7	2	2.0	0.5
	2000 - 2220	A2	59	900	18	10	2.0	1.1
23-2-80	0530-0725	A2	57	1000	27	12	2.7	1.2
24-2-80	0425-0750	A2	56	1850	192	60	10.4	3.2
25-2-80	0430-0650	A2	61	900	19	12	2.1	1.3
26-2-80	0425 - 0630	A2	58	500	85	25	17.0	5.0
	0635-0900	A2	57	1200	21	15	1.8	1.3
27-2-80	0440-0630	A2	56	500	124	43	24.8	8.6
28-2-80	0450 - 0625	A2	54	200	6	4	3.0	2.0
	0627 - 0800	A2	58	400	21	9	5.3	2.3
29-2-80	0430-0740	A2	59	1900	154	57	8.1	3.0
05-3-80	0505 - 0735	A2	58	1600	62	38	3.9	2.4
06-3-80	0500-0735	A2	58	2200	167	92	7.6	4.2
07-3-80	0435- 0730	A2	55	2000	44	24	2.2	1.2
08-3-80	0435-0755	A2	61	2025	109	54	5.4	2.7
09-3-80	0450 - 0745	A2	55	1850	30	11	1.6	0.6
11-3-80	0410 - 0745	A2	56	2150	136	45	6.3	2.1
12-3-80	0455-0615	A2	31	500	11	5	2.2	1.0
14-3-80	0505-0705	Al	57	1325	72	25	5.4	1.9
	0723-0925	—	58	1400	53	30	3.8	2.1
15-3-80	0335-0740	A2	54	2300	47	16	2.0	0.7
18-3-80	0405-0755	A2	56	1900	229	76	12.0	4.0
19-3-80	0435-0810	A2	70	2550	162	57	6.4	2.2
21-3-80	0515-0850	Al	60	2400	72	40	3.0	1.7
22-3-80	0545-0820	A2	58	1900	57	29	3.0	1.5
24-3-80	0505 - 0800	A2	55	2400	89	43	3.7	1.8
25-3-80	0450-0745	A2	54	1500	81	26	5.4	1.7
26-3-80	0430-0755	A2	58	1900	77	30	4.1	1.6
27-3-80	0430-0720	A2	55	1900	675	27	3.6	1.4
28-3-80	0440 - 0815	A2	57	1900	27	14	1.4	0.7
29-3-80	0435-0730	B4	68	1500	91	34	6.1	2.1
Total				99475	4535	2032		

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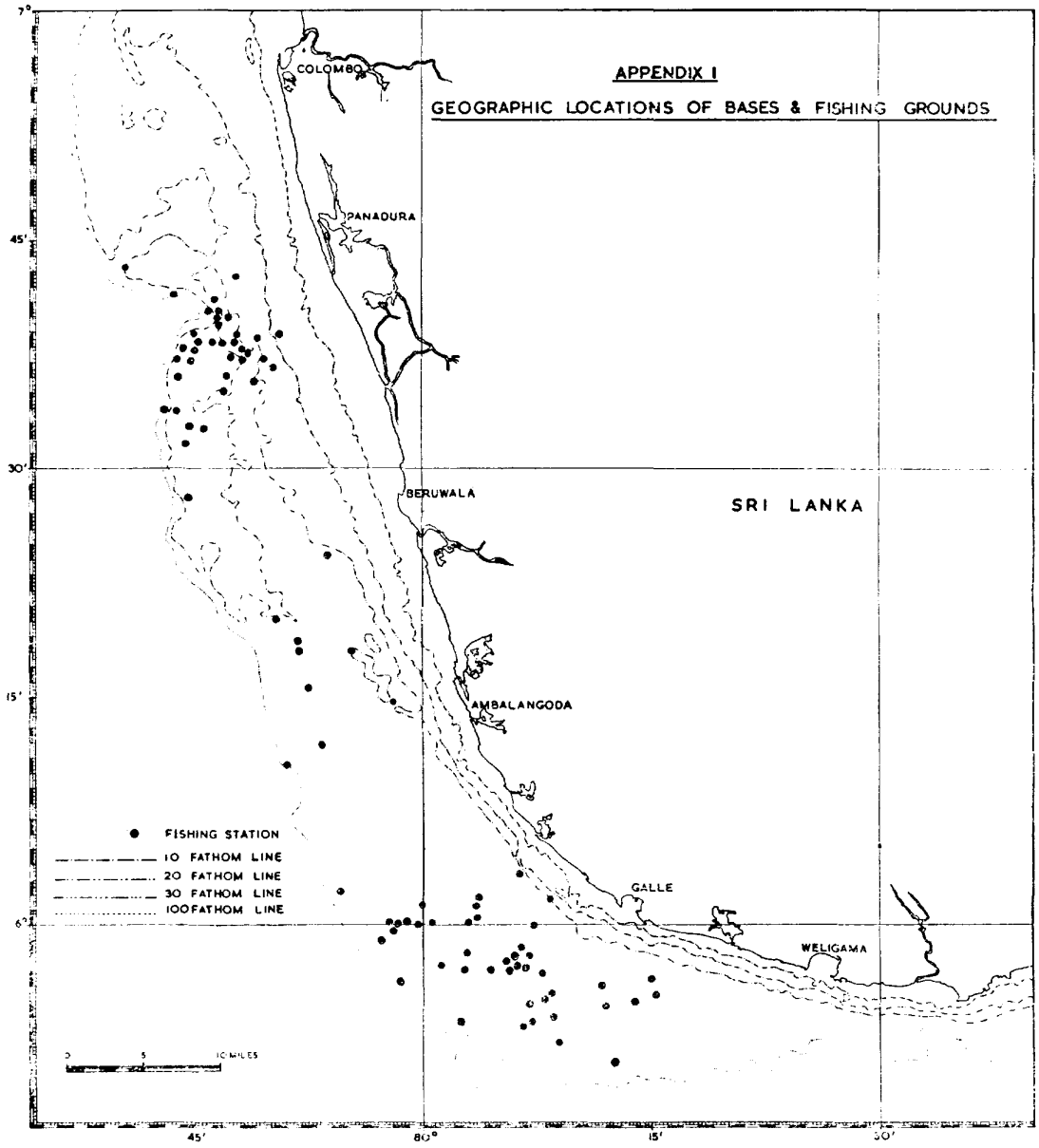
Table 2

DATA OF CATCH COMPOSITION

Date	Grouper		Snapper		Bream		Carang		Shark		Miscellaneous	
	No.	Wt.(kg)	No.	Wt.(kg)	No.	Wt.(kg)	No.	Wt.(kg)	No.	Wt.(kg)	No.	Wt.(kg)
29-01-80	1	12	—	—	12	31	—	—	—	—	—	—
30-01-80	—	—	—	—	—	—	—		8	10	2	7
08-02-80	4	10	—	—	1	1	1	5	—	—	10	6
09-02-80	12	50	8	34	12	43	—	—	—	—	—	—
10-02-80	11	44	10	23	10	21	2	8	1	10	10	4
12-02-80	18	37	—	—	26	68	1	4	1	4	3	1
14-02-80	3	12	2	8	25	64	2	3	5	14	1	4
21-02-80	6	27	9	10	6	17	—		—		—	—
22-02-80	1	2	2	7	8	14		—	1	2	—	—
23-02-80	4	18	—	—	8	9	—	—	—	—	—	—
24-02-80	16	72	11	49	16	37	1	10	—	—	15	25
25-02-80	5	9		—	6	8	—	—	—		1	2
26-02-80	17	33	3	10	17	43	2	17	—	—	1	3
27-02-80	12	60	18	25	12	37		—		—	1	2
28-02-80	3	12	4	5	3	4	3	6	—	—	—	—
29-02-80	8	32	8	29	37	92	2	1	—	—	—	—
05-3-80	8	15	5	17	15	27	—	—	—	—	10	3
06-3-80	21	54	20	39	33	71	—	—	—	—	18	3
09-3-80	—	—	—	—	7	16	3	11	1	3	—	—
11-3-80	12	55	1	4	18	42	3	6	—		11	13
12-3-80	2	7	2	—	1	4	—	—	—	—	—	—
14-3-80	17	31	2	3	28	60	4	29	—	—	5	2
15-3-80	1	4	1	6	7	18	2	4	2	5	3	8
18-3-80	10	36	8	30	41	108	8	48	3	4	6	3
19-3-80	17	67	8	36	13	33	3	16	1	5	15	6
21-3-80	16	21	7	17	11	22	1	2	—	—	14	8
22-3-80	13	13	—	—	14	40	1	2	—	—	1	2
24-3-80	1	5	1	5	21	40	6	23	2	3	12	13
25-3-80	—	—	6	11	13	34	7	36	—		—	—
26-3-80	2	14	3	10	13	33	8	10	—	—	4	10
27-3-80	10	30	7	15	4	5	2	13	2	3	4	2
28-3-80	2	7	2	3	5	8	1	2	4	7	—	—
29-3-80	9	48	4	11	14	31	—	—		—	7	1
Total	262	837	152	407	457	1081	63	256	23	70	154	128

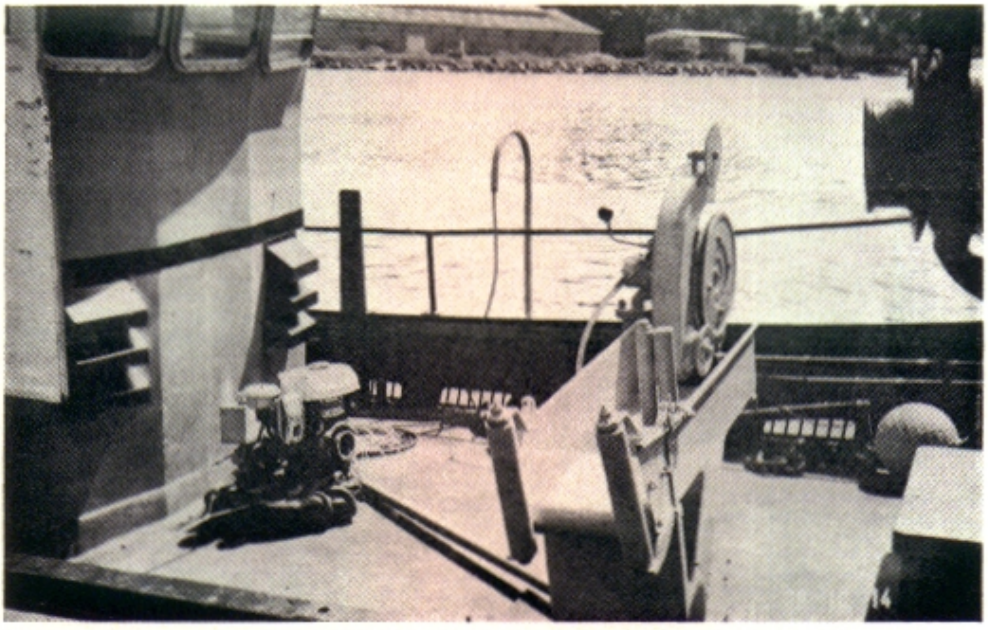
<<


APPENDIX I
GEOGRAPHIC LOCATIONS OF BASES & FISHING GROUNDS
COLOMBO
PANADURA
BERUWALA
AMBALANGODA
GALLE
WELIGAMA
SRI LANKA
FISHING STATION
10 FATHOM LINE
20 FATHOM LINE
30 FATHOM LINE
100FATHOM LINE
7°
45'
30'
15'
6°
45'
80°
15'
30'

<<

APPENDIX 2

FISHING BOAT USED FOR THE TRIALS

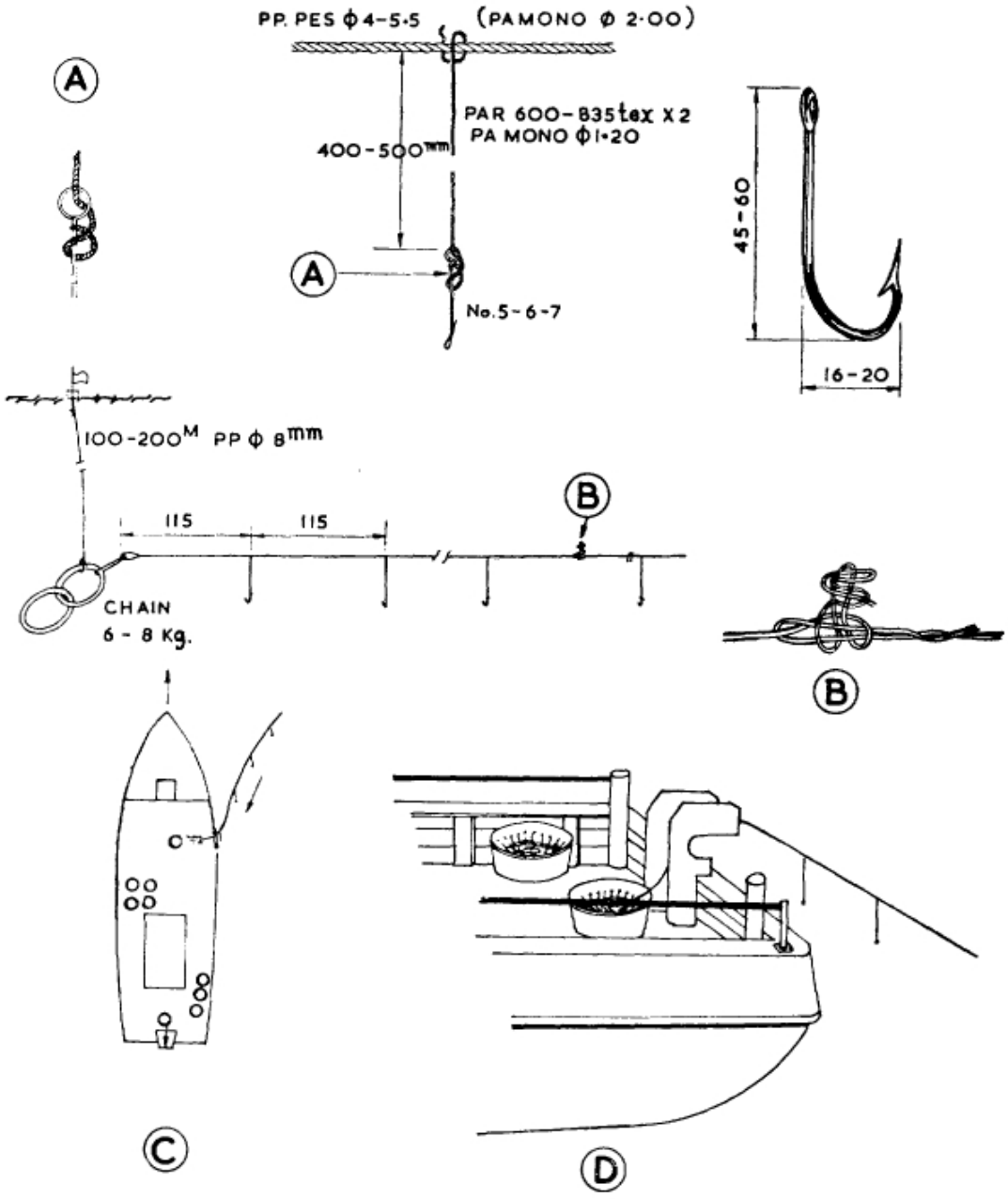


<< : The 38—toot FRP boat used for the bottom longline fishing trials.

Bottom: The echosounder (left foreground) and the hydraulic US hauler with which the boat was equipped.

APPENDIX 3

DESIGN & SPECIFICATION OF THE BOTTOM LONGLINE



A: Knots used for tying hooks to the snoods.

B: Knot used for joining batches of 500 metre lines of bottom longline,

C: Lay-out of the fishing boat.

0: Chute arrangements for the fishing boat.

<<

PUBLICATIONS OF THE

BAY OF BENGAL PROGRAMME (BOBP)

Development of Small-Scale Fisheries (GCP/RAS/040/SWE)

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 7-10 November 1978. Colombo, Sri Lanka, 1978.
Reissued Madras, India, September 1980.

4. Role of Women in Small-Scale Fisheries of the Bay of Bengal. (In preparation)

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. Madras, India, April 1980.

9. Report of the Training Course for Fish Marketing Personnel of Tamil Nadu, Madras, India, 3-14 December, 1979. Madras, India, September 1980.

10.1 Report of the Consultation on Stock Assessment for Small-Scale Fisheries in the Bay of Bengal. Chittagong, Bangladesh, 16-21 June, 1980.
Volume 1: Proceedings. Madras, India, September 1980.

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.

Working Papers (BOB P/WP/....)

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

2. Inventory of Kattumarams and Their Fishing Gear in Andhra Pradesh and Tamil Nadu, India. (In preparation)

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

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

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

<<

6. Fishing Trials with Bottom-Set Longlines in Sri Lanka. Madras, India, September 1980.
7. Technical Trials of Beachcraft Prototypes in India, Madras, India, October 1980.
8. Current Knowledge of Fisheries Resources in the Shelf Area of the Bay of Bengal, Madras, India, September 1980.
9. Boatbuilding Materials for Small-Scale Fisheries in India. Madras, India, October1980.
10. Fishing Trials with High-Opening Bottom Trawls in Palk Bay, Tamil Nadu. Madras, India, October 1980.

Miscellaneous Papers (BOBP/MIS/....)

1. Fisheries Cooperatives in Kerala: A Critique (In preparation)

Published by the Bay of Bengal Programme, FAO, 91, St. Mary's Road, Abhiramapuram, Madras—600 018, India. Printed at Amra Press, Madras—600 041.

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