Bay of Bengal Programme

Development of Small-Scale Fisheries

FISWHING TRIALS WITH BEACHLANDING CRAFT
AT UPPADA, ANDHRA PRADESH, INDIA

BOBP/WP/56

SWEDISH INTERNATIONAL DEVELOPMENT AUTHORITY

FOOD AND AGRICULTURE ORGANISATION OF THE UNITED NATIONS

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BAY OF BENGAL PROGRAMME
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BOB P/WP/56
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FISHING TRIALS WITH BEACHLANDING CRAFT AT UPPADA, ANDHRA PRADESH, INDIA

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This paper discusses the conduct and findings of fishing trials carried out with the BOBP beachcraft IND 20-C at Uppada, Andhra Pradesh, India between August 1985 and July 1986. The beachcraft was equipped with fishing gear designed to catch large pelagic species. The idea was to investigate the craft's fishing potential in offshore areas — since earlier fishing trials had been confined to inshore waters.

The trials were conducted at the request of the Directorate of Fisheries and in cooperation with them. Five private fishermen constituted the crew. An inspector of fisheries was the main local counterpart. On behalf of BOBP, a fishing technologist (associate professional officer) provided the expertise, while a senior fishing technologist and a naval architect consultant provided supervision and advice as necessary.

The trials showed that the BOBP beachcraft are capable of fishing in offshore waters upto 35 n miles. Catch performance and profitability can be improved with better organization and refinements to the craft's propuLion unit.

The fishing trials, and this paper which reports on them, were sponsored by the small-scale fisheries project of the Bay of Bengal Programme (BOBP) during its first phase (1 979—86). During this phase the project was funded by SIDA (Swedish International Development Authority) and executed by the FAO (Food and Agriculture Organization of the United Nations). Its objective was to develop, demonstrate and promote methodologies and technologies to improve the conditions of small-scale fisherfolk in five member countries— Bangladesh, India, Malaysia, Sri Lanka and Thailand.

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INTRODUCTION

On the coast of Andhra Pradesh, India, there are some 36,000 traditional non-motorized fishing craft, 30% of which are the plank-built navas and 60% log raft (kattumaram). According to estimates of the Central Marine Fisheries Research Institute for 1982/83, the non-motorized craft accounted for about 73% of the total marine fish production. Most of those traditional craft operate from fishing villages situated at exposed beaches along the coast.

Some of the main disadvantages of the traditional craft are: limited range of operation, poor endurance at sea, lack of mobility on the fishing ground, lack of protection of crew and low carrying capacity, the latter being particularly true for the kattumaram. Their main advantages are low construction and operational costs.

In an endeavour to improve the standard of living of small-scale fishermen of the east coast of India, BOBP undertook to develop a motorized beachlanding craft (BLC) with good surf crossing ability, greater carrying capacity, better endurance at sea, wider range of operation and better protection for crew.

Repeated trials with various BLC prototypes led to the design of IND-20 as the one most suitable for local conditions in Andhra Pradesh. Modifications made in the subsequent versions 20A, 20B and 20C are described in BOB P/WP/45. To recapitulate briefly, in IND-20A the hull was modified, incorporating wider stern sections and a flatter run; in IND-20B, the working deck was lowered to provide better comfort and safety for the crew; in IND-20C, the 8 hp air-cooled engine of earlier versions was replaced by a 10 hp freshwater-cooled engine; the working deck being the same as on IND-20B. The general arrangement of IND-20C is shown in Fig. 2.

During the earlier fishing trials, emphasis was placed on the technical development of the BLC and its propulsion unit rather than on the fishing gear and area of operation, and it so happened that these beachcraft were operated in heavily fished inshore waters. The August 1985 - **July** 1986 fishing trials conducted at the request of the Directorate of Fisheries were therefore meant to investigate the potential of IND-20C to employ more diversified fishing gear in offshore areas.

CONDUCT OF THE FISHING TRIALS

The BLC was equipped with large mesh driftnets, drift longlines and trolling lines particularly designed for catching offshore laige pelagic species (Figs. 3, 4 & 5). A set of bottom set shark longline for deep-water fishing operations was also available.

The fishing trials were conducted as much as possible offshore at the edge of and beyond the continental shelf, up to about 35 n-miles from the shore.

For conduct of fishing trials five private fishermen, who to some extent had already been trained in the use of motorized BLC, were selected by local fisheries officers in charge of execution and monitoring of the fishing trials. As remuneration, each crew member was paid Rs. 45 per sea day and Rs. 20 per shore working day. The head fisherman in charge of the boat and engine was given Rs. 5 extra. This arrangement was arrived at due to the uncertainties in earnings because of the experimental nature of the trials. In the future, however, a share system could be usod wherein the fishermen would receive 30% of the difference between gross earnings and running expenses.

The fishing operations were conducted as much as possible along commercial lines. Supplies of fuel, oil, ice, bait, food, etc. were arranged as needed. The catch was auctioned on the beach and proceeds of the sale of catch went to the project. Daily records of catch data, costs and earnings were maintained.

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The catches were landed in fresh form on the beach. After collection of catch data, fish were auctioned to small fish traders. According to supply and demand, landings were sold in fresh or dry form. Some of the traders extracted liver oil from the sharks. Large landings of tunas, sharks and bill fishes resulted in very low prices for those species; comparatively, sharks fetched a slightly better price. Large landings also created a shortage of cash, hence fish had to be sold on credit.

FINDINGS

Earnings

The monthly landings and earnings of IND-20C are set out in Table 1.

- Though the table shows an average of Rs. 608/trip over 193 trips during the year, one should note that the best catch rates were obtained during February, March and April.

- Nearly 82 days were lost due to technical problems with the propulsion unit and lack of cooperation from the crew and the community.

—Seasonal offshore fishing operations upto 35 n-miles from shore for large pelagic species are likely to be rewarding. The high catch rates would compensate for the low market value of tunas, sharks and bill fishes now realised. If better marketing tie-ups were developed the economics of operation would improve further.

- The offshore large pelagic resources appear to be more abundant between February and May than in other months and are accessible to motorized navas also. Further fishing trials are desirable to obtain more information on the resources and comparative figures on economic viability of different crafts.

Fishing gear

Large mesh driftnets were found to be suitabte fishing gear, particularly beyond the continental shelf, for catching the large pelagic species. No significant difference of catch efficiency was observed between nets of 125 mm - 150 mm and 180 mm mesh size. The specifications and designs of the driftnet have been found to be adequate and could be adopted for further commercially oriented fishing trials.

The designs of drift longlines were found to be suitable for catching shark off the continental shelf, but not for tuna; for the latter, the branch lines and float lines have to be longer.

Trolling lines were also found to be useful tools for catching highly valued seerfish while cruising **to** and from the fishing ground. The income generated may well cover most of the running costs.

Since trials with bottom set longlines wore limited to too few occasions and showed poor results, more trials are desirable to evaluate their performance.

Boat

The working of the BLC was not affected in any significant way, except for 12 days, by hull repair and maintenance problems. With a few minor adjustments and improvements, the general arrangement and deck layout of the IND-20C were found to be satisfactory for conduct of driftnetting, drift longlining and trolling.

The sailing performance of the IND-20C, provided with a gunter rig, was satisfactory. However, the crew lacked interest in the use of the new sail rig and felt that the local lateen rig used by navas would be adequate. But since IND-20C is motorized, perhaps a simple rig such as the dipping lug may be more acceptable.

Due to installation of a large engine box for the experimental fresh water-cooled engine, the BLC lacked buoyancy in the stern. To increase the buoyancy, the engine box was made smaller.

IND-20C was most of the time kept at anchor, as were the traditional navas. An exposed wooden false keel is therefore not recommended and should be covered with FRP reinforcement to prevent worm attack.

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Propulsion unit

Though 82 days were lost due to mechanical problems, one can hope for better performance in future. The installation was experimental, in that a water-cooled engine had not been tried before and the reverse-reduction gearbox was a prototype.

Frequent breakdown of the engine-mounted fresh water circulating pump indicated the need for a sturdier replacement. This was done by purchasing a gear pump with a bronze housing and stainless steel shaft from the local market.

The throttle and gearbox controls were of the cable type and sometimes caused problems of proper engagement. This was set right later by separate controls using stainless steel link rods.

Besides these, the usual problems of lube oil leakage due to wearing of shaft seals, frequent air locks due to leaks in the fuel line, clogging of the nozzle due to dirty fuel, worn out piston rings and valve seating also accounted for the number of non-fishing days.

The positive side has been the acceptable performance of the VST 10 hp engine itself. A complete overhaul by the manufacturers after the trials revealed normal wear and tear for the number of hours worked.

Though the speed attained by using the 10 hp engine is marginally higher than with the 8 hp air cooled engine (7 kn vs. 6.6 kn), the main point in favour of such an installation is the efficiency of the cooling system. Only similar fishing trials with the 8 hp air cooled version will show whether there is likely to be a problem of overheating on such long runs to the fishing grounds (5-6 hours).

Using the gearbox clutch was an advantage for hauling in the nets during rough weather. However frequent problems with clutch slippage cause concern. As a reverse is not essential for a BLC, perhaps a simpler reduction gearbox could have proved less troublesome.

Beach-hauling winch

At Uppada beach, the BLC was occasionally hauled on the beach for repairs and maintenance and on account of bad weather with a diesel engine-driven mechanical winch developed earlier (BOBP/WP/51). However, considering the low frequency of hauling operations, the use of such a costly winch may not be necessary from a place like Uppada.

Resources

Although the fishing trials were rather limited in time and area of operation, they indicated good seasonal availability of large pelagic species (tunas, sharks and bill fishes) beyond the present range of the non-motorized country craft.

Operational range

As the trials were meant to experiment with offshore fishing from a BLC, fishing was as far as possible conducted at the edge of or beyond the continental shelf. To cover this distance of about 35 n miles required about 6 hours running under motor or motor and sail. This was definitely beyond the range of the non-motorized craft. Distance from the shore and fishing depth were progresively increased from month to month. The majority of fishing trlps during the months of February, March and April were conducted at a depth of 300 m and incidentally, the highest catches were recorded during this perlod.

Crew

The crew was selected by the counterpart inspector of fisheries in charge, in consultation with his direct supervisor, BOBP staff and village leaders. Some were replaced for professional or family reasons or because of personal conflicts. Except for one fisherman who left the project to take up driftlonglining with a non-motorized nava, the crew did not extend full cooperation.

Community

The fishing community did not show great interest in the fishing trials and did not cooperate to make the trials a success. When good catches were landed by BOBP BLC, regardless of the pattern of operations, the village elders enforced the traditional fishing holiday. Non-introduc-

tion of subsidized BLC at Uppada by the Government may have been a reason for the lack of interest from the cooperative society and caste associations at Uppada. However, good catches of tunas, sharks, and billfishes from offshore did generate interest among some of the active nava fishermen, who, employing the traditional nava and fishing gear, undertook to venture further offshore for a short period. Some of the more enterprising fishermen took to offshore shark drift longlining with improvised fishing gear and met with some success.

CONCLUSIONS AND RECOMMENDATIONS

Although any economic prediction should be viewed with caution due to the limited period of trials using only one boat, the results clearly show that a BLC like IND 20 can fish in offshore waters upto 35 n miles. Achieving 193 trips and a return of 23% with a prototype engine installation and during experimental fishing trials clearly indicates that with optimization of fishing gear and improvements to the propulsion unit, the BLC could be even more profitable.

Some of the findings are also applicable to traditional craft. For example drift longlines and trolling lines are not presently employed by local fishermen. The use of this gear from motorized and non-motorized navas could benefit them when there is a seasonal abundance of large pelagic species in the near offshore.

The relatively small carrying capacity of the IND-20C and the crew shelter offered seems to indicate that though it is possible to fish offshore with such a boat, it requires a fair degree of endurance from the fishermen and the boat to fish round the year. Perhaps this class of boat should restrict its operations offshore to four months in a year. Committed offshore fishing, year round if feasible, may need larger boats.

Fishing trials with similar or improved crafts have to be conducted offshore in othcr areas of the east coast to establish whether large pelagic species are available all along the coast. Exploratory fishing trials with larger harbour based fishing boats employing the above fishing gear could also be undertaken beyond 50 n miles from the shore.

Since pelagics such as tunas, tuna-like fishes and sharks fetch too low a price at the beach site, a study of market outlets should be made in order to improve the feasibility of large pelagic species fishery.

Table 1

MONTHLY LANDINGS AND EARNINGS OF IND-20C

Year/Month		No. of trips (days)	Catch (kg)	Value of catch (Rs)
1985	08	23	1,941	8,276
	09	11	1,177	4,138
	10	09	251	981
	11	13	877	3,373
	12	25	1,411	8,542
1986	01	14	2,310	6,503
	02	18	11,312	24,585
	03	13	9,085	23,975
	04	16	4,846	15,459
	05	21	2,121	11,265
	06	21	885	5,041
	07	09	1,319	5,258
Total	12	193	37,535	1,17,396
Average per month		16	3,128	9,783

Table 2

ESTIMATE OF COSTS AND EARNINGS OF IND-20C

			Rs.	Rs.
I.	**Investment costs**			
	1.	**Hull**	**57,000**	
	2.	**Engine (10 hp)**	**38,000**	
	3.	**Sail rig**	**2,000**	
	4.	**Fishing gear**	**45,000**	
		Total		**142, 000**
II.	**Annual gross earnings 193 trips**			
		Total		117,396
III.	**Annual operating costs**			
	1.	**Diesel and oil**	**11,500**	
	2.	**Ice, bait**	**4,800**	
	3.	**Engine repair and maintenance**	**5,200**	
	4.	**Hull repair**	**900**	
	5.	**Net repair**	**3,000**	
	6.	**Insurance**	**4,000**	
	7.	**Crew wages based on 1/3 share of (gross earnings minus cost 1 -6)**	**29,040**	
		Total		**58,440**
IV.	**Annual fixed costs**			
	Depreciation			
	1.	Hull (10 years)	5,700	
	2.	**Engine (5 years)**	**3,600**	
	3.	**Engine box (3 years)**	**7,000**	
	4.	Sail rig	1,000	
	5.	Fishing gear (5 years)	9,000	
		Total		26,300
V.	Annual total costs (III-LIV)			84,740
VI.	Annual net earnings (II—V)			32,656
VII.	Rate of return on investment (VI/I)			23%

Figure 1 MAP OF COASTAL AREA SHOWING OPERATIONAL BASE AND FISHING AREA

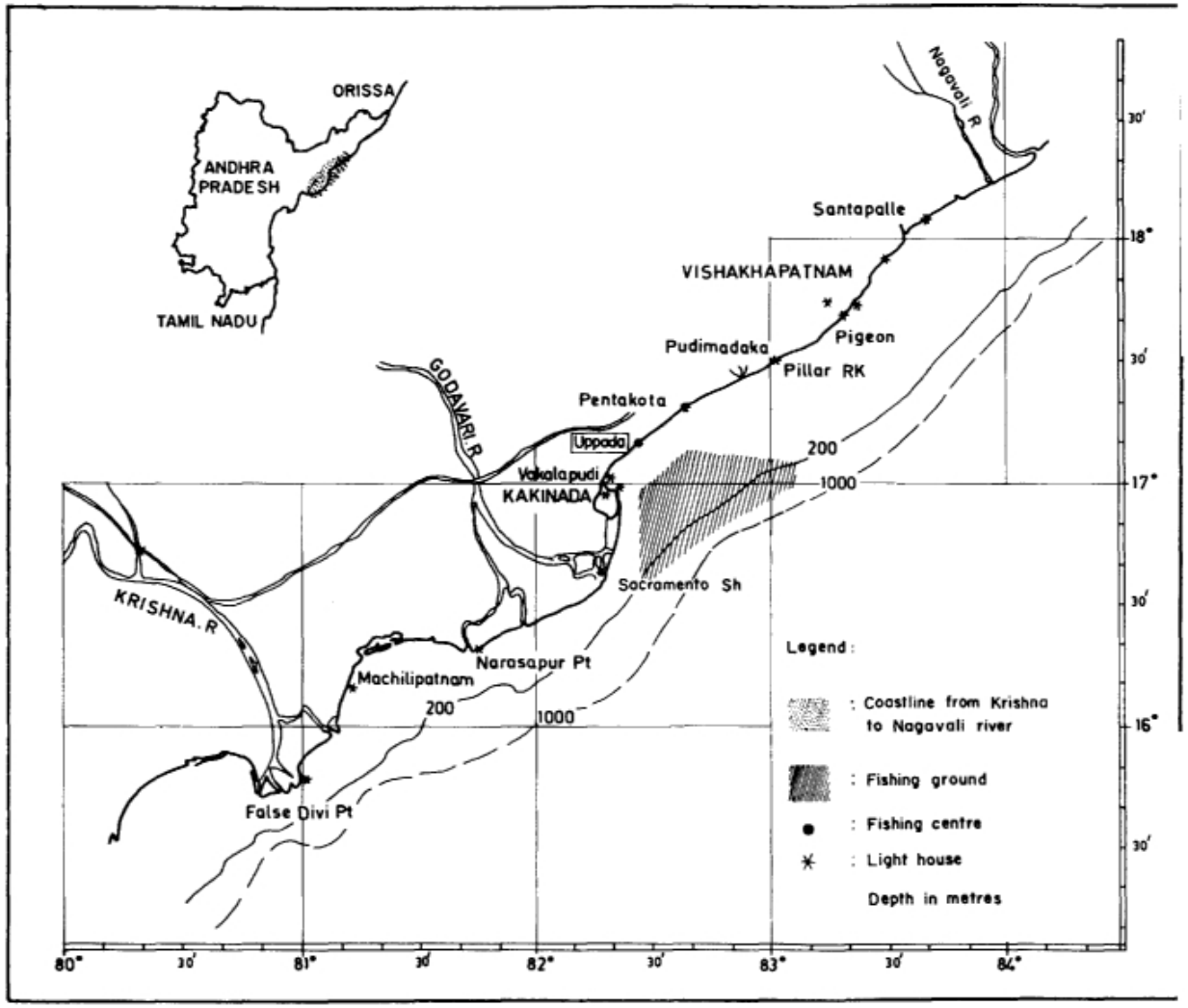

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Figure 2 GENERAL ARRANGEMENT: 8.5 m. GRP BEACH BOAT (IND 20 C)

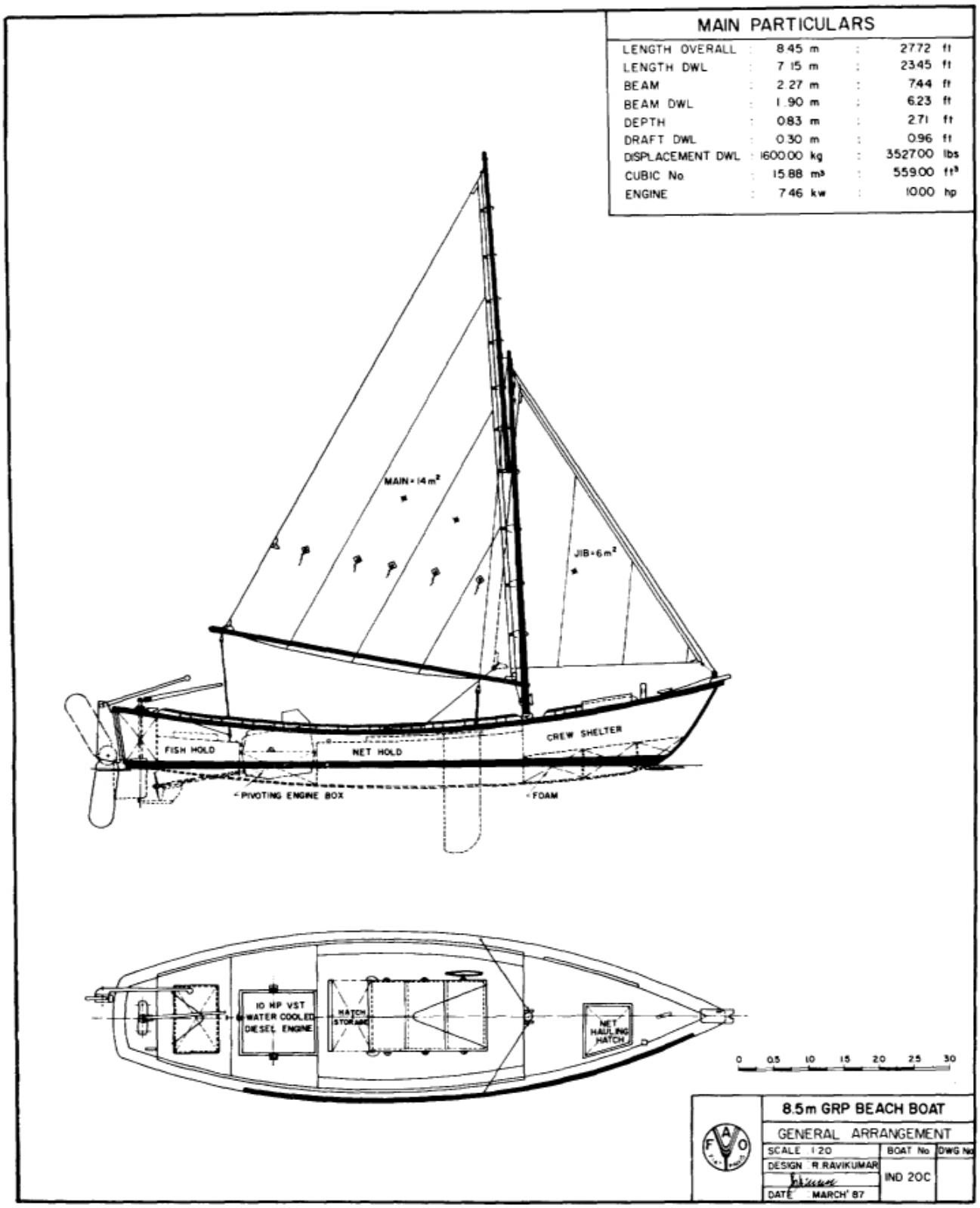


Figure 3 DESIGN OF DRIFTNETS

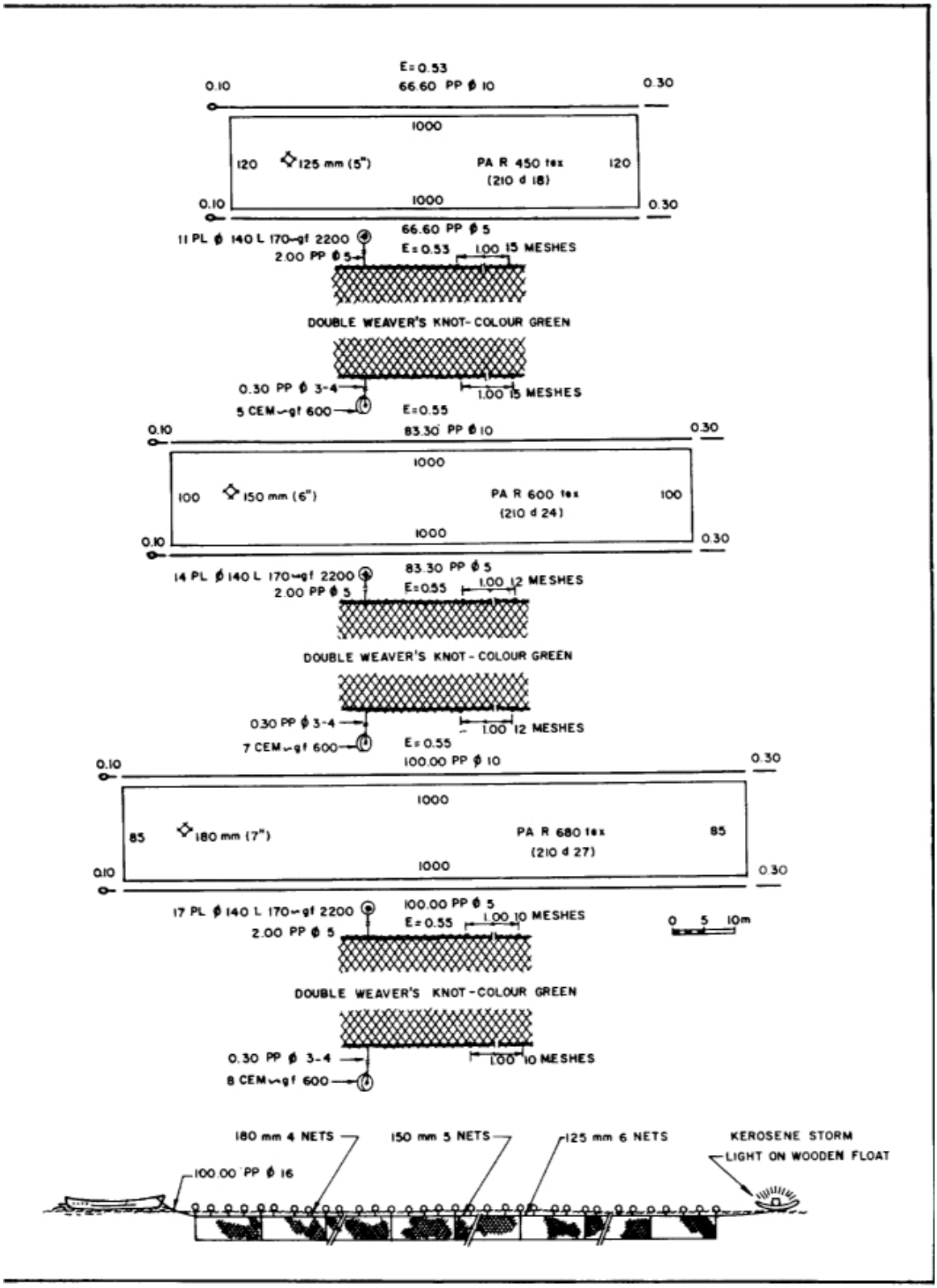


Figure 4 DESIGN OF DRIFT LONGLINES

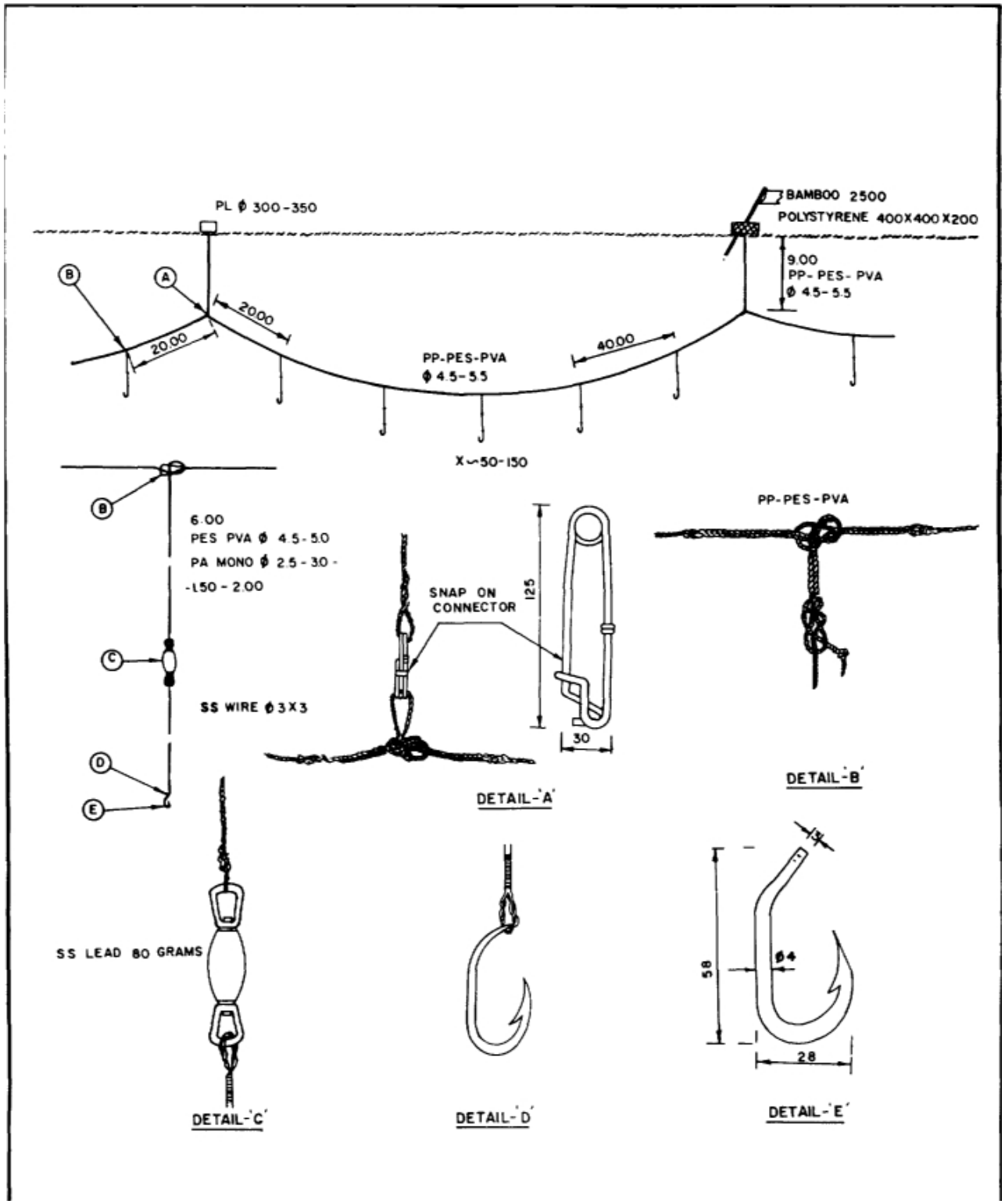
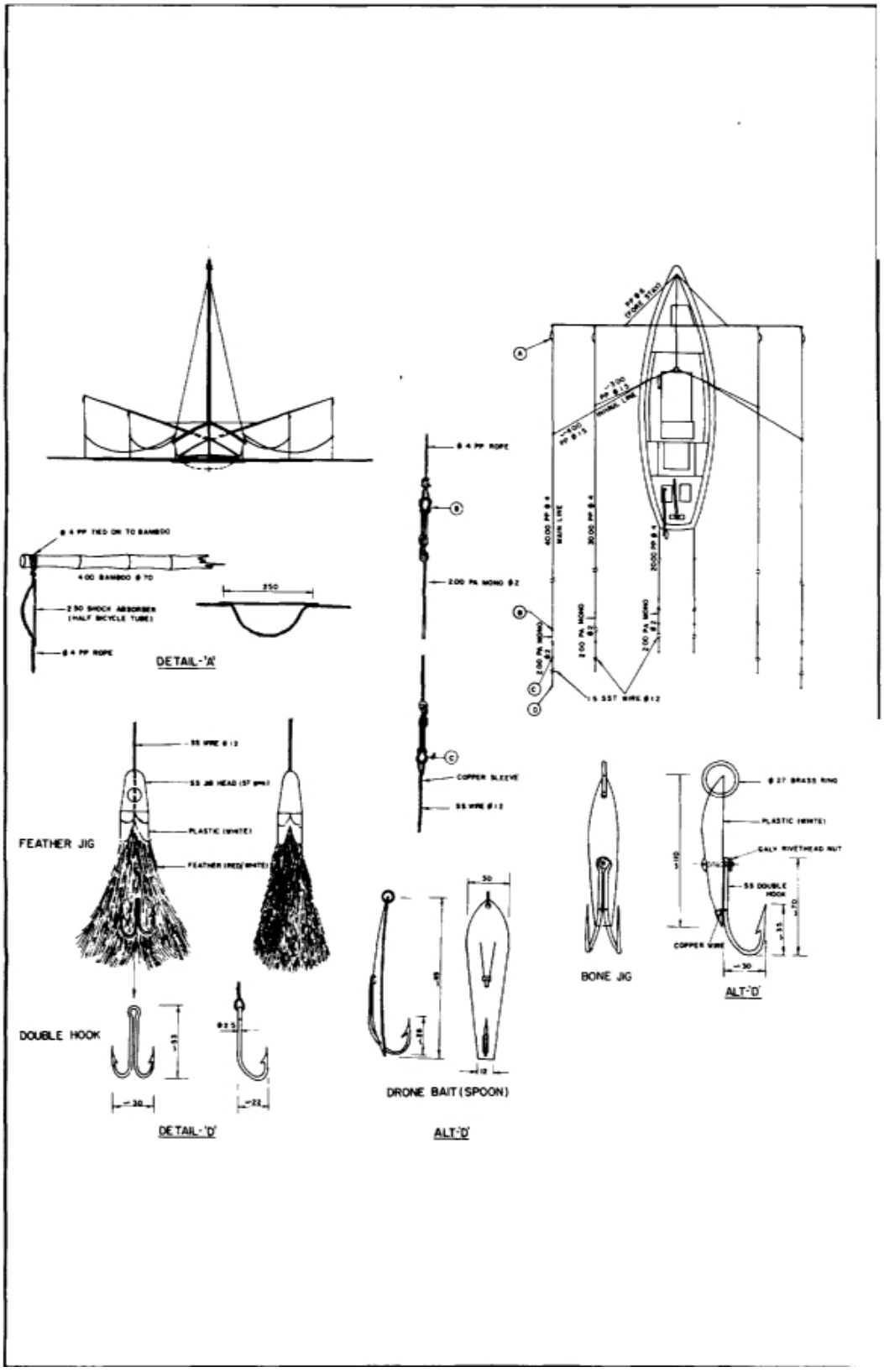


Figure 5 DESIGN OF TROLLING LINES



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/WPI...) are progress reports that discuss the findings of ongoing BOBP work.

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

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

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

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

A list of publications follows.

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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)
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