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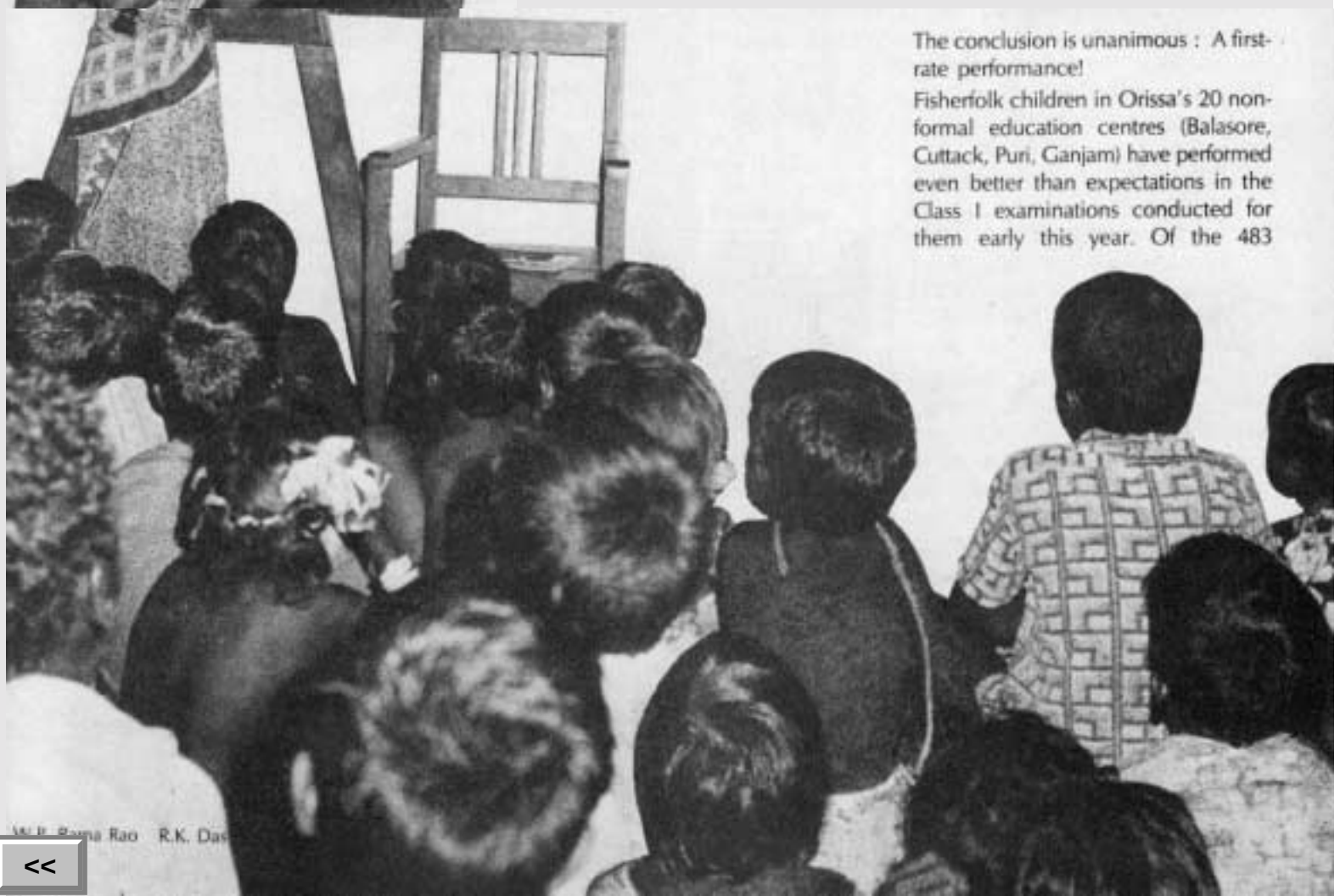
Orissa Fisherfolk Children - A First-Rate Performance!

Orissa fisherfolk children studying in non-formal centres in the state's coastal districts have fared remarkably well in the examinations held for them recently. BOBP consultant Namita Ray reports on their performance and reviews the progress of the BOBP-assisted non-formal education project in the state.

The conclusion is unanimous : A first-rate performance!

Fisherfolk children in Orissa's 20 non-formal education centres (Balasore, Cuttack, Puri, Ganjam) have performed even better than expectations in the Class I examinations conducted for them early this year. Of the 483



W.P. Rama Rao R.K. Das

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children who wrote the exam, 94% passed in language, 98% in environmental studies, 95% in arithmetic. The average marks are pretty high too : 70% for language, 80% for environmental studies, 72% for arithmetic. There were 1 00% achievers in environmental studies from all the four districts; 100% marks in arithmetic were obtained by some students in Balasore and Ganjam. And in language, 99% marks were obtained in Ganjam, 98% in Puri.

In general, Telugu-speaking students from Puri and Ganjam fared better than the others. For detailed results, see table.

Said a proud Dr S C Dash, Director of SCERT, Bhubaneswar : "The results confirm the efficacy of non-formal education. . of inputs that are relevant and of education that centres on the learners". He said : "The success achieved at the BOBP centres is due to the personal involvement of the teachers, facilitators and organizers who assemble for discussion at BOBP seminars. . . , . The departments of education and fisheries have come together under' this project to effect much-needed socio-economic change in the fishermen's community".

* * *

The introduction of the non-formal centres for Orissa fisherfolk. children, the role of the many agencies taking part in the project, the. curriculum material prepared by BOBP for the learners and the work being done at the centres have been described in the December 1984 issue of Bay *of Bengal News.*

The present article examines the project's concepts and its progress in the context of the socio-economic background of Orissa's fisherfolk and the need for change.

Until very recently, Orissa fishermen were primarily engaged in riverine, estuarine or brackishwater fishing or in fishing from the tidal waters that needed very little skill in the exploitation of marine resources. The vast shallow tidal belt — from Talsary (a coastal fishing village in Balasore district, close to West Bengal in the north), to Paradip in the district of Cuttack — offers good scope for easy catch without going out to the deep sea for fishing. Besides, the largest lagoon in the country, called the Chilka lake, extends over the districts of Puri and Ganjam.

Marine resources exploitation was more or less confined to Andhra fisherfolk, who in search of better fishing grounds, migrated to and later settled in the State. These Telugu fishermen with their traditional craft and gear 'carried on fishing from the southern part. The other half of its coastal belt extended from Paradip to Patisonapur (a fishing village close to Andhra Pradesh border) in Ganjam.

By and by, increased pressure on land, resources and jobs forced Orissa's native fishermen into sea fishing. Fishermen from the northern part take after the traditional methods of the Bangalees and the Bangladeshis, while those in the southern region take after the Telugu fishermen already settled there. Besides, incentives from different agencies — by way of loans on easy terms, or new craft and gear — have attracted many to marine fishing.

Artisinal marine fishermen of Orissa can, by and large, be divided into two. distinct ethnic groups, with different lifestyles, life expectations, fishing techniques and socio-economic conditions.

(a) Fishermen *of the north*

– They are natives of Orissa. They speak Oriya, a dialect that's influenced by Bengali, different from the standard Oriya dialect.

– Many of them are agrarian-based and supplement their income from fishing. Hence they are better off than their counterparts in the south.

– They live in mud-built thatched houses in close-knit villages far from the sea coast.

– They are conscious about the value of education. A few of them are literate. They are not unwilling to send their, daughters to school.

– Very few women in the community go out for fish trading or marketing;

During the fishing season,, each fishing unit, comprising of men only, se's up camps at the coast for fishing or remains away from home consecutively for three or four days; it takes up both day and night fishing from river mouths with plank-built displacement boats like Dinghi, Donga, Chhoat, Patia etc.

– Men play a more important role in handling money matters than women. In reality they are the masters while the women do their bidding, without any part in decision-making.

– They are more superstitious in matters concerning fishing than those concerning family life.

(b) Fishermen *of the south*

– They have migrated from Andhra Pradesh and speak Telugu, but understand Oriya. Their Oriya is mixed with Telugu.

– They depend on marine resources and earn mainly by fishing from the sea. They are not well off.

– They live in fishermen's settlements very close to the coast.

– They are not education-conscious. Hardly any fisherman knows to read or

Continued on page 4)

A Letter from the Publisher

REACHING THE TARGET GROUP

In discussions about a new BOBP small-scale fisheries project to succeed the present one, the focal issue is how the technical development work reaches the target group — the small-scale fisher-folk. There are many examples of failure. The technology might just not have reached the target group; it may have benefited others or may not have worked at all. How can we do better?

— A prerequisite is that we have a technology that works and is appropriate for the target group. This ought to be obvious, but there are too many ideas launched as solutions without having been properly tested and tried out.

— The objective of helping small-scale fisherfolk must be kept in focus to prevent interference from other common objectives such as increased production or export. The objectives are not necessarily compatible, and influence development and introduction of technology in different ways.

— We must get to know the communities better (not so much in numbers but in qualitative terms) to facilitate appropriate technical development and proper identification and selection of beneficiaries. This could be done by activating and reorienting the extension services.

— Intended beneficiaries need to be motivated to take up new technologies. In most cases this can only be done through practical demonstrations of unequivocal advantages.

— The beneficiaries also need to be trained to utilize the technology. Institutional training courses may be required for certain subjects. But more impartant is in-service training over longer periods.

— Small-scale operators usually lack the capital for investment; credits must therefore be organized. These must be flexible to suit the particular technology with regard to size of loan, repayment schedules etc.

— Use should be made of licenses or other regulations, and incentives such as subsidies, to ensure fair income and ownership distribution among the members of the target group.

— We must be prepared for long term cooperation with the target group. The measures required are not arranged overnight and they need time to show impact.

An analysis in one of our village development activities showed that the target group consisted of four distinct segments.

* destitutes : widows, the sick, and the aged
* workers : families without assets, including working women
* workers/owners': families with some nets and/or "small craft
* owners :– families with production assets who hire workers for fishing (the segment may include also other well-off people).

A technical innovation. in fisheries, a new fishing method for instance, will not directly benefit the lowest in the social ladder i.e. the destitutes. It may create additional odd, job opportunities, but only welfare can bring about any significant improvement of their condition.

The upper "elite" group ought not to benefit. But it is often difficult to prevent this from happening. The financial status and the clout of its members make it easier for them than for others to pick up ideas, arrange finance, obtain permission, etc.

Those who can and should benefit from improved technology may be found in the two middle segments.

Reaching the target group is not an easy task. But given competence and dedication on the part of the various development agencies and workers concerned and some funds at their disposal, the target group is within reach.

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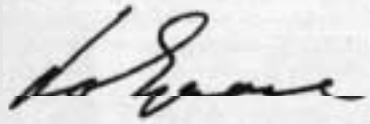

BAY OF BENGAL NEWS

BAY OF BENGAL NEWS is a quarterly publication of the Bay of Bengal Programme (BOBP).

The BOBP is a regional fisheries programme executed by the Food and Agriculture Organisation of the United Nations (FAO) and funded by the Swedish International Development Authority (SIDA) and the United Nations Development Programme (UNDP). It covers countries bordering the Bay of Bengal.

The BOBP's main aims are to develop, demonstrate and promote appropriate technologies and methodologies to improve the conditions of small-scale fisherfolk, and to assess and monitor fishery resources.

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Teachers of fisherfolk children at a seminar. Several seminars were organized to train the teachers and to review NFE material proposed *for the* children.

Orissa fisherfolk children — a first-rate performance!

(Continued from page 2)

write. Women are uneducated and do not like to send their daughters to school.

— Women very often take to the fish business and go out for other related trades.

— Men do not stay away from home for long periods on extended fishing trips. They fish only during the day, using log boats, kattumarams and masula boats. Fishing is undertaken directly from an open-extended beach.

— Women play a more important role in handling money matters and in household management. They take part in decision-making on all matters, even those related to fishery.

— They are more superstitious in matters concerning family life than those concerning fishery.

Objective and its rationale

Set against this background, the objective of the BOBP-initiated education project is :

— To integrate learning with the lives of fishermen;

— To help make the younger generation of the community aware of and aspire for the technological advances and sociological changes needed for a better tomorrow;

– To help them develop a personality free from superstition and blind conviction; and

— To equip them with the three R's for continuing education.

if these objectives are to be achieved, non-formal education, as part of a national policy for universalising education for children in the 6-14 age group, is the only answer. This will help combat illiteracy, unemployability and exploitability; it will prepare children to take part in the democratic process and to help remove poverty and inequality. Besides, learning being integrated with life, the child will take an active interest in education. As the programme advances, his aspirations for becoming a successful fisherman grow.

Curriculum and its contents

To facilitate a "learner-centred" education, a suitable fishery-related curriculum has been prepared and packaged in Oriya, the regional language.

1. The first package with three modules covered by 36 "capsules" or booklets is designed tc teach basic concepts, basic letters, words and numbers. Each "capsule" begins with a story, called the episode. It is drawn from a real life situation and is set in the child's living environment — the trees, the sun, the sky, the ocean, the moon, the lunar effects, the fishing trips, the crafts and gear the fishermen use, etc. These episodes, together with the questions, both open and closed, help

— in gearing the child toward a systematic non-formal education/approach;

— in making the children articulate their own experiences and express their ideas in the language we expect them to develop;

– in correcting regional dialectical variations; and
– in making the children understand regional characteristics and variations concerning fisheries and fishermen in Orissa.

To facilitate learning of the alphabet, methods of analysis and synthesis are applied and picture illustrations used. Reading and writing exercises follow. The child learns to read and write the language without much strain.

2. The second package deals with socio-cultural and socio-economic aspects. It highlights the blind beliefs, family disorders, social evils, and exploitative relations that prevail in the fishermen's society through three modules – "Festivals, practices and beliefs", "Our family life" and "Our society".

This package is important for development of a child's personality. Episodes drawn from real life are presented with the problems and their desirable solutions in their macro-didactic structure. When the child goes through these episodes, he becomes conscious about prevailing social evils and understands the cause of his low profile and status in the larger context of society. But more important are the micro-didactic arrangements evident in the questions that follow each episode. The learner-oriented questions for each problem set in the episode are thrown up for group discussion. The learner is expected to forward his opinion on the problems and suggest alternative solutions. Thereafter he is required to expound how he will react to a similar situation in real life. This method covers various domains of learning, such as pragmatic components (behaviour and linguistic skills and abilities), normative components (attitudes and values) and the transfer components required to, analyse traditional structures critically and the readiness and ability to change and improve them.

Classes *in* progress *at* a ***NFE*** centre. Below Consultant Namita Ray (at left, bespectacled) toured *fishing* communities to *gain* first-hand *knowledge.*

3. The last package "oceanography" is meant to develop the child's scientific perception on marine environment, marine products and fish vis-a-vis the fishing technique. Facts based on scientific truth analysed in the package go a long way in helping the child think rationally and scientifically about his beliefs, his perception of nature and marine environment. The oceanography package comprises 31 capsules or booklets under five modules – "Aquatic environment and ecology", "Primary production", "Climate and currents", "Life history of some marine species" and "fishing methods".

learner's level of competence

With the study of the last package the child completes his or her education up to the primary level. The level of competence will be on par with that of a child passing out of a formal primary school – a statement based on facts drawn from actual evaluation. This is because subjects like arithmetic, science and sociology that are relevant to life are integrated in each capsule.

This produces a better impact on the child's learning capacity.

Non-formal education centres and training of facilitators

The idea of a specially prepared non-formal education package for fisherfolk children through BOBP's extension scheme was accepted unequivocally by all. The SCERT, whose limited resources did not permit a special NFE package for marine fisherfolk children, was happy with its new project partner and extended whole-hearted cooperation. Similar was the encouragement from the state department of fisheries. It played a key role in identifying and setting up NFE centres in the fishermen's settlements. The involvement of fishermen in the localities identified was spectacular. The scheme raised great hopes in them; and though poor, they contributed to the scheme by providing shelter for the facilitators and sheds for running the non-formal centres.

Twenty experimental non-formal primary centres in the four coastal districts started operating from early 1984. Learning materials were introduced. The fisherfolk children were delighted with the colour pictures in the booklets. Those concerned with the project are grateful to SIDA for making the paper available and to UNICEF for funding the printing. The demand for admission made the organizers raise the limit of 25 students per centre to 30. Besides, 20 additional centres were opened in other settlements in December, 1984.

Facilitators and their training

The "facilitators" are the teachers at non-formal centres. They are the key persons to handle the learning materials on the one hand and the students on the other. Ideally they should be from the fishing community but because of the dearth of educated people in the community, they are not. The facilitators are usually undergraduates; briefing and orientation courses for them are held at quarterly seminars. Being untrained and having very little knowledge about fishermen and fishery-related subjects, they need rigorous didactic training. That is done for 4-5 days during these seminars.

Problems with the facilitators

The facilitators appointed by the Department of Education, Orissa, receive an annual salary of Rs. 1,260 (about US $ 100 per annum). Very often, they leave for better-paid jobs elsewhere. Besides, the non-availability of facilitators from among fisherfolk of the locality poses a problem. Frequent changes among the teachers/facilitators hamper progress and reduce student attendance. In remote areas, not easily approachable, this problem is even more acute. Unless something is done to raise the facilitators' salary or give them some other compensation, the project may not be as effective as we expect.

Evaluation and examinations

To assess the applicability of the learning material and its effect on teaching, self-evaluation exercises are carried out for each capsule by the facilitators. Their evaluation report discusses the relevance of the episodes to real life, the learners' experience, average attendance, average time required for teaching the capsule, percentage of questions answered, percentage of students that participated in the discussion and that learned alphabets! numbers easily. These reports are compiled, reviewed and analysed at periodic seminars.

For assessing the students' level of attainmerct, examinations were conducted3or the 20 centres operated from the beginning of 1984 on the basis of a standardised test for Class-I. The examination results have been discussed earlier in the article.

As pointed out by Dr Dash, Director of SCERT, the coming together of Orissa's departments of education and fisheries through the BOBP-oriented project, has indeed provided an impetus to socio-economic change in the fisherfolk community of Orissa. The progress of the project should be a matter of interest not merely for Orissa but for fishing communities everywhere.

EXAMINATION RESULTS BY DISTRICT

Subject	District	Frequency distribution under different marks-groups					Total number appeared	Average marks	No. above 29% marks	Highest marks recorded
		0-29	30-44	44-59	60-69	70 & above				
Language	Balasore	17	25	52	73	123	296	66%	94%	88%
	Cuttack	4	3	2	11	27	47	70%	91%	95%
	Puri	3	7	10	13	46	79	71%	91%	98%
	Ganjam	4	3	2	9	43	61	74%	93%	99%
Total		28	38	66	106	245	483	70%	94%	99%
Environmental Studies	Balasore	7	4	7	15	262	295	81%	98%	100%
	Cuttack	1	1	3	0	42	47	80%	98%	100%
	Puri	2	3	5	9	59	78	77%	98%	100%
	Ganjam	0	1	2	1	54	58	83%	100%	100%
Total		10	9	17	25	417	478	80%	98%	100%
Arithmetic	Balasore	2	7	8	18	264	299	81%	99%	100%
	Cuttack	7	6	7	9	18	47	60%	85%	99%
	Puri	5	7	10	6	50	78	71%	94%	99%
	Ganjam	4	3	1	8	45	61	75%	93%	100%
Total		18	23	26	41	377	485	72%	95%	100%

Nutrition surveys in Andhra Pradesh, Tamil Nadu and Orissa

by Vanaja Ramprasad and Diana Tempelman

Following the recommendation of the World Fiheries Conference in Rome, July 1984, to promote the role of fisheries in alleviating undernutrition, the BOBP was requested to come forward with suggestions for action – hopefully, recommendations for nutrition intervention that would fit into ongoing fisheries extension projects.

Additional funds from NORAD – for a project titled "Nutrition and fisherfolk in the Bay of Bengal Region – enabled BOBP to first study the nutrition status of fisherfolk living in traditional coastal villages. Work preparation started during November 1984, with the assistance of an international nutrition consultant.

The nutritional well-being of people is influenced by a number of factors, ranging from direct food intake to hygiene conditions, to the general economic situation. To avoid duplication of work with health or social welfare departments, the WHO or other nutrition-oriented agencies, it was agreed that the BOBP would refrain from actions in connection with food supply or feeding programmes and instead concentrate on extension activities which would benefit the natritional status of fisherfolk.

The BOBP documentalist set out to prepare a compilation of all nutrition institutes, existing data reports and ongoing nutrition programmes in the east coast states of India. (Her report is to be published as a BOBP information document,) It was found that, though a lot of nutrition research had been undertaken, information on the nutritional status of fisherfolk was scarce.

Consequently, preparation started in April 1985 for a nutrition study of fisherfolk in Andhra Pradesh, Orissa and Tamil Nadu.

The objective of this study was :

- To collect data on the nutritional status of fisherfolk and to remove deficiencies highlighted by the initial investigation.
- To formulate recommendations for nutrition intervention.

BOBP recruited a national consultant to take charge of the nutrition study. A study frame was prepared together with the international consultant. The study was planned to take into consideration quantitative and qualitative aspects of the nutritional status of fisherfolk and that, as far as possible, in connection with the socioeconomic circumstances of the households.

Considering the funds/time and personnel available, the following was decided :

1. Two fishing villages in each state would be selected for investigation.
2. Quantitative information would be collected by means of a household census (nutritional status and socio-economic data).
3. For the qualitative information, a sample of 10-1 5% of the households in each village would be interviewed in depth.

Since women and children under five are considered the most vulnerable groups, their nutritional status is taken as indicative for the fisherfolk community as a whole. The nutritional status is determined by use of anthropometric measurements and clinical assessments of nutrient deficiencies in comparison with Indian standards and the WHO's nutrition standards. In the in-depth interviews, detailed investigation was undertaken of the actual food intake, food habits and beliefs, and the morbidity and parity patterns (illness patterns and number/spread of pregnancies).

At the time of writing, the Andhra Pradesh survey has just been completed and this data still awaits processing. The Tamil Nadu survey was undertaken earlier – a preliminary analysis is available.

Some findings of the Tamil Nadu survey :

- The mean heights and weights of children below five are lower than those reported for the whole of Tamil Nadu.
- Growth retardation (stunting) be-. comes more distinct from the age of 13 months.
- Both children and women suffer from vitamin and iron deficiencies (especially Vitamin A and Riboflavin)
- Large family size, sibling deaths and short intervals between birth are common features.
- Households with higher incomes don't necessarily show more or qualitatively better intake of food than those with lower income.

These findings have been forwarded to the Department of Fisheries and the Department of Health and Preventive medicine. Discussion has commenced with officials concerned on recommendations for nutrition intervention.

Anthropometric measurements (height and weight) were part of a nutrition study carried out in selected villages of Andhra Pradesh, Tamil Nadu and Orissa by *BOBP* investigators.

Brackishwater Aquaculture in Sri Lanka — Prospects and Problems

by P. Funegaard

Brackishwater aquaculture is practised in coastal areas where sea water mixes with fresh water, creating a special environment suitable for a few specialised species of shrimp and fish. In Sri Lanka, brackishwater areas cover 120,000 ha. According to official estimates, approximately 40,000 ha of these consist of shallow lagoons, tidal flats and mangroves suitable for aquaculture. (Some other estimates, however, cite lower figures).

While Sri Lanka has some of the infrastructure — such as facilities for transport and electric power — essential for the success of fish and shrimp culture, aquaculture and brackishwater aquaculture in particular are fairly new.

Modern aquaculture techniques were first introduced to Sri Lanka during the '50s by a Chinese expert, Dr S W Ling, who started the first experiment on milkfish (Chanos chanos) culture at Pitipana brackishwater research station. Pitipana is one of the two brackishwater research stations operated at present in the Ministry of Fisheries. The other is the two-year old station at Pambala near Chilaw. The Pambala station was meant to carry out culture experiments of different brackishwater fish species. The trials are yet to succeed because rearing ponds have been flooded by fresh water during the rainy season. The hatchery at Pambala now mainly produces freshwater prawns (Machrobrachium rosenbergii). These juvenile prawns are brought and cultured to marketable size by some small-scale farmers of the region.

The Pitipana station, which was strengthened and reactivated during the late '70s, now supplies about 10 private farmers in Negombo with milkfish juveniles. These private farmers produce approximately 600 kg/ha/year — a total of about 5 tonnes/year. But the production potential of milkfish farming remains enormous due to the availability of fry, estimated to be adequate for stocking over 10,000 ha of brackishwater ponds. (These fry are reared in just two weeks at the fishery station before distribution on private farmers). Culture trials have been carried out in ponds with Panaeiid shrimps since 1981 at the Pitipana station. Since 1984, BOBP has been assisting the station in hatchery techniques and pen culture trials (see box).

Besides the two brackishwater stations at Pitipana and Pambala, several private shrimp culture projects either operate or are under construction. These projects are mainly for culture of *P. monodon* (tiger prawn) in very intensive culture systems. They depend on hatchery-produced post larvae. The hatcheries in turn rely on the supply of spawners collected with trawlers.

The two important shrimp culture areas in Sri Lanka are situated on the west coast, from Negombo up to Puttalam, and on the east coast in the lagoon areas around Batticaloa. One of the new projects on the west coast — it will

BOBP project for coastal aquacukure in Sri Lanka

In 1984, a pilot project "Development and demonstration of Coastal Aquaculture Techniques in Sri Lanka" was launched by the BOBP and the Ministry of Fisheries. The purpose was to evolve and demonstrate some locally suitable techniques of brackishwater shrimp culture relating to hatchery management and pen culture (See Bay *of* Bengal News, December 1984, pages 8 - 9).

The pen culture trials at Pitipana, where juvenile shrimp are stocked in a water area enclosed by net material, have shown mixed results. Reasons can be that the soil is too acid and the current too strong. But as a technique, pen culture is simple and cheap, and BOBP will therefore set up new culture trials in Puttalam and Koggala lagoons during 1985. The Ministry of Fisheries has also carried out a pen culture trial of milk fish in Puttalam lagoon.

The hatchery has been successful in demonstrating a simple hatchery technique and in producing post larvae continuously. The maximum production capacity is about 800,000 post larvae (PL) per month, attained if the supply of mature shrimp is sufficient.

soon start operating – is the Andriesz Maw culture farm north of Chilaw. A hatchery has been constructed with an approximate capacity of 8 million P. monodon post larvae per month, and a 5 ha pond area is scheduled for stocking by October 1985. It is to be extended to 35 ha.

Some private shrimp culture projects have also been set up on the west coast. One of them, run by a company called Aquatec, is located near the Puttalam lagoon. Five one-hectare ponds will soon be stocked with *P. semisulcatus* and *P. merguiensis.* These species are not so valuable as *P. monodon,* but seeds of these are abundant in the lagoon and will be collected by locally employed seed collectors. Mr Van Culenburg, who owns this company, is trying to develop a simple culture technique which does not need much capital input.

On the east coast are two pond complexes: a 200 ha pond farm is in use and a 400 ha farm is under construction. The 200 ha pond complex, built two years ago by Serendib Sea Foods Ltd., was the first private company to start intensive pond culture of marine shrimp in the country. It is one of Asia's largest shrimp farms. The stocking rate is 60,000 PLJha and shrimp grow up to 40 g in individual weight. The growth rate is said to be very good. No published figures are available concerning production; indications are that it exceeds 2,000 kg/ha/year.

To supply the pond complex with shrimp post larvae, Serendib has constructed a hatchery near Negombo on the west coast. This hatchery is said to have a maximum production capacity of 4 million post larvae per month. Yet Serendib imports shrimp larvae from Singapore to feed its east coast pond complex, so the hatchery is obviously not in full production. Likewise, the Lever Brothers import post larvae from Singapore to supply their 30 ha pond complex south of Chilaw – though they have their own hatchery south of Colombo.

Some basic problems with the expanding industry:

– The hatcheries on the west coast are competing for scarce *P. monodon* seed. Fishermen• from the West Coast who are trawling for shrimp have increased their price for live specimens from Rs. 25 (US $ 1) to Rs. 125 (US $ 4) per piece, within a year (Sept. '84 to Sept. '85).
– Scarcity of spawners. Consequently, their price is shooting up.
– Some of the best culture sites on the northern and eastern part of the island may be difficult to utilize for some time because of the current situation there.
– The reported closing of the barmouth of several lagoons by siltation.

However, these problems have not deterred other private enterpreneurs from constructing shrimp farms on the West Coast. The large private projects already in operation are partly owned by foreign companies. They have received incentives from the ExDort Development Board to export shrimp and earn foreign exchange.

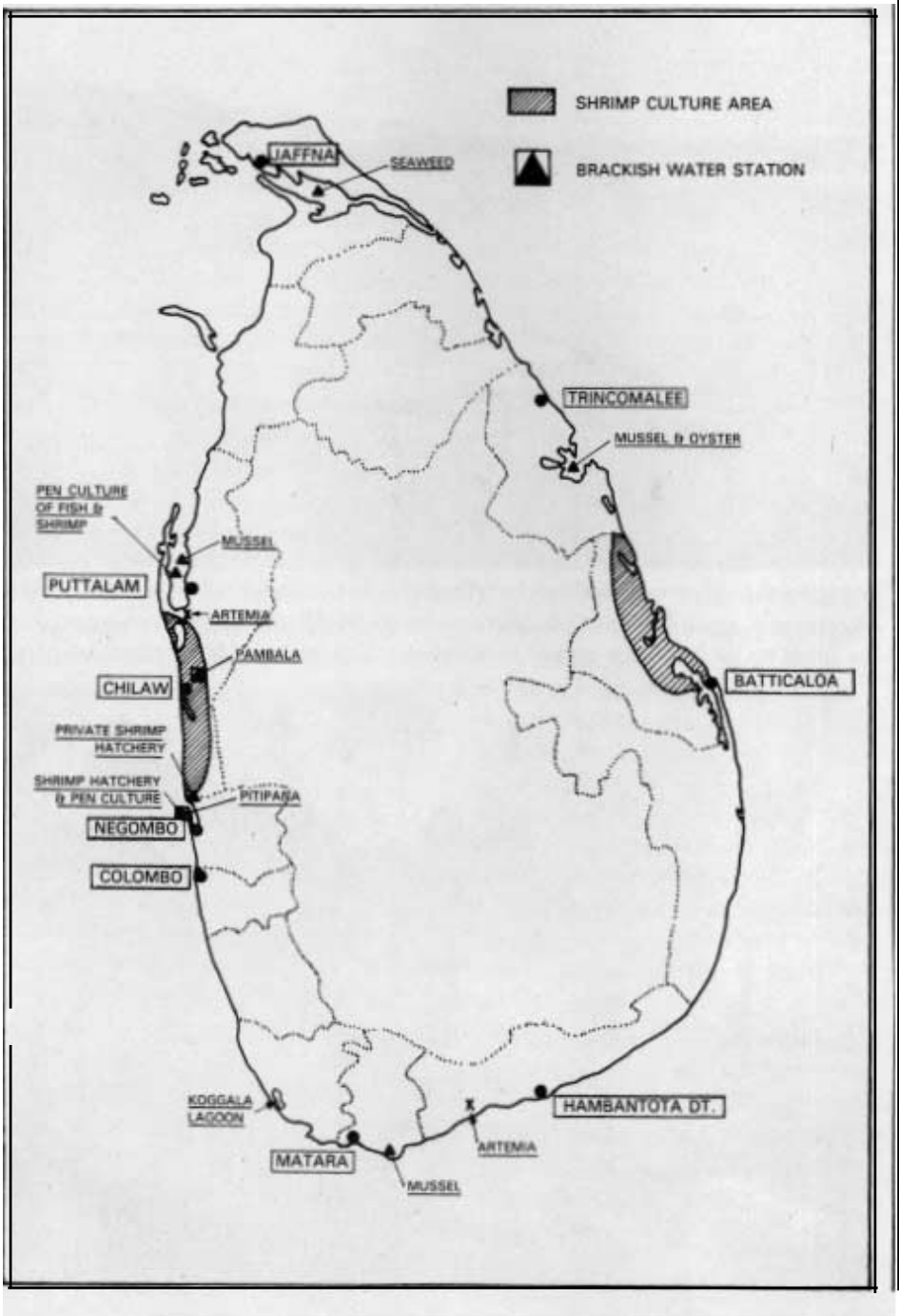
Research

Various research institutes in Sri Lanka carry out studies on coastal aquaculture.

NARA (National Aquatic Resources Agency), established in 1981, is identifying aquatic organisms like seaweeds and cockles, suitable for culture along Sri Lanka's coastline. Scientists from the Universities of Sri Lanka have also carried out studies and surveys to investigate future culturable species. This research work has shown that seaweed, mussel and oyster could be cultured in many lagoons, specially in the northern districts. The studies on AFtemia (brine shrimp), a well known

Transport to the pen culture project at Pitipana is by the traditional Oru. Below : Pen erection at Koggala lagoon, Galle district where a BOBP-assisted pen culture project has come up for freshwater prawn. Facing page : a spawner for the Pitipana hatchery.

Newly *constructed outdoor collapsible pools for nursery rearing of shrimp* postlarvae.
Below: Sri Lanka — brackishwater aquaculture map.



feed organism for shrimp and fish farmers, indicate that culture of Artemia could be carried out in more than 2000 ha of ponds already used for salt production.

The Artemia Cysts, which are possible to produce without interrupting salt production, can help Sri Lanka's aquaculture programme : the excess if any can be processed and exported to Indonesia, Thailand and Philippines. Adult Artemia has been proved to be a suitable feed for juvenile shrimp; it can also be used to strengthen protein content in human food.

Several new activities have been planned for the future. Recently, a survey was made with the help of Japanese experts of the siltation taking place in the barriiouth of ten lagoons. They concluded that this siltation could be stopped- after constructing dykes, digging channels etc. The constant opening of the barmouth will keep lagoohs saline enough for coastal aquaculture activities.

A major Asian Development Bank project to finance aquaculture activities in Sri Lanka will come up in 1986. The project will focus on:

- Construction of a fully equipped National Inland Fisheries Development Centre;
- Construction of a shrimp hatchery to produce 20 million marine shrimp post larvae annually;
- Brackishwater demonstration ponds and pens;
- Construction of a small number of commercial brackishwater ponds to be stocked with hatchery-produced shrimp post larvae and milkfish;
- 200 ha pond area with 5 ha ponds.

The project will have a duration of six years and involve 5000 inland farmers and 200 marine shrimp farmers.

The recent boom in large-scale coastal aquaculture development in Sri Lanka augurs well for the future, since the infrastructure for aquaculture exists and suitable sites are available. Some basic problems have cropped up, as described earlier in this article. The large private companies are surmounting these problems by buying know-how, equipment and supplies from abroad for hatcheries and pond culture of shrimp. Small-scale farmers however do not have the funds. A strategy has to be formulated to benefit small-scale farmers also.

Fishery Resources Research in the Bay of Bengal
A factsheet on the Maldives

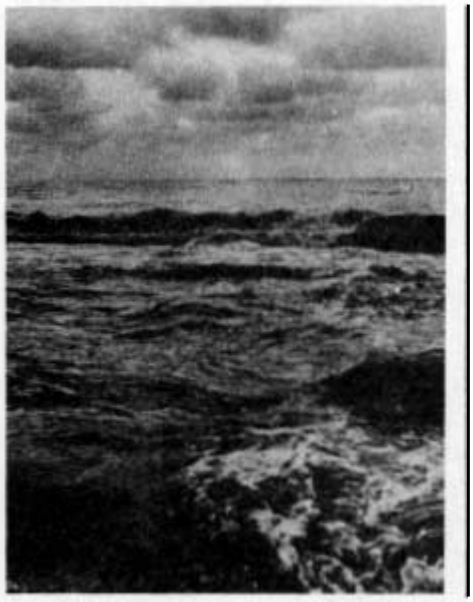
The September 1985 Bay of Bengal News *carried an overview of marine fishery resources research in the Bay of Bengal region. We begin with this issue a series of individual country factsheets on the subject. Maldives is the first in the series.*

1. *Resources surveys and exploratory fishing:*

Resources surveys are of recent origin in the Maldives. The first survey was carried out only in 1982 by the Research Vessel KK PETALING. It was a bottom trawling survey for shrimps. In August 1983 RN Dr. FRIDJOF NANSEN conducted acoustic and trawling surveys.

2. *Fishery Statistics:*

The Ministry of Fisheries maintains islandwise catch/effort statistics based on number of trips, total catch and species composition. Since 1984, when an FAQ technical cooperation project on "Development of Extension Services and Training" was established, data collection has become more elaborate. There is a proposal for mechanised data processing.



3. *Marine fishery resources research facilities:*

A research institute was established in Male in 1983. Its research emphasis is on fish aggregating decvices and tuna sampling. It is also partly responsible for activities covering economic analyses, and for preparing an inventory of existing fisheries. Future action needed concerns strengthening these areas and initiating research on resource surveys, environmental studies, stock assessment and detailed biological studies. Manpower planning would be essential for this purpose.

Table 1 : Resources surveys and exploratory fishing

Period	Vessel	Type of Survey	Limitation	Remarks
April-July'82	K K Petaling	Bottom Trawl Shrimp	Upto 40 m	Minimum depth 5m
August'83	Dr Fridtjof Nansen	Acoustic and Trawl	Suitable ground between atolls	Very special conditions make the use of large survey vessel difficult.

Table 2 : Statistics : Review of present system for marine fisheries

Institute	System used	Collectors of basic data : type, number	Processing place/ method	Species	Effort	Value	Regular publications; Remarks
Ministry of Fisheries	Total enumeration; standard form revised after TCP project	Enumeration on every island	Male (Ministry of Fisheries). By hand	6 groups revised to 9 groups in 1984	4 gear/vessel categories and various gear categories in 1984	Yes	Stencilled Report

Table 3 : Marine fishery resources research facilities

Institute	Location	Type of resources research	Biologists	Gear	Acoustic	Coverage	Research Vessel	Remarks/ Publications
Ministry of Fisheries	Male	Fish attracting devices; Tuna sampling	3	—	—	— Inventory of fisheries — Fishery statistics — Tuna sampling — Studies on FADs	None	No publication. TCP project assistance; A Research Institute opened in Male, 1983

Problems of Tuna Stock Assessment in the Maldives

by Charles Anderson and Ahamed Hafiz

The BOBP's Marine Fishery Resource Management project aims at improving the practice of fishery resources assessment among participating countries and at stimulating joint assessment and management activities between countries sharing fish stocks. As part of this project, investigations are being encouraged into the status of stocks of skipjack tuna (Katsuwonus pelamis) and yellowfin tuna Thunnus albecares), which are assumed to be shared by India, Sri Lanka and the Maldives.

In the Maldives, skipjack and yellowfin are of particular importance, contributing over 75% of the recorded catch. As a first start to stock assessment of these tunas, one of the simplest types of models available — that of surplus production (more commonly known as the Maximum Sustainable Yield or MSY approach) — was tried out with little success, No meaningful results were obtained using available Sri Lankan data, or yellowfin data from the Maldives. For Maldives skipjack an MSY of about 19,000 — 20,000 MT per year was estimated (the average annual catch is already about this level.) However, even in this case the results were not statistically significant. There are two main reasons for the lack of success with the MSY approach.

First, the available data is inadequate. A fourteen year time series of catch and effort data is available, but there are problems with interpreting the effort data. Mechanization of traditional masdhoni has, for some species at least, greatly changed the pattern of fishing, and created difficulties in standardizing fishing effort. This is particularly noticeable in the case of yellowfin, for which boats now travel much further out into the ocean than they ever did before. Also, the fishery for yellowfin is to some extent directed, but it is not possible to resolve the different components of effort. Furthermore, masdhonis are live bait pole and line vessels, and the only measure of effort available is the boat day. This fails to take account of variations in bait abundance, which can greatly influence tuna catches by affecting both the time and, of course, the amount of bait available, for tuna fishing.

The second reason for the lack of success of the MSY approach is that the models themselves are inadequate. The

species under consideration, skipjack and yellowfin, are both widespread and highly migratory. As such, they are subject to fishing pressure elsewhere in their ranges, which the simple, local models fail to take into account. With the recent rapid expansion of tuna fisheries by other Indian Ocean countries, this is no longer a trivial matter. On the other hand, however, expansion of the local fisheries of India, Sri Lanka and Maldives into previously unexploited parts of their EEZ s might still allow increased catches to be made on a sustainable basis. Nobody knows.

Another approach to fish stock assessment is the length frequency analysis using the ELEFAN package of computer programes (see Daniel Pauly's article in *Bay of Bengal News,* December 1984). The beauty of this technique is the simplicity of its data requirements. All that is really needed is a series of monthly samples of a few hundred fish lengths. These are analysed for modal progression (increases in peak lengths from month to month) in order to estimate growth rates. Using this information, and the combined length frequency data set, it is then possible to estimate mortality rates and an index of exploitation (the ratio between natural mortality and fishing mortality).

But the length frequency analysis approach presents problems when you try to use it in the Maldives. A major problem is the highly migratory nature of tuna. In the case of yellowfin, the surface pole and line fishery samples only juvenile fish, up to about 60 cm in length. But this species grows to about 180 cm. As the fish grow they move southwards and into deeper water, where they are not available to the local pole and line fleet. Length frequency samples of the Maldivian yellowfin catch are therefore highly biased, in that they contain virtually no large fish. As a result mortality and exploitation ratio estimates are highly suspect. Length frequency sampling of Maldivian skipjack catches illustrates another problem. Several consecutive months' samples may have the same peak length. ELEFAN can interpret this as meaning that the skipjack population sampled has shown no growth over the sampling period. However, what really seems to be happening is that the skipjack population is continually moving past the sampling point Only fish of a particular size (age) are being sampled. As a result, the whole ELEFAN approach is invalid.

It is clear then that the only two models for which suitable data are available tor indeed are likely to be available in the near future) are inadequate for assessment of Maldivian tuna stocks. A more international approach is required. It is necessary to have a much clearer idea of the biology of skipjack and yellowfin tunas in the Indian Ocean as a whole. More must be found out about the details of their migrations; spawning times and areas must be identified; realistic estimates of parameters such as growth and natural mortality must be made. It is also important to recognize the truly dynamic nature of tuna stocks and not be distracted by the static picture given by 'average' data. Because tuna are now being fished in rapidly increasing quantities throughout the Indian Ocean, stock assessment must be conducted on a similar scale. For one country to perform stock assessment analyses on its domestic tuna fishery data alone will become increasingly meaningless. Nevertheless, all good fisheries research must start at home. In this respect the BOBP's support for local stock assessment efforts is both timely and valuable, providing a sound basis from which to enter the wider international arena in the future.

The difficulties should not be underestimated. To give but one example, the massive skipjack program recently concluded by the South Pacific Commission gives an idea of the scale of the research effort needed. However, for the Maldives, which is the only country in the Indian Ocean with a traditional tuna fishery of any site (talking now in terms of centuries raTher than just decades), and in which tuna fishing still provides the major source of employment and export earnings, the potential benefits cannot but outweigh the undoubted problems.

Maldivian masdhonis *unload good catches of skipjack and yellowfin on to a freezer vessel. Facing page:* Masdhonis *line up, waiting to unload catch.*

Experts Discuss Resources Management

Under the auspices of **BOBP's** project "Marine fishery resources management in the Bay of Bengal, " funded by UNDP, several studies, workshops and meetings have been held in recent months. Presented here are glimpses into these activities.

Mackerels in the Malacca Straits — study tours to improve sampling system

Indonesia, Malaysia and Thailand are jointly conducting a study of mackerels of the Malacca straits.

As part of this activity a two-week study tour of the three countries was organised by the project from May 19 for two participants from each country. The idea was that the participants should observe the mackerel fishery and the sampling systems in other countries: identify shortcomings in sampling techniques in their own country; discuss ways of ensuring that the sampling is conducted according to agreed standards, so that the study findings are compatible and comparable; and discuss common problems.

The participants visited leading fishing centres, observed sampling demonstrations, and held meetings in each country.

Taking part in the study tour were Mr. M.K. Sumantri and Mr. Isman of Indonesia; Mr. Lui Yean Pong and Mrs. Chee P. Haik Eay of Malaysia; Mr. Veera Boonraksa and Mr. Kavi Saranakomkul of Thailand. Participants in the study tour at the national level were Dr. Dikdik Sodikin, Mr. Gomal H. Tampubolon and Mr. Suroso (Indonesia); Mr. M. Selvarajah and Mr. Mansor Mat Isa (Malaysia); and Mr. Udom Bhatia, Mr. T. Piroh and Mr. Somsak Chullusorn (Thailand).

Mackerels in the Malacca Strait — Working Group meeting

Participants from Thailand, Malaysia and Indonesia discussed progress in mackerel investigations in the Malacca Straits subsequent to the first working group meeting (Penang, December 1983) at a meeting in Colombo, October 4-9. They identified aspects that need further investigation and recommended a work plan for it.

The production of scads and chub mackerels has increased in recent years in all three countries. Sustainable yield levels appear to have changed more significantly in Malaysia, with the high rate of increase in annual production during the past few years, particularly in the bottom trawl fishery. However the production of all four species appears to indicate very high levels of exploitation.

Malaysia continued to maintain its very high level of production compared to that of Thailand and Indonesia. New information was evident on growth parameters, spawning, movement patterns, and depth-wise distribution. However, many of these trends have to be confirmed, and necessary follow-up activities were discussed and agreed upon.

The participants included Mr. Udom Bhatia and Mr.Piroh Suthakorn from Thailand, Mr. Mansor Mat Isa and Mr. A.A. Bin Nuruddin from Malaysia, and Mr. Gomal H. Tempubolon and Mr. I.G.S. Merta from Indonesia.

Workshop on fisheries statistics and sampling techniques in Sri Lanka

The workshop was initially meant for junior scientific officers and research assistants taking part in the tuna research programme. However, in view of the interest and encouragement shown by the Ministry of Fisheries, the workshop was widened to cover all aspects of fisheries statistics and sampling in Sri Lanka.

Nineteen officers from NARA and eleven from the Ministry of Fisheries took part in the workshop, held from September 2 through 4.

The objectives were to

- discuss existing fisheries statistical systems and sampling programmes adopted by NARA and the Ministry of Fisheries;
- Identify shortcomings and needed improvements and recommend measures to achieve them;
- help junior scientific officers of NARA and officers of the Ministry's statistics division to get more familiar with sampling techniques and statistics collection methods in fisheries.

Senior officers dealing with each aspect led the discussions. The workshop recommended a fisheries census, fewer forms for field use and better forms. Possibilities of using 'BOBFINS'. a fisheries statistics program developed by the project, were demonstrated to the participants. It is earnestly hoped that the recommendations will be implemented.

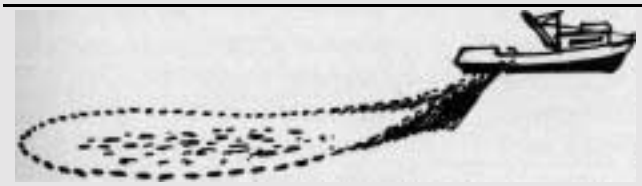
Tunas in the Andaman Sea — Working Group meeting

This meeting was held in Colombo on October 10 and 11. Biologists from Thailand and Indonesia participated. The

objectives were to review the available information, assess the status of tuna fisheries in the area, identify limitations in knowledge of the biology and fisheries of the species, recommend a work plan for improving this knowledge and discuss the mode of implementing activities under the work plan.

At present, the eastern little tuna and the longtail tuna are the species commonly caught on the West Coast of Thailand, while skipjack, little tuna, frigate tuna and yellowfin tuna are the main species caught around the north and west coasts of Sumatra. Except for the troll fishery on the west coast of Sumatra, the purse seine fishery in both countries and Thailand's gillnet fisheries are directed towards a wide variety of pelagic species. The tuna fisheries in both areas are found inshore rather than offshore, and expansion of the, fisheries towards their common EEZ boundary is likely to result in the exploitation of shared stocks of skipjack, yellowfin and long tail tunas. A sampling programe which is to be executed in conjunction with that for the mackerel fishery was discussed and agreed upon.

Participants in the meeting were Mr I G Sedana Merta and Mr Gomal H Tampubolon (Indonesia), and Mr Udom Bhatia and Mr Piroh Suthakorn (Thailand):



Fishing log book system for purse seine fishery tried out in Sumatra

Another activity in connection with the study of mackerels in the Malacca Strait and tunas in the Andaman Sea is the preparation and distribution of about 600 copies of fishing log books to purse seiners operating along the north and east coasts of Sumatra. The log books were prepared with the help of Indonesian biologists participating in the study programme.

Each log book contains cyclostyled forms in which data relating to basic characteristics of craft and gear, and details of cost, operations and catch up to 50 trips per year, have to be filled up. It is expected that this data will help evaluate the performances of the P. seiners in terms of craft and gear sizes, catch rates, species caught, operational systems and economics of the fishery.

The log books were distributed around July 1985 to some 100 purse seiners picked at random. The biologists will check the entries during their monthly field visits to the area. It is expected that at least 40-50% of the forms will be filled in and returned. If the scheme is found to be successful, it may be expanded to cover other areas/countries.

Demersals in the southern part of Malacca Strait

Biologists from Malaysia and Indonesia met in Colombo October 2-3 to discuss the status of the demersal fishery in the southern part of the Malacca Strait, to identify common features and possible interaction between their fisheries, and to recommend suitable programmes for follow-up activities.

It was noted that on the Malaysian side, commercially valuable species do not seem to increase, but trash fish catches are increasing and have exceeded the catch of valuable species in recent years. The overall catch rates declined after 1978 but appear to have stabilized during 1980-1982. On the Indonesian side the production declined by 50% soon after the 1980 prohibition of bottom trawling in their waters, but production has now recovered to the 1979 level, The fish density also appears to have recovered considerably since the ban on trawling. The production levels may be close to the MSY on both sides of the Strait.

The production of demersals on the Malaysian side is more than twice that from the corresponding coastline on the Indonesian side. It was also noted that the trawl fishery on the Malaysian side contributes very significantly to the production of chub mackerels on the Malaysian side. Improvements in the assessment of finfish and shrimp resources were discussed and follow-up activities were planned. The use of numerous small types of gears on the Indonesian side, and the absence of effiiient methods of sampling such as bottom trawls, make comparison and standardization of fish effort more difficult.

The participants included Mr. Gomal H Tampubolon and Mr I G Sedana Merta from Indonesia and Mr Ahamed Adnan Bin Nuruddin and Mr Mansor Mat Isa from Malaysia.

Tunas in the EEZs of the Maldives and Sri Lanka — Working Group meeting

Biologists from the Maldives and Sri Lanka came together in Male October 26-29 to discuss the findings subsequent to their first meeting; identify gaps in knowledge and aspects that require future investigation; discuss problems in carrying out these investigations, and ways and means of overcoming them, and to chalk out a work plan for the immediate future.

Evidence indicated that the tunas within the presently exploited ranges around both countries are rather intensively fished, and that a significant increase in production may be possible only through expansion into the offshore ranges. The need for investigations before expansion was realised, and a proposal for a specific tuna survey up to about 100 miles from the shore was discussed. Information was presented on the seasonality of the fishery related to the two monsoons and the probable entry of small fish during these two seasons. Biological information was presented on skipjack and yellowfin tunas – mean lengths at maturity, gonad development, sex ratio, spawning, growth parameters, length at age, morphometric characters, etc. Probable migratory patterns were also discussed. On the basis of the results presented, a future work plan was discussed and agreed upon.

Participants at the meeting included Mr Hassan Maniku, Mr Ahamed Hafiz, Mr Charles Anderson and Mr Hassan Rasheed from the Maldives, and Mr Leslie Joseph, Mr C Amarasiri and Mr R Maldeniya from Sri Lanka.

Air-cooled vs water-cooled engines - which are more suitable for beachcraft?

by P A Hemminghyth

Since its inception six years ago, the BOBP concept for development of a beachlanding craft has always been the same — i.e. a flat bottom craft with a pivoting engine installation.

The pivoting engine box can briefly be described as an engine box installed in a well in the boat. The stern tube, propeller and rudder are part of the installation. By lifting the rudder stock the propeller and rudder retract into a recess provided in the boat. Propeller recess, the shaft tunnel and the engine well are flooded with sea water since they are open to the sea. (See figure). This system allows a rough landing on the beach after crossing the surf, since just before the craft bangs on to the beach, the helmsman lifts the rudder stock to prevent damage to propeller and rudder.

In India, the choice of a diesel engine for the pivoting engine box was based on three main considerations :

1. Weight of the engine
2. Cooling system
3. Local manufacture (because of import curbs and disincentives, such as heavy duties).

Air-cooled diesel engines are lighter than watercooled : an important point because the engine has to be light to enable manual handling of craft on the beach. Also since the craft's users are fishermen without a technical background it was decided to use air-cooled engines and avoid a technically complicated engine installation (i.e. no water-pump, v-belts, cooling pipes etc).

Trials showed that the adequate power for BOBP-designed BLCs was around 6-8 hp. Small marine diesel engines are not being manufactured in India; this resulted in a collaboration between BOBP and an engine manufacturer to marinize a tiller tractor engine.

Marinizing an engine means making it suitable for marine application, thus :

1. Use components that withstand the highly corrosive marine environment.
2. Make it suitable to take axial load (Propeller thrust).
3. Develop adequate stern gear (Propeller, shaft, tube shaft couplings etc.) corresponding to the engine power.
4. Ensure proper fuel system (fuel filter, water separator and fuel tank, throttle and starting arrangement).
5. Develop an engine box that ensures a proper running condition of the engine with sufficient air flow for combustion and cooling.

Trials provided feedback about parts not suited for marine use. Continuous improvements on the engine and other components, together with technical training of fishermen and mechanics, cut the "down time" to an acceptable level.

The development of beachlanding craft in Sri Lanka followed the same pattern as in India, but the crafts here were longer and heavier, to suit the surf conditions and fishing methods in Sri Lanka. A larger aircooled diesel engine (12.5 — 15 hp) had to be used. Problems with overheating proved that fitting a large-air-cooled diesel engine in a small closed box had its limitations because of lack of airflow for cooling. (In India, problems with engine overheating arose because of overrating i.e. too large a propeller, and not because of inadequate flow of cooling air to the engine).

Trials were then undertaken with a watercooled diesel engine fitted in the pivoting engine box. The type of water-cooling system used is called keel-cooling. The engine water jacket is filled with fresh water in a closed system. To cool the water in the system after it is heated up by the engine, water pipes containing the fresh water pass outside and underneath the hull of the boat. 4s the seawater is cold, the hot water in the pipe is cooled through heat exchange.

Fitting the cooling pipes under the bottom of a beachlanding craft is not possible as they will get damaged when the craft hits the beach. However, as mentioned initially, the engine box is mounted in a well flooded with seawater. The cooling pipes were therefore fitted to the underside of the engine box.

All over the world, water-cooled marine diesel engines are preferred to air-cooled engines. Use of water as cooling-medium ensures better control over the engine running temperature.

A year of trouble-free trials with the water-cooled engine tried out on the SRL14 beachcraft in Sri Lanka raised the question whether such an installation should be tried in India. It must be pointed out that while Sri Lanka does not manufacture marine diesel engines, it has no import curbs either. A well-proven water-cooled marine diesel engine suitable for the pivoting engine box was imported and installed. India has many engine manufacturers but none of them make lightweight marine diesel engines under 15 hp. The manufacturer of the 8 hp air-cooled tiller tractor engine also makes a 10 hp water-cooled engine for the same application. On the basis of the cooperation between BOBP and the manufacturer, it was decided to try out installing the 10 hp watercooled engine in the pivoting engine box.

Why it was decided to marinize a slightly bigger engine (from 8 to 10 hp) must be seen in the context of off-shore fishing trials of the IND 25 craft in Gopalpur, Orissa. The following points were noted :

1. Heavier load due to more and heavier type of gear;
2. Longer running time to and from the fishing ground.(4-6 hours);
3. Advantage of a power reserve in case of bad weather.

A rule of thumb in marine engineering is to reduce the propeller rpm (revolutions per minute) as much as possible. By doing so, a big size propeller can be used. Low rpm and big propeller diameter ensure the most effective and economic propulsion.

The 8HP air-cooled engine used has the advantage of a built-in 2 : 1 reduction; this eliminates the need of a reduction gearbox for bringing down the propeller rpm.

Unfortunately the water-cooled engine has no built-in reduction, so a reduction gearbox had to be attached. Relatively cheap, high reduction gearboxes for marine application are now being manufactured in India.

In February, a go-ahead was given for marinization of the water-cooled engine. While the engine installation was built in Madras by a private workshop, the craft was ordered from APFC in Kakinada. The craft was of the IND 20 type (fibreglass, 28 ft, lowered deck for maximum crew shelter). The offshore fishing trials were to take place off Uppada, Andhra Pradesh, and Inspector of Fisheries S.B. Sarma was deputed full time to BOBP to monitor the trials.

The trials started at the end'of July. They were interrupted for 14 days in September for craft modification and engine installation. During the period from July to September the craft had made 34 offshore fishing trials (beyond 15-20 miles offshore) and the results, technically as well as economically, were promising.

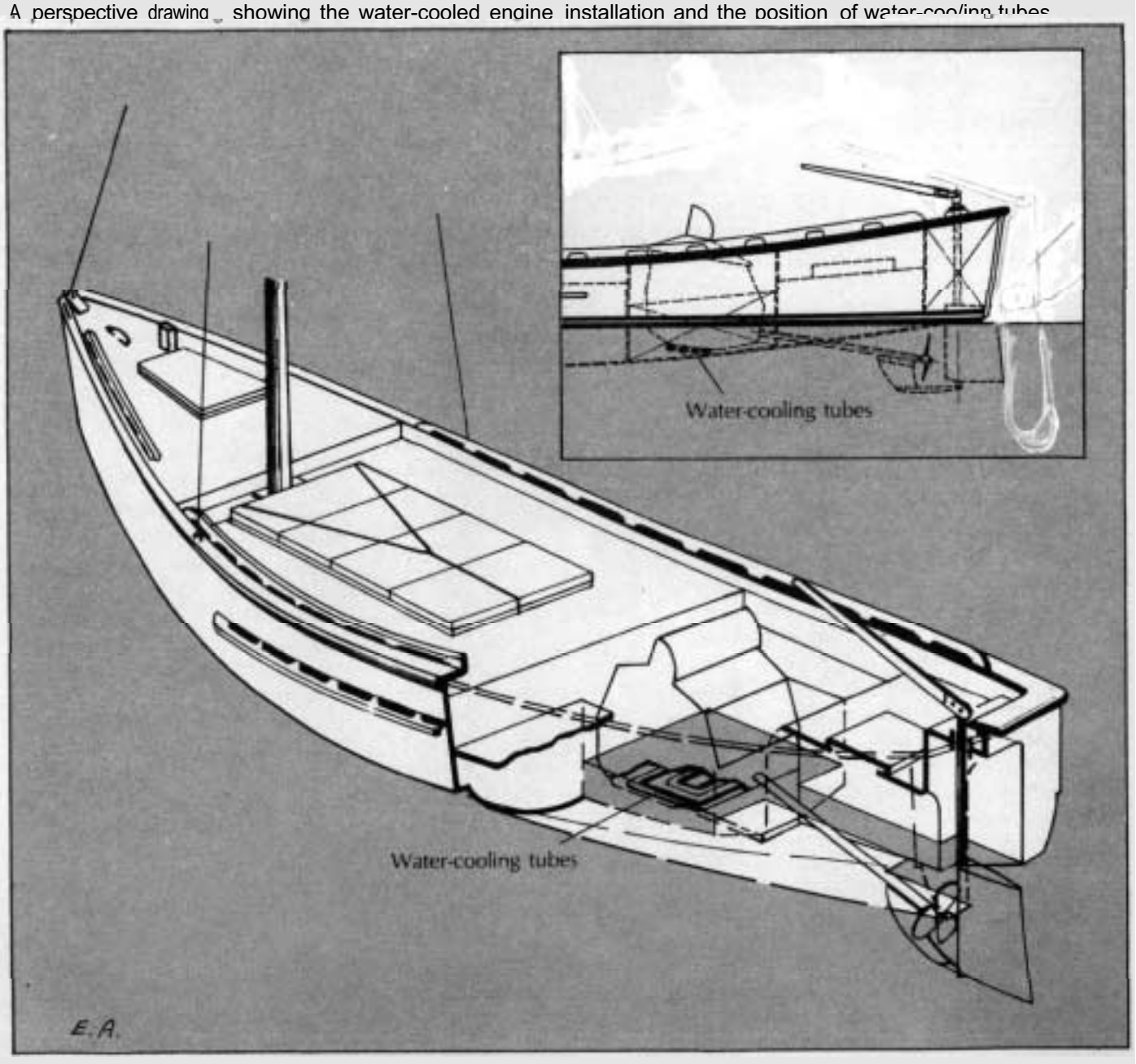
The water-cooled engine installation posed no problems, However, after 34 trips the cooling water pump wore out since it was not of the heavy duty type. A new heavy duty gear type water pump, obtained locally, was fitted. Further, the engine box was found to be too big and modifications were undertaken to make it more compact.

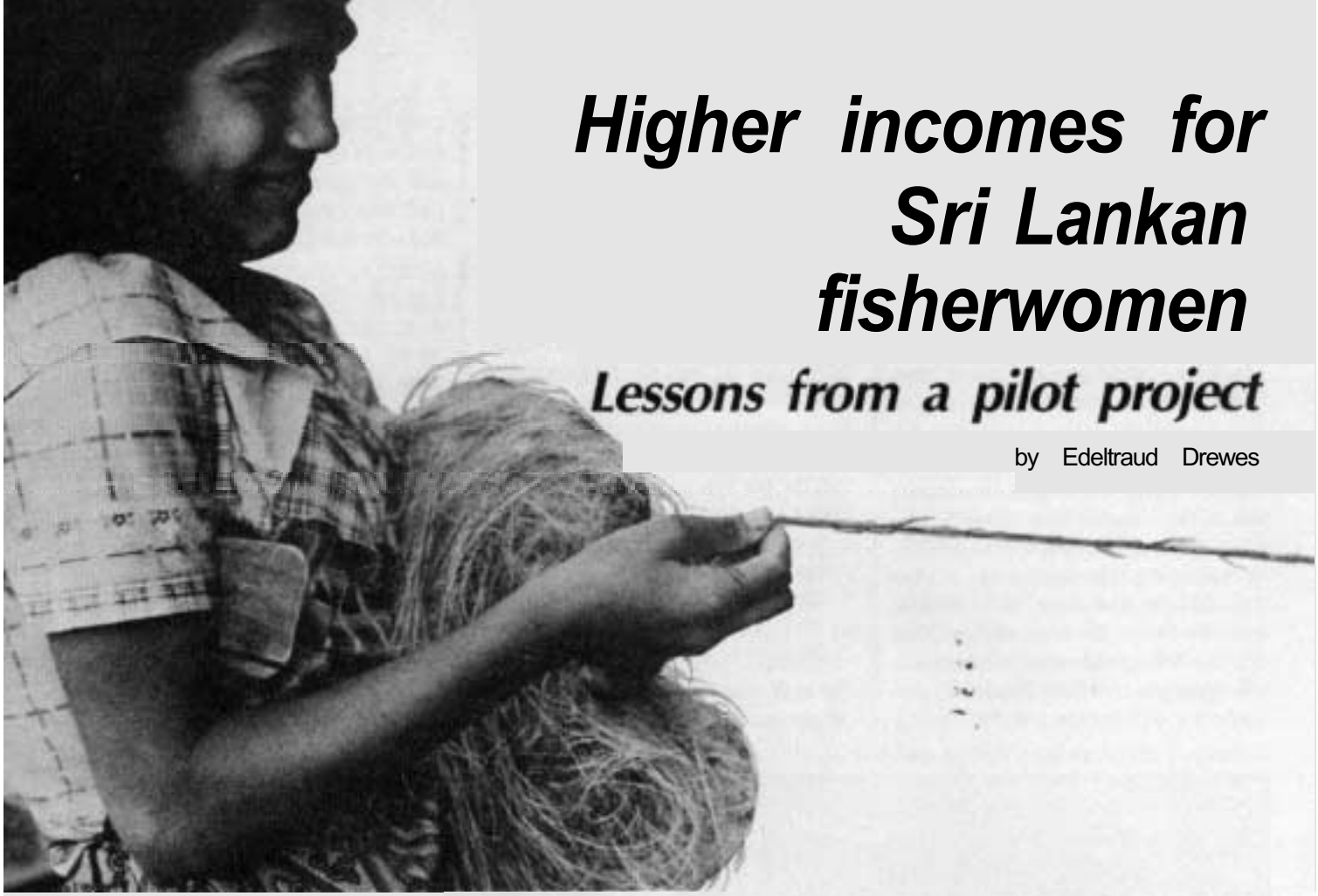
The craft operators, all fishing with the old version of IND 20 with the 8 hp air-cooled engine, exoressed confidence in the performance of the new craft and the water-cooled engine. Speed performance was 1.5 knots better than that with the 8 hp engine, but fuel consumption was the same. (High reduction gearbox + big propeller = economic propulsion).

As for costs the water-cooled engine (with gear box) costs Rs. 14,000, while the air-cooled engine costs Rs. 9,000.

It is too early to say whether the water-cooled engine installation is to be preferred for future beachlanding crafts in India. At least one year of trials is necessary. One should promote the water-cooled engine installation only after being very sure of its performance. Meanwhile, work is continuing on improving the performance of the 8 hp air cooled engine.

A perspective drawing showing the water-cooled engine installation and the position of water-cooling tubes





Higher incomes for Sri Lankan fisherwomen

Lessons from a pilot project

by Edeltraud Drewes

What is the best strategy to improve the economic conditions of coastal fisher-folk, bearing in mind that in low-income communities or families, women have to contribute to the families' incomes – and in certain cases even earn the main part of the income?

The BOBP's strategy has been to aim at both men and women, but new technologies concerning fish capture and culture have to be directed mainly at men. This is because women are not engaged in capture activities; as for culture activites, they are not a part of tradition and are still in the experimental stage. Fishery-related activities in Sri Lanka, such as sand sun-drying of certain fish varieties and small-scale fish vending, though in some areas carried out by women, were found to have too limited a scope for any viable technical imporvement.

As the economic conditions of low-income coastal families need to be improved by both male and female members, it became essential to identify areas in which women were engaged. A study was carried out; it was found that women from Sri Lankan coastal communities who need to work, engage to a great extent in coir processing. For coir-processing, women are either self-employed – working from their own yards and houses – or work for a wage in small-to-medium village-based private or state-owned industrial units. They also engage in a part-time basis in lace-making as a village home industry. It's these industries – rather than those related to fisheries – that had to be looked into for pushing up women's incomes.

Rather than develop and demonstrate new production technologies for coir/lace as it does for fisheries, BOBP decided to approach the problem of low earnings of coir processors and lace makers by improving their skills in production and product marketing, using existing technology. This consequently meant providing certain skill training.

For identifying the subject of training and for selecting possible locations and target groups, various institutions helped – the Ministry of Fisheries; the Ministry of Rural Industrial Development; the Women's Bureau; and the Lanka Mahila Samiti, a voluntary organization.

In 1982, a project proposal forwarded by the Ministry of Fisheries was finalized in cooperation with the BOBP. It concerned setting up three pilot training centres for:

a) coir processing in Ulhitiyawa, Chilaw district
b) lace fabrication in Kudawella, Hambantota district
c) tailoring in Mirissa, Matara district

Coordination of the three pilot projects was the responsibility of the Ministry of Fisheries (MINFISH). BOBP agreed to fund training equipment, training facilities and fees. Technical expertise was provided by the Ministry of Rural Industrial Development and the Lanka Mahila Samiti. From August 1982 until February 1983, twenty to thirty women underwent training in each centre, which was to a great extent restricted to production skills. The BOBP experience at each centre is outlined below.

Coir processing cenfre: Training was provided for 30 women in coir rope spinning. Most of them possessed skills in processing (combing) of raw fibre – they had earlier experience in it. It was assumed that coir rope spinning skills could push up their incomes. During

the course of the six-month training, however, it was found that the market demand for coir ropes had dropped, whereas the demand for combed and bundled raw coir fibre had gone up because of higher export orders. It was therefore decided to reorient the production-oriented training and emphasize practical marketing training, by setting up a product marketing and raw material supply centre. It was found only at this stage (due to short-comings in project identification — the training needs of women) that the main reason for low women's earnings was their dependence on middlemen for supply of raw materials and market outlets. Land and finance to set up a material storage shed were other constraints.

Initially planned mainly as a production skill centre, the training centre had by early 1984 been turned into a successful marketing-cum-production centre. Over the past one and half years it has drawn the interest of more and more women. Though the centre has served as a demonstration unit and has been visited by various people, the impact on other coastal villages has been limited. Reason : replicability depends on government extension support to coastal women and on government allotting a certain priority in its subsides programme to women's activities. (The coir centres require seed money as subsidy to set up a simple storage-cum-production shed).

Lace fabrication centre : Most women participating in the training did not possess lace-making skills, because they were mainly young girls (the target group of the Lanka Mahila Samiti) and because the pillow lace industry is dying out due to competition with machine-fabricated lace. It was assumed, however, that if adequate product marketing training and demonstration could be provided in addition to production skill training, earnings would go up.

During the six-month training course, emphasis was placed on production and to some extent on product verification. Marketing skill training could not be provided as the required expertise was lacking. This resulted in a rather negative pilot project demonstration effect trained women with under-utilized production skills. A few women have managed to get buyers for their products through middlemen.

Tailoring centre The tailoring centre differed from the other two centres in the matter of skills possessed by the women. As this occupation is generally restricted to towns and cities — where villagers buy garments, usually on festive occasions — none of the trainees possessed tailoring skills.

It was assumed that if set up in coastal Communities, such centres could supply village markets, thus offering women from these communities some new income opportunities.

Women *comb* coir *fibre at the* Ulhitiyawa centre.

Loading of coir ropes for transport to customers.

Twenty women were selected for the training, which aimed at covering both production and product marketing skills. This training period of six months proved to be too short and was extended by another six months. The idea was to demonstrate a functioning production and product marketing centre, similar to the coir centre. This, however, was a very ambitious task; considering the fact that a voluntary organization had been given the full responsibility for project implementation, technical expertise and funds were lacking to achieve the objectives.

What can be learned from the above approach to improve the economic conditions of coastal fisherfolk by pushing up women's earnings?

On coir production and lace-making, a crucial lesson learnt was that the emphasis should not be on production skill training. Reason most women who are compelled by economic need to contribute to family incomes, already possess some technical skills, handed over from mother to daughter. These cannot usually be upgraded unless they enter another industry or another line of production.

The coir centre succeeded as a demonstration unit because it focused on marketing training as well. However, the government should give thought to financial arrangements for a project on a wider scale, so that more women from coastal communities benefit. Otherwise, a demonstration centre will remain just that, instead of catalyzing further development.

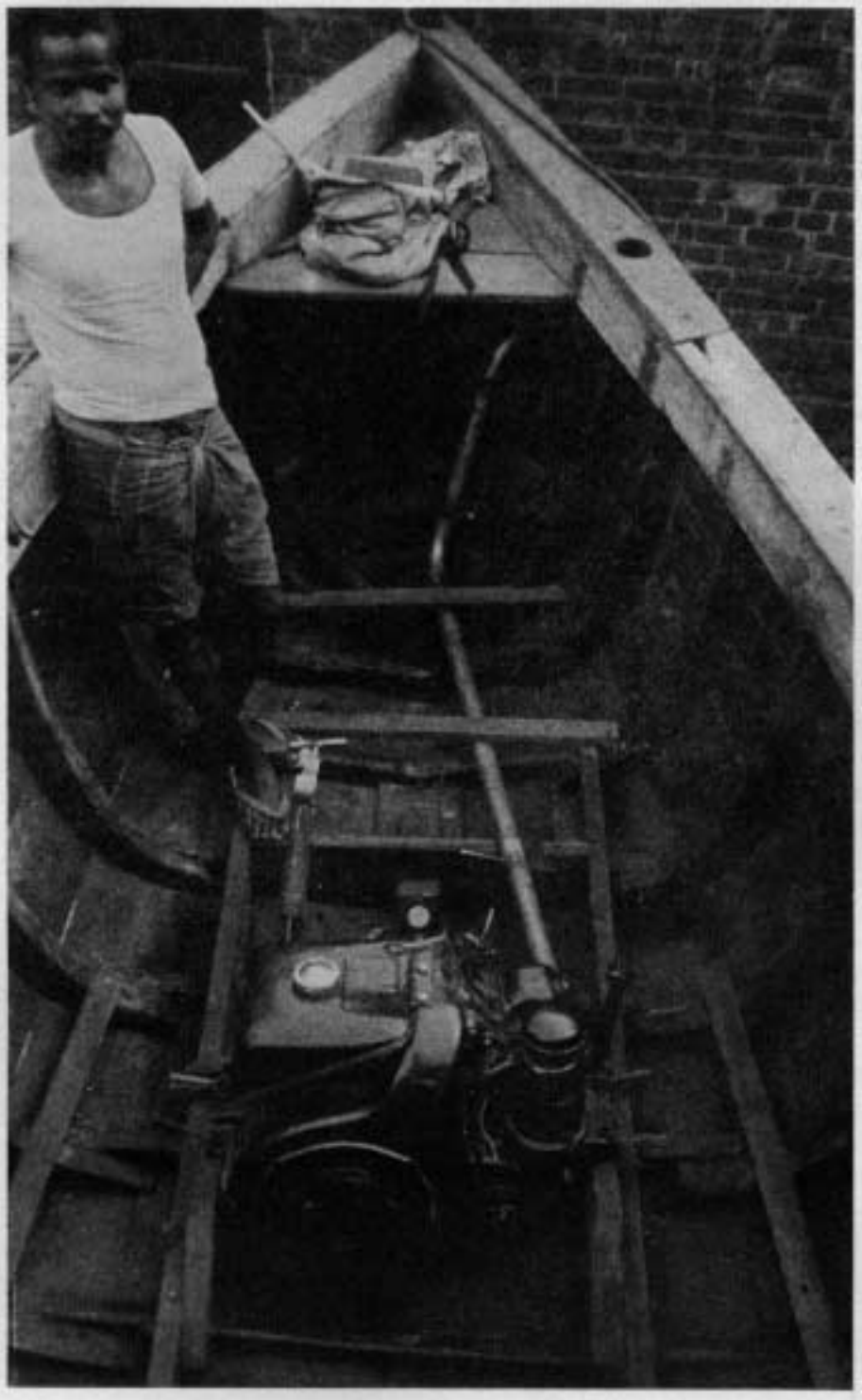
As for tailoring, most mothers do not possess tailoring skills. (In earlier days garment making did not require as much time or skill as it does now, with fashions changing from simply stitched lungis to fancy dresses, skirts and trousers). So there was a case for formal training in tailoring skills when the project started – particularly because a market for ready-made garments existed then. However, the problem that cropped up was that skilled trainers could not be attracted by village jobs and consequently the trainer recruited was herself insufficiently skilled. And setting up a commercial tailoring centre in the village to supply garments to the rural market nearby requires expertise in organization and sales management. (This is because a village-based centre has to compete with all the city-based tailoring centres and factories that have sprouted up over the past few years.) Such competence or experience is not available around the village.

Further training centres for other village-based industries should focus as much on marketing and sales management as on technical demonstrations, with arrangements for suitable follow-up to replicate and spread any beneficial impact on a wide scale.

Motorization of dhingies in Orissa

Will the traditional dhingy of Orissa (a double-ended carvel-built craft) yield higher catches and incomes if motorized? Executing a study for NORAD (Norwegian Agency for International Development), BOBP recently motorized four dhingies with 8 hp VST engines (modified, marinized and used on all BOBP beachcraft) at Kasafal, an hour's drive from Balasore.

The motorized dhingies will do test fishing for a year in cooperation with the fisheries department, which will assign an officer to monitor catch data for both motorized and non-motorized dhingies of the area. For engine repair and maintenance, two Balasore mechanics trained recently by BOBP at the VST factory in Bangalore are expected to be available.



Describing project work, Mr S O Johansen, BOBP naval architect (associate professional officer) says that a traditional dhingie was modified for the motorization experiment in September 1984. An engine and stern gear fabricated in Bangalore and Bombay arrived two months later and were fitted on to it. Initial technical trials made it clear that some boat modifications were necessary – a larger propeller for better speed; and a reverse reduction gearbox, so that the crew could, if and when necessary, stop the boat to prevent nets from getting entangled in the propeller.

Reverse reduction gearboxes were ordered from Bangalore, larger propellers from Bombay. By the time they arrived (July 1985), a new fishing season had commenced, and fishermen were reluctant to forego fishing and yield their boats for the motorization experiment. Eventually they yielded. Motorization of four boats was completed end-August 1985.

Further work may be needed on improving the engine installation and transmission, to prevent misalignment between the engine and the propeller shaft. Meanwhile, fishing trials with the motorized dhingies have begun, and the results are awaited with interest. Says Johansen "We hope the small hard-working fishing community of Kasafal benefit from motorization of country craft".

Left : One of the *four motorized* dhingies, now fishing at Kasafal *near* Balasore, *in* Orissa, India. Test fishing will go on for a year, as part of a study undertaken by the BOBP for *NORAD (Norwegian Agency for International Development).*

ABSTRACTS OF BOBP PUBLICATIONS

Abstracted here are BOBP publications out in recent months.

BOBP/REP/21 : Income-Earning Activities *for Women* from Fishing Communities in *Sri* Lanka. By Edeltraud Drewes. Madras, India, September, 1985.

How can women from fishing communities earn more money? This report describes the BOBP's efforts to improve the earnings of women in Sri Lanka through two pilot projects : coir production in Ulhitiyawa, sewing and tailoring in Mirissa. One of the lessons learnt was that in such activities technical skill training alone is not enough — because traditional skills in most areas are best learnt informally, passed on to daughters by mothers. It is necessary to sharpen management and marketing skills. Another way is to improve the access of women to production assets (such as coir looms, coir crushers), natural resources and raw materials.

BOBPIWPI36 : Marine Fishery *Resources of the Bay of Bengal. By K* Sivasubramaniam Colombo, Sri *Lanka, October, 1985.*

This paper attempts to summarize available knowledge, and identify gaps in that kowledge, on marine fisheries and fishery resources in the Bay of Bengal region. It covers Bangladesh, Burma, India, Indonesia, Maldives, Malaysia, Sri Lanka and Thailand, and provides information on their marine fisheries, fishery resources, the status of important stocks.

BOBP/WP/37 : A Review of the Biology and Fisheries *of Hilsa* Ilisha in *the Upper Bay of Bengal.* By B T Antony *Raja. Colombo,* Sri Lanka, October 7985.

This paper describes the Hilsa shad fishery in the upper Bay of Bengal (Bangladesh, Burma, and Orissa-West Bengal, India). It reviews current knowledge on the biology and fishery of Hilsa ilisha, sets out the findings of field observations, and makes recommendations on future work needed to understand better the nature of the stocks exploited in India and Bangladesh.

BOBP/WP/39 : The Organization of Fish Marketing *in* Madras Fishing Harbour. By *M* H Kalavathy. Madras, India, September 1985.

This paper describes the organization of fish marketing at a large fish landing centre, and describes in particular the role of women in the marketing of fish. (Previous studies conducted by BOBP had dealt with the role of women in fish marketing at small landing centres). The study indicated that while the modernization of fishing technology and fish transport noticed at a large landing centre has benefited some women by way of higher earnings or new earning opportunities, it has aggravated income disparities among fisherwomen.

BOBP/INF/8 Marine Small-Scale *Fisheries of Bangladesh : A General* Description. Madras, India, September, 1985.

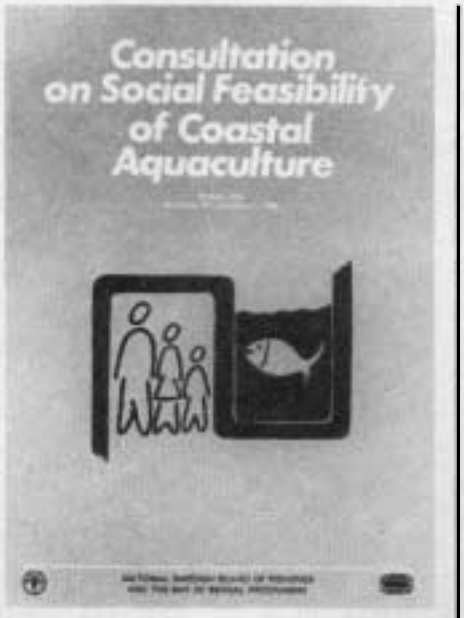
This document is a concise factual presentation of data on the main features of the marine small-scale fisheries of Bangladesh, prepared in cooperation with the Directorate of Fisheries, Bangladesh.

BOBP/MIS/2 : Consultation *on Social* Feasibility of Coastal Aquaculture. Madras, India, November 26 — December 7, 1984. Madras, India, November 1985. Rathindra Nath Roy. (Ed.)

This important paper is the outcome of a consultation organized jointly by the National Swedish Board of Fisheries and the Bay of Bengal Programme. Proposed at a BOBP advisory committee, the consultation grew out of the recognition that though technically and economically feasible methods of aquaculture could be evolved, their social feasibility is sometimes suspect. Further, some aquaculture projects have failed to meet the social equity and development needs of the very communities that they set out to help.

The consultation was organized around a keynote address (by Dr Ian R Smith, now Director General of ICLARM) and case-studies of four aquaculture projects — at Killai, and Chilka lake, India;

S.R. Madhu



Satkhira, Bangladesh; and Phang Nga, Thailand. (Three of these are BOBP-assisted projects). Thirty five experts from several countries who took part in the consultation pooled ideas, insights and experiences. Out of their discussion emerged ideas on techniques, strategies and instruments concerning the social feasibility of coastal aquaculture projects. These ideas are listed in the summary of the paper. "Development agencies may choose from this list those ideas and strategies that are appropriate from the standpoint of their policies, the countries they operate in, the projects they are concerned with, the communities they cater to."

BOBP/WP/41 : The *Demersal Fisheries* of Sri Lanka. By K Sivasubramaniam *and* R Maldeniya. Madras, India, December 1985.

The results of various demersal fishery surveys carried out in Sri Lanka in the past are reviewed in this paper. The current status of demersal stocks is also reassessed . The two exercises are a first step towards identifying development possibilities, management measures for demersal resources, and areas requiring future investigations.

The paper sets out conclusions about the most productive belt for valuable demersal resources, peak seasons, and the level of surplus yield. It suggests that the demersal fishery in the shelf area should be developed as a small-scale fishery, because rapid exploitation may destroy the resource. Development should be on an areawise basis, and capital investment based on surplus yield levels in each area. A combination of fishing methods will be needed to fish the entire exploitable potential in most areas. Besides the bottom trawl, passive methods should be encouraged.

The paper suggests regular systematic observations around the country to evaluate the status of demersal fishery, as-an essential part of the activities of NARA (the National Aquatic Resource Agency, Colombo\.

At the Madras fish harbour. Fish traders, men and women, *wait* for boats to land. (BOBP/WP/39)

BOBP TRIES OUT VIDEO –
Modest equipment, promising results

Bay of Bengal News has in a couple of earlier issues (June 1982, March 1985) discussed the potential of video as a development tool. The BOBP has since embarked on its own productions. Extension Training Officer Hans Dorresteijn (right) who worked earlier with a video farmer training project in Peru, has produced eight video films. Four of them describe BOBP activities concerning beachcraft, shrimp pen culture, non-formal education and women's extension. Four others are training films on engine maintenance.

Pen culture of shrimp at Killai : This 20-minute production provides glimpses into the fisherfolk community at Killai, Tamil Nadu, India, and the technology and the economics of BOBP-assisted pen culture operations.

Non-formal education, Tamil Nadu : This 15-minute film discusses the whys and hows of non-formal education for fisherfolk. It also describes the material prepared by BOBP staff, consultants and workshop participants for fisherfolk, their teachers and the trainers of these teachers.

Beachcraft development : Visually the most interesting of the lot, this film explains the concept, the progress, problems encountered and overcome, during the course of BOBP's extensive work on beachcraft development.

Fisherwomen's extension : This 15-minute film discusses the training imparted to selected Tamil Nadu fisherwomen by BOBP. It also gives an idea of how the trained fisherwomen function as "link workers" between their villages on the one hand, and government and welfare agencies on the other – thereby initiating several development activities that have benefited the villages.

The four *training films on engine maintenance* – part of a package that will also include pictorial manuals and practical demonstration – are in Telugu. They explain the principles of the engine and the engine installation used on BOBP beachcraft, why and how they should be maintained, and the working of the fuel system, the air system and the lubrication system.

Talking about these productions, producer Hans Dorresteijn, 34, says his personal favourite is the one on beachcraft. Not merely because of the spectacular shots of boats crossing the surf – but because he discovered new technical possibilities while making this film. "Techniques that would normally require a special effects generator were tried out with BOBP's modest equipment," he points out.* Examples : Fading in and fading out of titles was achieved by manipulating light. And superimposition of animation effects on visuals was done through camera synch adjustments. Hans recorded sound for all these films in his own room rather than in a sound studio. "The absence of an equalizer does affect clarity, but is not a serious drawback."

The problems Hans encountered in his work were organizational – like finding the right people for his films at the right place, at the right time – rather than technical.

One shot Hans says he cannot forget is that of Killai "veddars" fishing with their bare hands. "I have not seen this anywhere and it was exciting to shoot."

An Associate Professional Officer (APO), Hans has completed his assignment with BOBP. The work on video productions will be continued by artist-draughtsman-photographer E Amalore, who has worked with Hans for the past few months. **S.R.M.**

* BOBP video equipment consists of a field recording unit (camera, VCR, etc.); a field p&back unit (VCR, monitor etc); and a studio editing unit. The costs are US $ 5,000, $ 1,500 and $ 2,000 respectively.

Hans Dorresteijn and *E Amalore* at work in *the* video editing *room.*

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