BAY OF BENGAL NEWS

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An exciting pilot project on pen culture of shrimp is on at Killai, 250 km from Madras. BOBP's aquaculturist, M. Karim, describes the project's main features, problems and achievements.

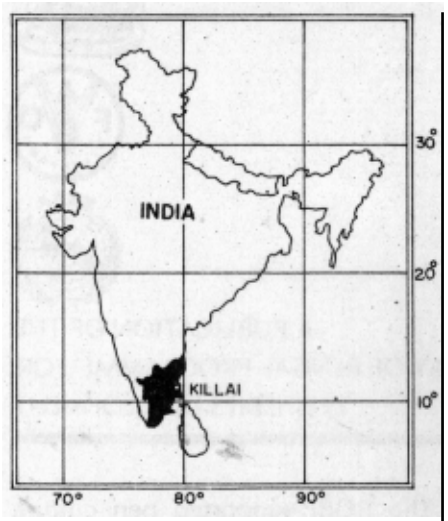
The "pen cottage" at Killai, which serves as a laboratory, meeting room, storage room and bedroom for half a dozen project staff.

The BOBP-supported pen culture project at Killai started operation in May 1982 for an approved period of 21 months. The Tamil Nadu government made available two full-time professional staff and a part-timer plus secretarial facilities and three night watchmen, besides office accommodation with furniture. The BOBP contributed expertise, equipment, temporary labour, materials and supplies; it also funds overseas study tours and operating costs.

Located in Chidambaram Taluk, South Arcot District, the Killai backwaters look like a branched lagoon. They are formed by a network of canals and creeks connected to Vellar river on the north and Coleroon river on the south; both therivers empty into the Bay of Bengal. The project site, respectively 7 and 15 km from the Vellar and Coleroon river bar mouths, can be reached by road except during the two short monsoons.

Why pen culture? Thereare apparently two alternatives for developing marine shrimp culture in the state — aquaculture in ponds constructed on the coastal lands, or its culture in lagoons or backwaters enclosed in parts with suitable netting material, a process known as pen culture.

The government is already trying to develop pond culture. The fact that extensive areas of shallow backwaters and lagoons are available and that the government wants to put them to productive use for fish production, encouraged us to take up this project and test whether pen culture is a possible technology for the area. In view of the predominantly sandy nature of the coastal soil, the characteristically low tidal amplitude, and the combination of



high temperature and high salinity condition resulting in biological stresses as frequently observed in coastal fish ponds, we envisaged certain advantages in pen culture. This method would not call for expensive and complicated pond and sluice construction, nor would it require a fuel-dependent pump or any mechanical assistance for filling, replenishing, exchanging and drain ing of water. Being freely confluent with a large dynamic water system connected with the sea, temperature and salinity extremes and oxygen deficiency are less.likely to be encountered in the pens. Pen construction requires low capital investment; it can be constructed easily and quickly with little training and manpower. It is ready for full-scale production as soon as it is installed, made pest-free and stocked with seed. The whole structure can be shifted to another place if considered necessary.

Our pen culture operation started in July 1982. Since then we have completed two culture trials; a third set of culture experiments is in progress and should be completed by mid-July 1983 or a little earlier. Thus, we hope to harvest three full crops of shrimp in 12 months; this includes nursery periods-for the seeds stocked and time loss of abotit two months due to certain unanticipated problems.

Four pens, two measuring 70 m x 25 mandtheothertwo25 mX 25 m, were used in the first and second experiments; in each of the former pair of pens the effective water area ranged between 1250 m^2 and 1500m^2. Five more pens of various specifications have since been added; two of these have an effective water area of 0.5 ha each though the actual size of each is about 140 m x 50 m; the other three are much smaller. All the nine pens have been stocked for the third culture operation. The sketch on page 4 gives a rough layout of the pens. The penned areas are shallow. Only during the high tide do the water depths in the deeper areas reach or exceed 60 cm; at other times it is shallower. During the peak northeast monsoon in November 1982, the water depth in deeper areas rose up to 1.15 m. About2Oto 30% of pens 1,2,5 and 6 which include in them the intertidal zone, get either completely exposed or become shallower than 30 cm during low tide. In oUr project, areas not all the time covered under at least 30cm of water are ruled out as effective culturable waters.

Small-mesh (&-14 mm when-stretched) knotless nylon webbing of Indian make has been used for pen construction. The pen walls have a foot rope. While installing the pens, the foot rope along with the netting was tucked into the bottom soil about half a meter deep. The purpose of this was to keep the pen walls in position against wave and wind and to prevent eels, catfish, crab etc from burrowing into the pens and the shrimp from burrowing out The headline of the pen was attached to a series of horizontal bars supported on vertical casuarina posts about 4m apart. The pen walls have a sufficiently high freeboard over the normal flood water level.

After the pen installation, vigorous efforts followed for removal of predators or unwanted animals from the pens. Cast nets and bag nets were used to remove pests. Traps and hand-pickers were also deployed. *Plutosus, Lates, Polynemus, Sciaena, Flops, Serranus* etc were the main predator animals. Occasionally, *Muraena* eels were also found. Amongst the pen-damaging crabs, species Of *Scy!la* and *Neptunus* were abundant.

Over 74 kg of fish, 10 kg of crab and some quantity of other animals were removed from the two 0.5 ha pens alone during the prestocking pest-removal operations.

For stocking pens, the entire lot of shrimp seed was collected from the wild. Though *Penaeus monodon* is a superior culture species, its availability in and around Killai during the last one year of our regular seed prospecting operations was meagre and unpredictable. *P. indicus* seed was, however, always available in varying degrees of abundance, allowing scope for large-scale collection in different parts of the year. A push net developed by us proved very efficient for seed collection in the project area.

The small seed needed to be reared in the nursery to bigger sizes for-their retention in the pens and for better survival in an environment which could not be kept pest-free.

In our first culture operation, pens 1 and 3, given a supplemental feed of minced squid offal, produced 129 kg, or over 600 kg/ha, in 80 days; without artificial feeding the production was half this.

(Continued on page 4)

The Killai project crew pose with two visitors.

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A Letter from the Publisher

-F ISHERWOMEN

The BOBP has, since 1981, operated several pilot projects in which fisherwomen constitute the target group. (By fisherwomen, we mean the women from fishing communities engaged in. fish handling, marketing and net-making and in some cottage industries.)

We started our promotional work even earlier, in 1979, by conducting a workshop on Fisherwomen Extension Workers. This was greeted with a high degree of scepticism by some and regarded as a funny or odd activity by many. But there has been a pronounced change in attitude over the years. The change is of course a reflection of world opinion and of governments' policies, but we like to think that the BOBP has also contributed to -the process.

Women have been neglected in the past and continue to suffer neglect. In most development efforts the focus is on technology for men. Women and families of course indirectly benefit from such schemes but their status and role in society have remained unchanged. Training of fishermen, loans and subsidies for fishermen, cooperatives for fishermen, are common support measures – corresponding support to fisherwomen is non-existent or very rare.

Our main objective as we see it, is to improve the social status of women by enabling them to participate in the development and governing of their community so that their interests are met; and by giving them opportunities to engage in economic activities, and to benefit from training and financial incentives on equal terms with the men.

How is this sought to be achieved? The BOBP's role is to test and demonstrate new methodologies in pilot projects, the results of which might be applied widely by- the governments concerned. As far as fisherwomen are concerned, the BOl3P adopts three different strategies: education, group action and income generation. Some observations:

– Resistance from the male population against women activities has been much less than anticipated.

– Supplementary education for women is a must for any activity to be fruitful.

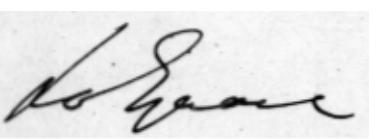
– Efforts to organize women in groups for different purposes (income generation, acquisition of consumer goods, provision of communal facilities/services, social activities, etc) have met with a good response. But strong and competent leadership is required to keep them together. Selection of leaders and their training is crucial. Group action is desirable not only for economic or social activities but also for exercising power to defend rights and benefits in the interest of the group.

– As regards income-generating activities in the village setting, the choice is meagre -and the remuneration low. Yet the women wish to try to earn some money; they are even willing to save from the low incomes.

Income-generating activities work well if closely supported and supervised. The time required for women to acquire ability and confidence to handle matters on their own is very long.

– Finally, and perhaps most important, development activities targetted at women and families will be neither planned nor implemented properly unless women at different levels are deeply involved in the process. This is particularly important at the field level, in direct contact with the target groups, but also at higher planning and programming levels. But it appears that in the natural course women will not easily occupy jobs at such levels. If a government is serious about its declared aim of improving the conditibns of women, it must establish an implementation mechanism that is largely managed and handled by women.

LARS O. ENGVALL



BAY OF BENGAL NEWS

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The BOOP 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 8OBP'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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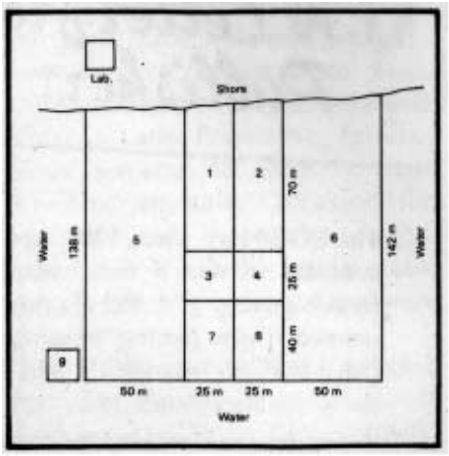
(Continued from page 2)

In a second phase culture trial of 117 days, all the pens received supplementary feed. Pens 2 to 4 totalling 2500 m^2 of effective water area produced 138.5 kg of shrimp, which worked outto over 550 kg/ha; this did not include 35 kg of small low-priced metapenaeid shrimp and nearly 100 kg of edible finfish removed during culture and final harvest. It may be pointed out that the low-priced metapenaeid shrimp, and the finfish which substantially contributed to the total production, were largely autostocked i.e., when very young they managed to intrude through the pen mesh; some of them obviOusly got trapped during the pen installation and escaped the pest-removing nets. These animals, despite their contribution to overall production, are to be considered undesirable in the shrimp culture system; this is because they either eat up the shrimp under culture or compete with the cultured species for space and food. The market price of the fish and small metapenaeid shrimp in the local village market is quite low. An analysis of the overall production data tends to indicate that the pens could sustain a much larger population of cultured shrimp if the fish and undesirable shrimp population could be more effectively controlled.

Culture in Pen 1 of the second phase was prolonged to 160 days to test the longer-term growth pattern of the shrimp under experimental conditions. It produced 71 kg of shrimp without accruing any production benefit over the 117-day culture cycle. Detailed statistics on the first and second culture operations are available at the BOBP.

The result of the second phase culture, literally a monoculture of *P. indicus,* could be considered quite significant. *P. monodon* is decidedly a superior species for culture, but what to do when the seed of this species is scarce or does not occur at all? We tried *P. indicus.* In fact we had to try this species since our efforts to collect *P. monodon* proved to be a wild goose chase.

During a two-to-three-week-long depression period in November when marine fishing totally stopped, the culture experiments survived a number of odds a sharp decline in the salinity down to 2 ppt and complete suspension of animal feed (squid) supply are two of them. Yet, the production and the value of the shrimp produced compared well with those obtained from the predominantly *P. monodon* culture in the first phase; this makes us ponder whether a commercial culture system can be developed based principally on *P. indicus.* Successful results in this line may go a long way for early development of shrimp culture in this area. The thircfbatch of culture



A layout of the project site showing the location of nine pens.

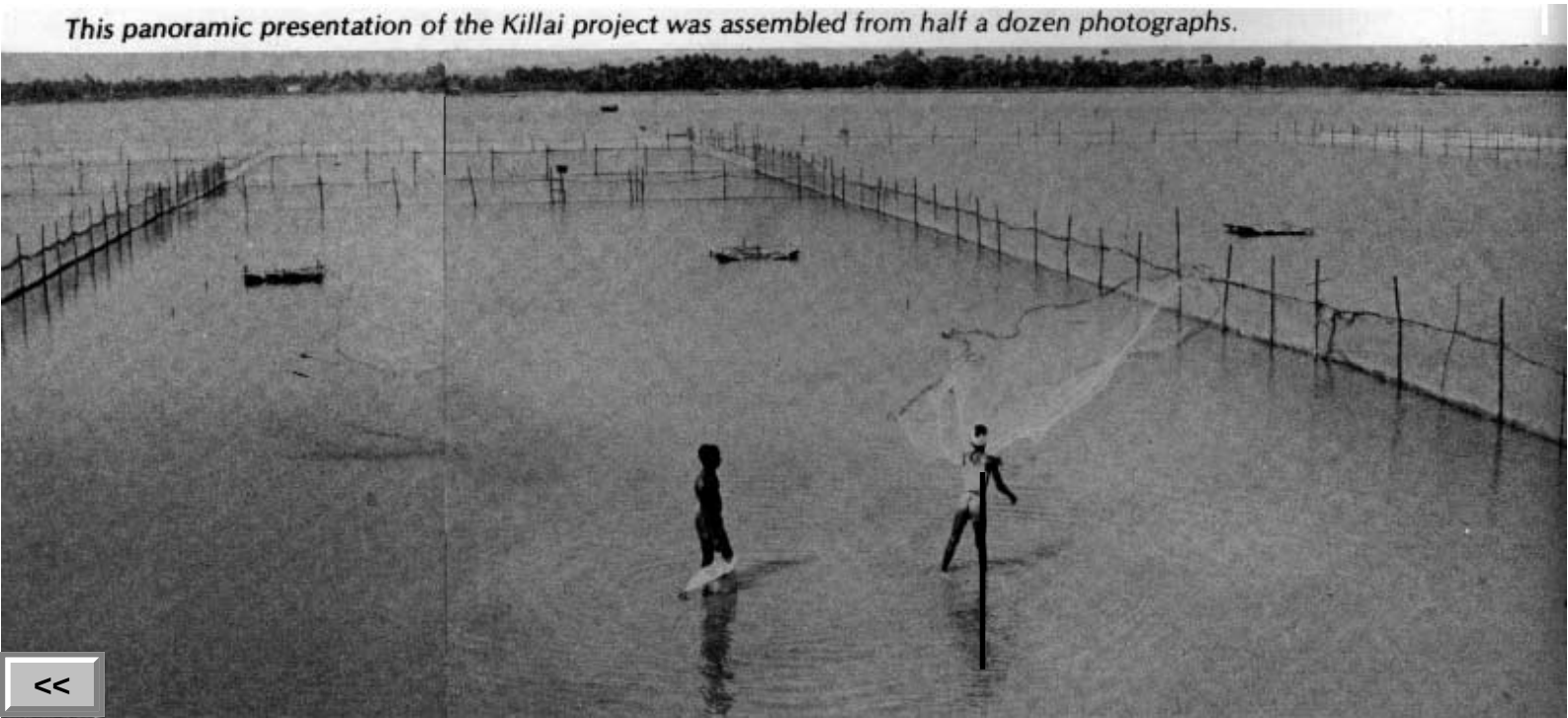
trials have been set with *P. indicus* and a few *P. monodon;* the latter species was only scarcely available.

Economics? With just two culture trials itfrather small pens, it is too early to form any definite opinion about shrimp pen culture. Results of year-round culture experiments in bigger pens, probably 0.5 ha units, could provide more practical data.

Our current work is being pursued on these lines. However, the main capital components include the netting material, casuarina posts and meat mincer; feed is the major recurring cost. Identifying more effective ways and means to reduce crab cuts and control unwanted animals in the pens is also one of our priority research activities.

Finally, two inferences could possibly be arrived at. First, the production potential of penculture looks very promising. Second, there are no easy pickings for farmers; success calls for hard work.

This panoramic presentation of the Killai project was assembled from half a dozen photographs.



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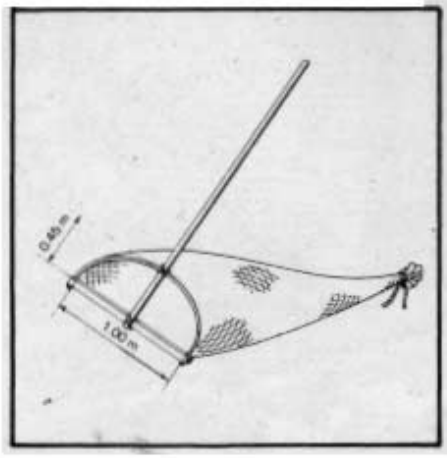
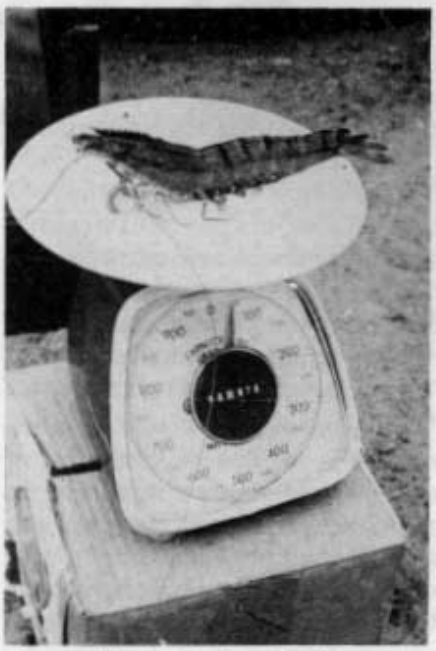


Above: This push net designed by a BOBP consultant was used to collect shrimp seed.

Right : Mr. Isaac Rajendran, Joint Director of Fisheries, Tamil Nadu, tours the project.



Above left : A cultured shrimp being weighed. Right : Sorting of harvested shrimp.

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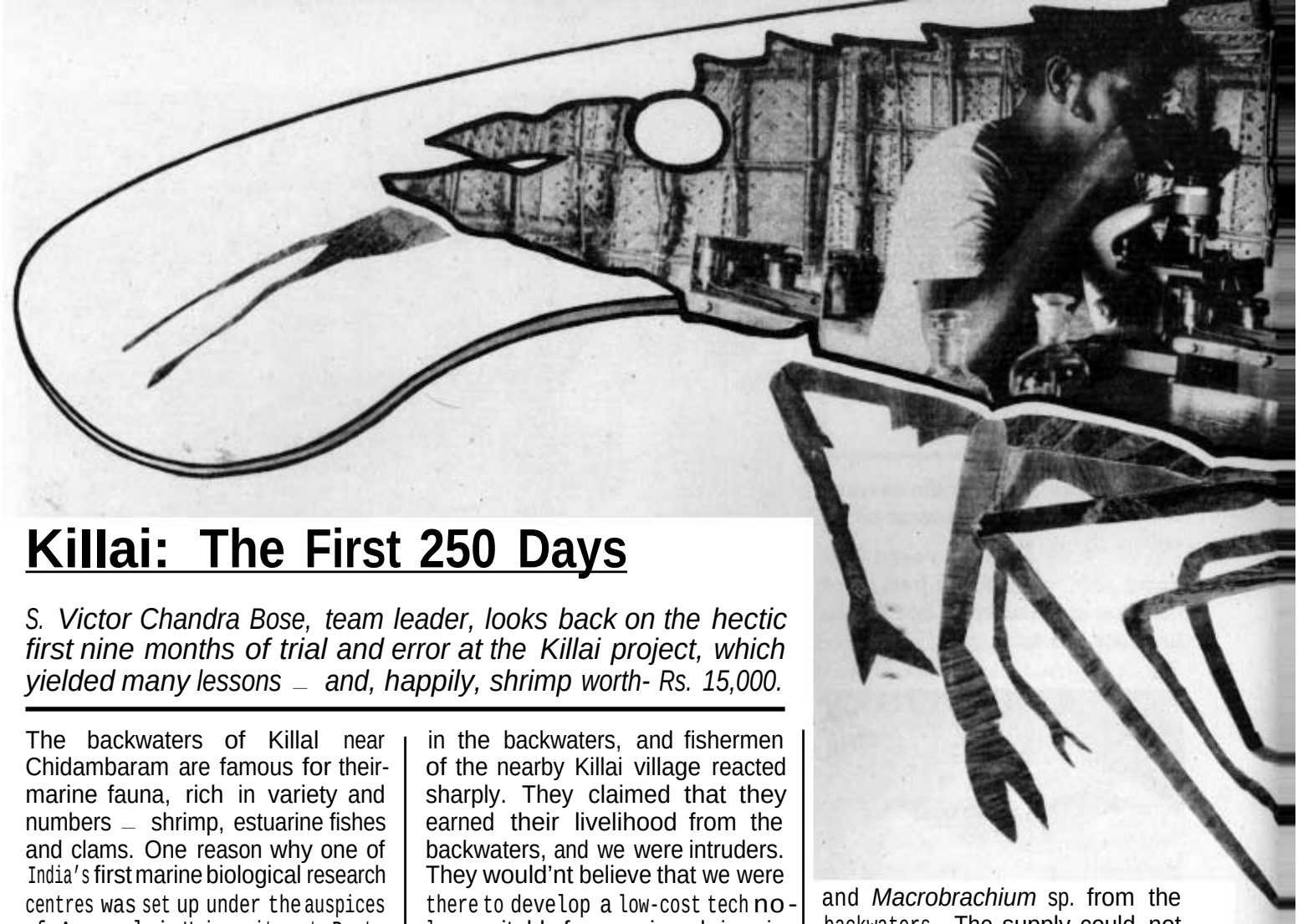


Killai: The First 250 Days

S. Victor Chandra Bose, team leader, looks back on the hectic first nine months of trial and error at the Killai project, which yielded many lessons – and, happily, shrimp worth- Rs. 15,000.

The backwaters of Killal near Chidambaram are famous for their-marine fauna, rich in variety and numbers – shrimp, estuarine fishes and clams. One reason why one of India's first marine biological research centres was set up under the auspices of Annamalai University at Porto Novo, 8 km from Killai. It is also a major reason why a project for pen culture of shrimp has come up at Killai.

The- Killai project site is located in a mangrove forest, and the "forest" is perhaps symbolic. In our work at Killai, there were no precedents to guide us. And like people in the deep woods groping their way towards light, we resorted to trial and error. This article is a simple description of what we did. "We" includes myself, my fellow-scientists C. Rajappan and I. Nalluchinnappan, some hired help.

The first thing we did was to put up a thatched shed, a "pen cottage" which would shelter us in extreme weather and also serve as a laboratory.

This later became a major attracion for visitors. As for culture, we began by collecting seeds of tiger and white shrimps *(P. monodon* and *P. indicus)* from the backwaters. The seeds were reared in nursery cages. Simultaneously, we erected pens with nylon webbing encircling an area of 0.4750 ha. – four pens in all. These structures looked conspicuous in the backwaters, and fishermen of the nearby Killai village reacted sharply. They claimed that they earned their livelihood from the backwaters, and we were intruders. They would'nt believe that we were there to develop a low-cost tech no-logy suitable for growing shrimp in shallow waters in this part of the country.

To overcome their resistance, we met local leaders and the educated youth of KilIai and explained to them that local fishermen would be among the main beneficiaries of this project. We also picked up a few local fishermen to work in the project as supporting staff. We indicated that they would be associated with culture operations such as seed collection, pre-stock pest-removal- and harvest.

The seeds raised in the nursery cages were stocked in the pens after removing pests and predators from the pens. Small-mesh cast nets and drag nets were used to catch the crabs; "hand-pickers", male and female, locally known as *Vedars,* were also hired. The shrimp seed had to be given a suitable feed for quick fattening. This turned out to be a stupendous task, because of the remoteness of Killai. We tried to get clam meat from a supplier 30 kms away. It did'nt work out. We tried collecting oysters from nearby oyster beds. We did that only for a few days. We collected Metapenaeids and *Macrobrachium* sp. from the backwaters. The supply could not be sustained. finally, we made a deal for squid offal supply from the Porto Novo fish landing centre.

During the rearing period in grow-out pens, we had to face a lot of problems to retain the shrimp in pens. Crabs started waging war against the pen walls. They would cut the meshes and tunnel through the walls! We did'nt relent. The crab menace was effectiyely checked by us by religiously checking the pen walls every day and mending the nets. Another determined foe was *Plustosus Canius,* a catfish with pointed spines. The spines used to pierce our feet when we waded through the water for day-to-day work. One shot would lay us flat with pain for two days. We would then approach hand-pickers to get rid of these foes. At times we got bitten by crabs while checking the pen walls. We eliminated crabs as far as possible by operating crab traps inside the pens. After the day-long warfare, night would creep in. It signalled not sound sleep butthe start of a vigil – on the nightguards. Days passed. Harvest was planned at the end of 80 days' rearing. Harvest

range of tiger shrimp was 15-26 grams and that of whites 11-15 grams. Production touched more than 600 kilograms/ha, for stocked shrimps and 700 kilograms/ha. including auto stocked shrimps. The catch fetched more than Rs. 6000 from four pens. We smiled to each other with satisfaction.

The strategy for the next activity now unfolded. Dr. M. Karim, BOBP's aquaculturist, wanted us to rear white shrimp through low saline conditions as monsoon was approaching. He was prepared to risk failure rather than accept the common belief that whites would not survive very low saline water conditions. We acted swiftly to rear whites through the monsoon period. After stocking we had to run from post to pillar to procure feed materials. Sometimes the fish landings would fail us; sometimes weather, warnings would keep the boats ashore. We were restless and sustained the little ones with feeds of vegetable origin. We survived the rainy season. We were wondering about the outcome of the experiment of rearing shrimps in low saline conditions. This time harvest from three of the pens was made at the end of 117 days, and the average size range of white shrimp was 12-24 grams. Production touched more than 550 kg/ha. for stocked shrimp and 700 kg including auto-stocked shrimp. The catch fetched more than Rs. 6,300 from three pens. The fourth pen was harvested 43 days later; it produced 71 kg. of shrimp fetching Rs. 3,000.

The total revenue from sale of shrimp produced in nine months was more than Rs. 15,000.

Before this harvest, we were already trying to collect tiger seeds for the next phase. We could'nt get seeds in spite of untiring efforts. This was rather perplexing : it went against available data. Dr. Karim would'nt wait endlessly. He suggested that we go for the white seeds. But the peak season for whites was already over. We half heartedly tried our net sometimes here, sometimes there, without much luck. Our enthusiasm fell. One hundred thousand seed in a few days! It seemed impossible. But Karim said 'We have to make it possible, Bose. No alternative. Motivate your boys and go ahead!" And we went ahead, sieving the backwaters for a target collection of 0.1 million white seeds in 10 days. It was Pongal, the festive season. The supporting staff preferred holidaying and merry-making to slogging and seed collection. But for a week we closed our eyes and ears and minds to the world outside. And attained our goal a day early. An exhilarating experience!

At present we are continuing pen culture of shrimp in two 0.5 ha. pens with whi,te shrimps. Success in larger pens would provide a viable new technology for the development of brackishwater shrimp culture in shallow waters of Tamil Nadu. There is reason to believe that success lies ahead.

INTRODUCING A MOTORIZED CRAFT INTO A TRADITIONAL FISHING VILLAGE: STORY OF A BOBP. EXPERIENCE

An engrossing account by socio-economist Edeltraud Drewes of the day a BOBP boat towed a kattumaram ... and two villages argued about and finally agreed on fishing rights.

BOBP technicians have successfully developed and built motorized beach-landing craft, such as the IND-21 and IND-23. But the job doesn't end there. We have to test these craft under local circumstances; and find out how the fishermen who are using these boats fare, what kind of problems they face — not merely with the boats but with other people as well.

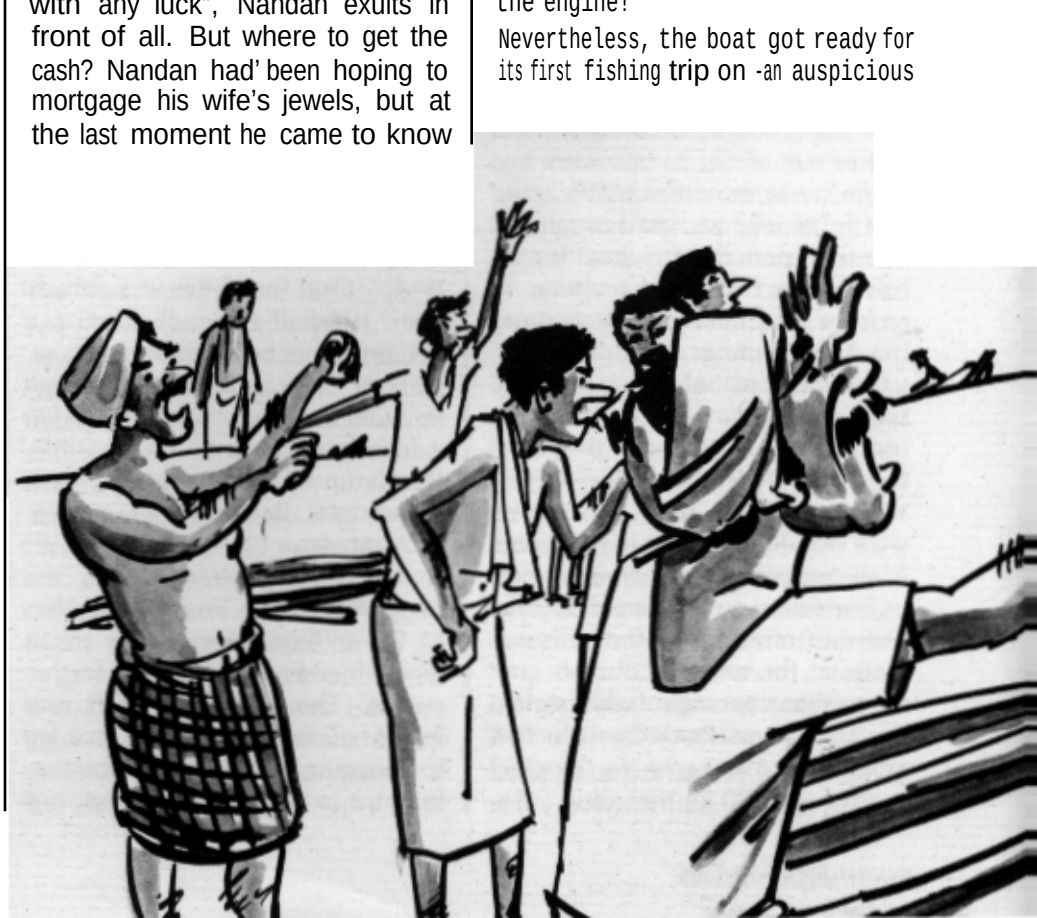
Though they live only 30 km from Madras, these fishermen live in beach settlements under economic conditions and social orders that have not undergone any remarkable change during the past couple of centuries. Palm leaf huts, log kattu marams, a few small mesh nets, baskets to carry the fish by headload and cycles to markets, schools with missing pupils or teachers or both, superstitious beliefs, traditional village, elders, frequent quarrels with neighbouring fishing villages, a good bottle or two of arrack, self-justice — these are some characteristics of the lifestyle of the fisherfolk communities we are working with.

To introduce only two motorized craft as prototypes among as many as 170 traditional fishermen of one clàse-knit community requires some thinking. How to ascertain the economic feasibility of these craft, yet avoid social conflicts over the new technology which may erode interest in using the new craft? We had to look into the social habits of the fishermen for a solution.

To avoid clashes among the villagers we needed to prove that we were not partial to particular individuals; to test economic viability we needed an individual fisherman in charge. We hit upon the solution : one craft to be operated by the whole village under the responsibility of the village elders; another craft to be hired Out in an auction to the highest bidder from the community.

A meeting with interested fishermen was arranged in the village school building. Conditions for the bid were laid down by BOBP staff and a lively discussion started. An auction date was fixed by the village elders. The opening bid for the monthly hire charge was Rs. 250, a reasonable amount. Only a few people took part in the bid, and the sum increased steadily — Rs. 250, Rs. 500, 700, 1000, 1005. . . 1600: The auction was knocked down by Nandan. He and his three comrades and relatives triumphed over the traditional village elders. The four of them, equipped with only a small-size kattumaram, now had to raise the three-month advance hire charge of Rs. 4800. "I can earn this money in two- days with any luck", Nandan exults in front of all. But where to get the cash? Nandan had' been hoping to mortgage his wife's jewels, but at the last moment he came to know that his wife had already done so without his knowledge months ago. Nandan went to friends in a nearby village. They offered a loan at 120% interest. This was too high. Nandan decided, to seek the help of his brotherand to ask his crew to become partners.Finallyagold necklace mortgaged with a pawn broker at 36% interest, and a chit fund saving meant for purchase of jewels was withdrawn. Now the boat would be theirs for a couple of months. The crew was sent for a week's engine training to Bangalore city. "After the course was over, they were like people returning from' some foreign country" some envious men remarked. "They even claimed they could pull the engine to pieces and put them back. But during the field test given by Mr. Srinivasan two of them struggled even to start the engine!"

Nevertheless, the boat got ready for its first fishing trip on -an auspicious



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Tuesday. Monday, the crew decided, was an unlucky day. They bought diesel, engine oil and coconuts as also some sweets (offerings to Lord Ganesha), performed a small pooja, and set out fishing. Many villagers turned out on the occasion and helped push the boat off the shore. The catch that day was extremely good and the profit much higher than that of a large kattumaram.

Things ,however did not always shape up so smoothly. Conflicts arose with other villages over competition in fishing grounds between the beach-landing craft and the kattumarams. Crew members report:

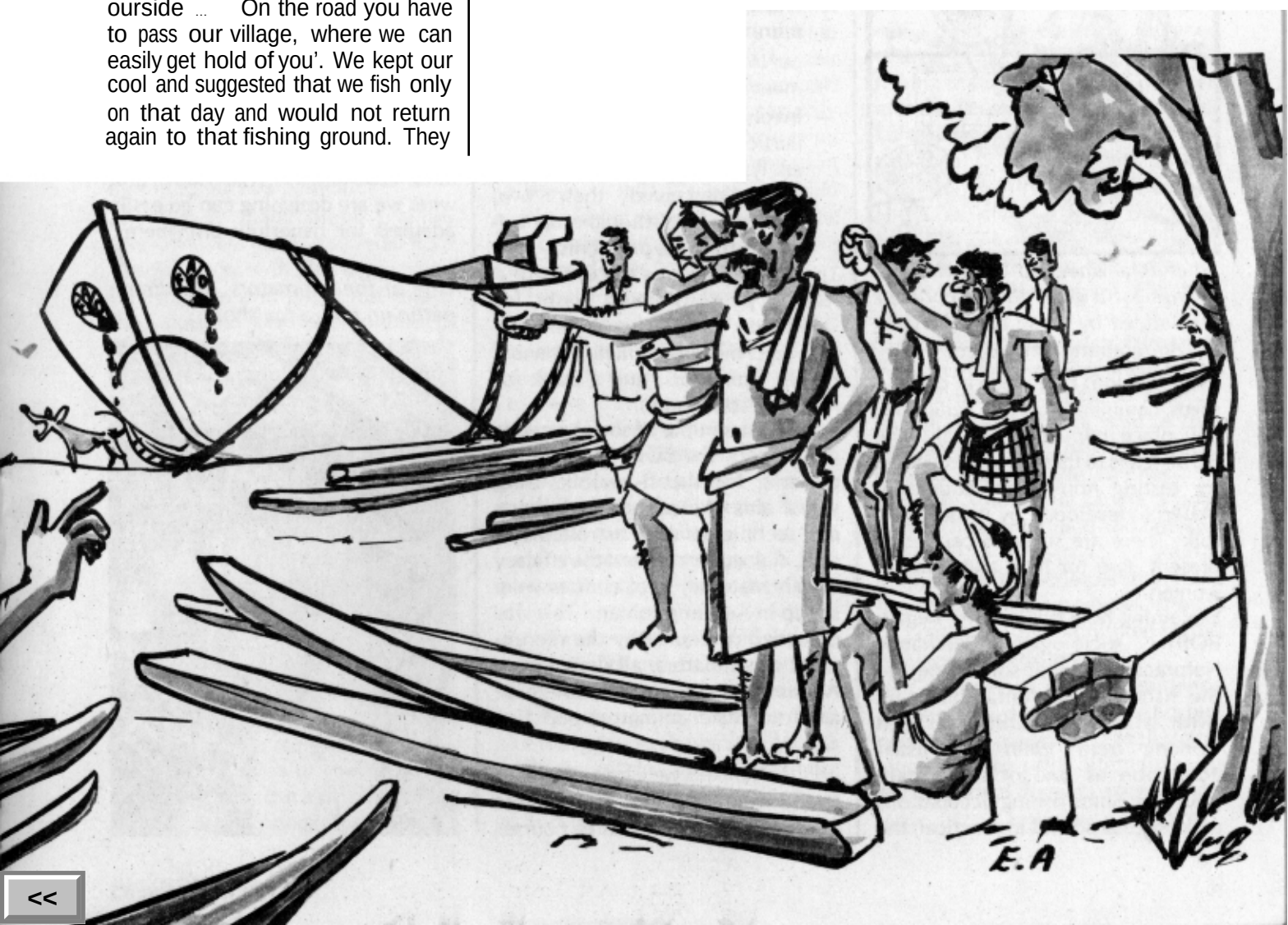
'We started at 4.30 p.m. and reached the fishing ground at 12 fathoms depth at 5 p.m. Five kattumarams and 22 men from amother village were already there. Two kattumarams with a crew of nine came close to us. They jumped into our boat and told us to quit their area. Their argument : 'We own this fishing ground, how come you people try to fish here? You should remember that we belong to a much larger village, with many more men by ourside ... On the road you have to pass our village, where we can easily get hold of you'. We kept our cool and suggested that we fish only on that day and would not return again to that fishing ground. They did not like that and replied 'We will fish here today with our nets, we will also take you away to our village and hold your boat'.

"Our nets were than taken away, and the kattumaram crew tried to tug our boat with their kattumaram. But our craft was too heavy, so we helped them by turning on the engine. So our craft it was that 'tugged the kattumaram . We had to pass our village, we asked them to let us go home. 'You will all come along with us unless you want to quarrel here', was their reply. So we went further, and while reaching a depth of four fathoms they asked us to anchor our boat and come ashore with their kattumaram. One of our.crew did not like it, he jumped into the sea and started swimming towards the shore. We tried to explain to our captors that ours was a beach-landing craft, it did not need to be anchored like a trawler. But they did not believe us. So all three of us jumped into the water and swam ashore, leaving the boat behind us, and walked home to inform our people. We returned with a large group of men and our village leaders, determined to settle the matter.

we tried to explain to our captors that oUrs was a beach-landing craft, it did not need 'to be anchored like a trawler. But they did not believe us.'

"When we reached the 'adversary' village, it was already in confusion. The people there had become apprehensive about what they had done. Seizing the boat of people with government connections could get them arrested. So they encouraged us to take our boat home. But we insisted on a panchayat meeting between our village leaders and theirs to settle the matter".

A temporary agreement was found by fixing fishing days for each village. How long will the agreement last?



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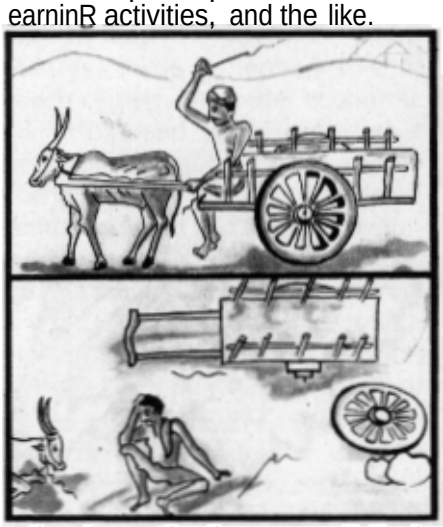
glimpses into BOBP projects

Experiment on non-formal education for fisherfolk

Every other evening in Adirampattinam, Tamil Nadu, fisherfolk huddle in groups for a two-hour session with "animators" or teachers. They view pictures, charts and posters, play games, question and analyse. The subjects they discuss could be health, sanitation, fishing operations, fishery-related activities, citizenship, cooperation, income-earninR activities, and the like.



What is a wheel to a cart? So is savings for a good life. A concept dramatized by these two charts in the Adirampattinam project.

These sessions take place at cyclone sheds, community centres, verandahs, any place convenient to all. The BOBP refers to them as "pilot centres" for testing non-formal education material developed by it for fisherfolk. There are six such centres at present, two for men and four for women.

Explaining how this activity began, BOBP sociologist Patchanee Natpracha says that some time ago the fisherfolk of Adirampattinam (with whom the BOBP has been working from 1980) had listed education as one of their main priorities. Since fishing occupations make regular school impractical, the idea ot non-torma! education was born. Such a programme, it was felt, should expand the "awareness" and practical skills of fisherfolk besides teaching them the basic elements of literacy.

Available material concerning non-formal education was found to be inadequate : it was not designed for fisherfolk, it was confined to the three R's (reading, writing and arithmetic). The BOBP therefore began to develop a model curriculum after talks with the Directorate of Non-Formal Education, the Tamil Nadu State Resource Center and the Directorate of Fisheries. The four institutions agreed that the curriculum should

- help meet the basic problems and needs of the fishing communities.
- be in accord with the government's adult education policies.
- involve the learners, secure their participation, and stimulate self-analysis and self-help so that the latter perceived their own problems and thought up solutions to these problems.

The curriculum was to consist of a "lesson plan" or basic script for "animators" or teachers, complete with teaching aids; a training manual for the animators; and a book for "learners" (students).

Engaging a couple of social workers and writers, the BOBP is preparing material for the fisherfolk using visual aids like posters and charts and techniques such as role plays, skits, dialogue etc. To testthe efficacy -of this material, pilot centres were set up in Adirampattinam. This was preceded of course by the recruitment of animators, all drawn from Adirampattinam. At present there are four male animators and five female.

All the animators were trained initially by the Tamil Nadu State Resource Centre. Then followed three courses given by BOBP, demonstrating "teaching manners" and the participatory approach.

Asked to describe a typical session at an Adirampattinam pilot centre, social worker R. S. Anbarasan, who is assisting BOBP in the project, says : "Let's say the subject being discussed is savings. The animator shows his learners two charts — one of a bullock cart in action, another of a cart that has collapsed. The learners are asked to explain the pictures. They agree that the second cart has broken apart because a wheel has conked out. The animator draws an analogy between the cart and life. What the wheel is to the cart, money (savings) is for a comfortable life. Then ensues a discussion on the vaiious savings patterns in the village ... and the learners decide that post office savings are the most suited for them, because it's possible to save in very small amounts through a post office.

"After the lesson on savings, the post office in Adirampattinam was quite taken aback by the sudden surge in demand for savings stamps and had to order fresh stocks!"

Any other examples of noticeable impact? After the sessions on environmental sanitation, women learrters took the initiative to dig up waste pits for dumping garbage...

Says Patchanee: 'We hope that what we are designing can be easlly adapted for fisherfolk elsewhere."

One of the 'animators' in Adirampattinam runs a tea shop.

Kerala fishing craft: a look into tomorrow's needs

A two-year BOBP-assisted experimental project that examined and tried out development alternatives for several fishing craft of Kerala, India, concluded recently with a bag of categorical findings, both positive and negative. The project was launched April 1981, with Norwegian naval architect Oyvind Gulbrandsen as consultant. It was meant to facilitate investment decisions by the Kerala Government for craft and engines which would boost fish production and expand incomes and productivity. Here's an outline of the project's components and findings

— Experience has shown that *thanga vala* (surrounding net) canoes can substantially increase their catches (usually of sardine and mackerel) through motorization. The question tackled by the BOBP was: Would locally made diesel engines be suitable for these canoes? Could they replace the imported kerosene outboard engines?

Trials conducted with a canoe motorized with a local 5 h.p. diesel engine showed that a centrally mounted engine and propeller were unsuitable due to the risk of the net entangling in the propeller — a risk that did not exist with the side-mounted outboard engine.

The locally made diesel engines consumed less fuel but suffered from various defects in the engine and transmission and could not match the imported kerosene engines in reliability. The higher catches made possible by motorization being substantial (an increase of 128% in monthly catch value, according to one estimate), the fishermen did not set much store by fuel economy.

"An engine acceptable to the fishermen has not yet been developed locally, but continues to be a worthy challenge for manufacturers," says Gulbrandsen.

— The project examined the feasibility of a new sailcraft to replace the existing planked and dug-out canoes that serve as small-mesh gillnetters. Operating these canoes means long hours of rowing under a hot sun, and the sailcraft, it was hoped, would reduce rowing time.

IND-17, the sailcraft designed for Kerala and tested near Quilon.

Fishing trials were conducted in October 1981 with a new BOBP-designed 7.8 m sailcraft (labelled IND-17) from Tangassery village near Quilon, and comparative catch data were obtained for two IND-17s and two local canoes. It was observed that sailing winds blew only about half the time : the boat could hoist sails while going out to the fishing ground, but normally had to row back at night. Concludes Gulbrandsen: "An improved sailing craft can only to a limited extent reduce rowing time .. However, the operation of the two IND-17s has provided much valuable experience concerning the characteristics of future non-motorized craft."

— Would a small motorized craft be viable as a small-mesh gillnetter? To find out, the two BOBP IND-17 beachcraft were fitted with 7 h.p. kerosene outboard engines, and comparative fishing trials were carried out with these boats and with two local canoes. Costs and earnings data showed that motorization increased net earnings only marginally. Although there was a 30% increase in gross earnings, these were offset by the costs of motorization — fuel and engine repair and depreciation. GUlbrandsen comments: "One should proceed with caution in motorizing craft fishing with passive gear such as small-mesh driftnets within 10 km from the coast." The motorized craft could go further offshore, but this is no advantage when fishermen are only after small pelagic species schooling close to the coast.

— Perhaps the best news from the project was the positive performance of IND-18, a new 8.4 m BOBP-designed sail-assisted beachlanding large-mesh driftnetter. Two IND-18s, initially powered with a 5 h.p. diesel engine which was subsequently replaced with a 8 h.p. engine, engaged in fishing trials over a period of seven months from March 1982 at Saktikulangara near Quilon, along with two local boats fitted with 24 h.p. engines. The IND-18 craft caught about as much fish as the local craft (Rs. 274 per trip for the former, Rs. 276 per trip for the latter) at much lower investment and fuel cost.

Gulbrandsen points out that the existing fleet of large-mesh gillnetters has proved unviable because of high engine power. "There is little that can be done on the fishing gear side to improve the catches," so the only solution is to use a boat that is cheaper to build and operate. The IND-18 appears to be such a boat, but further comparative trials from other fishing centres should be conducted and monitored by the Fisheries Department.

— Gulbrandsen also recommends a project to design, build and test new craft in plywood, fibreglass and aluminium to offer alternatives to the traditional dugout canoes of aini

(Continued on page 17)

Beachcraft development, Sri Lanka

Beachcraft development, India

All the BOBP's men (and wom

The BOBP has a professional staff of just ábdut a dozen. How does it manage to execute more than 50 pilot activities in five countries?

The answer is that several hundred people are actually engaged in' BOBP's experimental work. In the first six months of 1983, for instance, more than 4,000 people took direct and active part in these experiments.

A majority of the 4,000 were either local fisherfolk or contract labour — boatbuilders, net-makers, mechanics, welders and labourers. Others included government counterparts; specialists in fisheries disciplines; civil' engineers and pond engineers. There were also social workers and extension workers.

Most of BOBP's experiments or pilot activities are carried out on beaches, in fishing villages, boatyards, fish ponds, pens and cages and out at sea in the coastal waters. Successes in these activities are being expanded in scale and scope by member-governments.

Says BOBP Director Lars Engvall "We act as catalysts for the development and extension of technology. Local services and institutions, as also member-governments of BOBP, contribute substantially in the execution and implementation of projects we initiate We lay great stress on strong counterpart input. This ensures technology transfer so that our work can go on long after we have quit the scene."

Here are a few example of BOBP experiments in cooperation with fisherfolk that tap the resources of local agencies and the government:

— In Orissa, India, some 35 bank officials and 25 fisheries officers are interacting with 600 fisherfolk in a pilot credit project under which the fisherfolk will get loans worth Rs. 5 lakhs.

— In Chittagong, Bangladesh, some 120 women from the fishing community are supplementing their incomes by making nets, using twine supplied by BOBP Fisheries officials and Ghashful, a voluntary agency, are helping to monitor the project.

— In Chingleput district, Tamil Nadu, India, an inspiring exercise in self-help and collective action is on in seven villages. Taking part are 20 trained fisherwomen who serve as "link workers," 180 other fisherwomen who are members of cooperative societies, and 30 professionals, both government and non-government.

Training for fisherwomen, Tamil Nadu, India

Net-making by women, Bangladesh

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Aquaculture demonstration project : Phang Nga, Thailand

Shrimp culture demonstration project : Satkhira, Bangladesh

ɒmen) — hundreds of them!

The most urgent needs of the villages — credit, education, health care, water supply, land ownership, new income opportunities — are being tackled. "Action plans" for development have been drawn up for each village.

— On the west and south coasts of Sri Lanka, 90 women frorii three fishing villages are being given vocational training (in cOir work, lace-making, tailoring-sewing and 'wetakeiya' work) by 30 specialists, intructors and officials.

— Some 18 carpenters at the Royapuram yard near Madras are helping build prototype boats in timber, fibreglass and aluminium for fishermen of Tamil Nadu and Andhra Pradesh, while nearly 25 fishing crew in Tamil Nadu and 10 in Andhra Pradesh are engaged in fishing trials.

-Similarly, some 30 crew plus officials are engaged in fishing trials of BOBP boats at different places in Sri Lanka.

— In Bangladesh, ii boats with a total crew of 100 are carrying out trials with large-mesh driftnets at Chittagong, using twinethinner than the traditional. And at Sonadia Island near Cox's Bazar, a total of 30 crew and counterparts are taking part in comparative trials with set bagnets, using traditional and modified versions.

— In Polekurru, Andhra Pradesh, some 250 people were engaged as contract labour to build a pond complex for culture of shrimp, In Killai, Tamil Nadu, wherea pen culture project is on, some 50 people have been engaged at various times to erect or mend pens, and in seeding, feeding and pest-removal work.

— At Satkhira, Bangladesh, '300 people have helped to- construct ponds, 50 more to construct brick masonry and wooden sluices, for a shrimp culture demonstration project.

— A few hundred people were involved in an aquaculture demonstration project in Phang Nga, Thailand (finfish, cockles, oysters, mussels), whose technology has spread rapidly to other provinces. A second phase of the project is now on in the Satul, Trang and Krabi provinces of Thailand.

The catalytic effect of BOBP pilot activities, thanks to vigorous local participation — by the fisherfolk, by institutions, by government — is seen in all the BOBP member-countries : Bangladesh, India, Malaysia, Sri Lanka, Thailand.

Credit scheme for fisherfolk, Orissa, India

Improvement of set bagnets, Bangladesh

A fresh look at Sri Lanka's demersal resources

By K. Sivasubramaniam

A senior fishery biologist of the BOBP recently did a comprehensive study of available information on Sri Lanka's demersal resources, taking into account past surveys, experiments conducted by the BOBP and other data. His findings are summarized in this article.

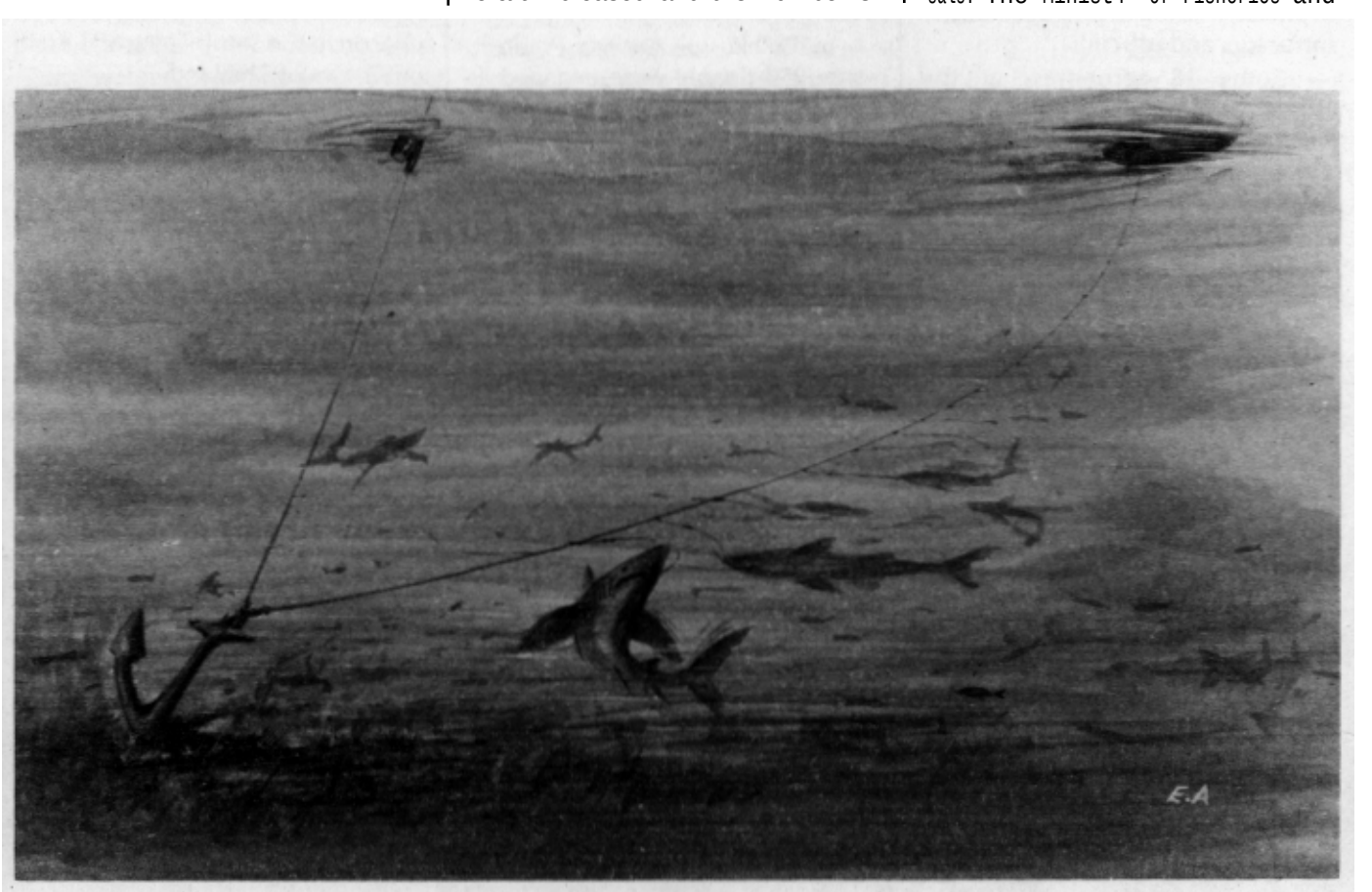
The history of Sri Lankan fisheries over the last seven decades or so highlights the rise and fall of the demersal fishery, unlike the pelagic fishery which has been developing rather steadily.

We find that demersal fishing methods such as bottom set gillnets (made of natural fibres) and bottom handlining were very common in the northern part of the country and occasionally practised in the Trincomalee and Puttalam districts six decades ago. Bottom handlining was directed mainly at the Emperor fishes (Lethrinidae) and Snappers (Lutjanidae); and vallams were towed by 'motherships' to the fishing grounds close to the edge of the continental shelf. Distant water bottom. trawling (on the Wadge Bank) with coal-fired engine power was also introduced around this time. Even as late as the mid 50s, handlining, together with beach seining continued to be the primary traditional fishing method in Sri Lanka.

But with the commencement of the mechanisation scheme for smaller fishing crafts, ,around 1959, and the introduction of synthetic fishing gear materials, the fishery for small and large pelagic species took a long stride ahead of the demersal fishery. The efficiency of,the new materials and the popularity of the pelagic species plus economic advantages encouraged the development of the pelagic fishery. Surface trolling and surface longlining for medium and large-sized pelagics also became popular hook-and-line methods.

This situation continued until the early 70s. The number of mechanized craft increased and the number of non-mechanized traditional craft which were commonly used in demersal fishing declined. Inshore trawling for shrimps developed rapidly during the 70s, but the small quantity of shrimps caught did not make a significant impact on the production level of demersal species, and the larger quantity of small demersal species caught as by – catch was not readily marketable.

However, towards the end of the 70s, the countrywide increase in numbers of fishing craft and in fuel prices reduced the lean-season migration of. craft from the west and southwest coasts to the east coast. And since the pelagic fishery was not viable during the lean season on the west and southwest coasts (January to May), fishermen tended to direct their effort toward demersals. The Minist4′ of Fisheries and



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the BOBP have been trying to assist the fishermen in this effort, with a view to improving their year-round fishing and earning capacity. Consequently there is evidence of an expansion in demersal fishing during the last three years.

At present, the demersal fish catch around Sri Lanka is approximately 40,000 metric tons/annum. About 77% of this is from the north and northwest coasts. The areawise production is as follows

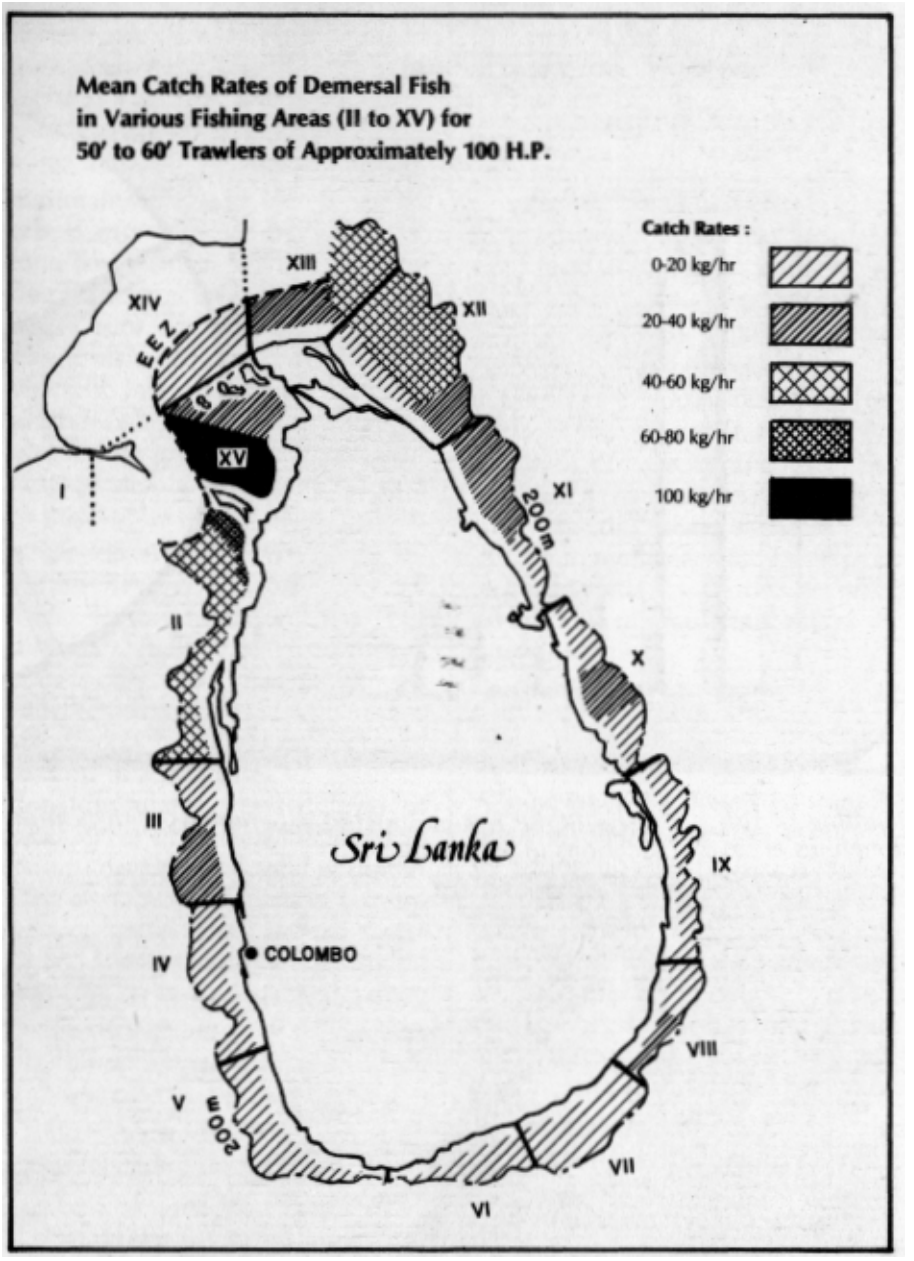
North West	—	15,187 metric tons
South West	—	375
South East	—	842
North East	—	3,340
West	—	1,432
South	—	2,410
East	—	2,598
North	—	14,000

The estimated percentage composition of the production of demersals by different gears is as follows:

Bottom set gillnet	—	25.3%
Bottom longline	—	15.5%
Handline	—	25.4%
Fish traps	—	2.2%
Bottom trawl	—	31.4%

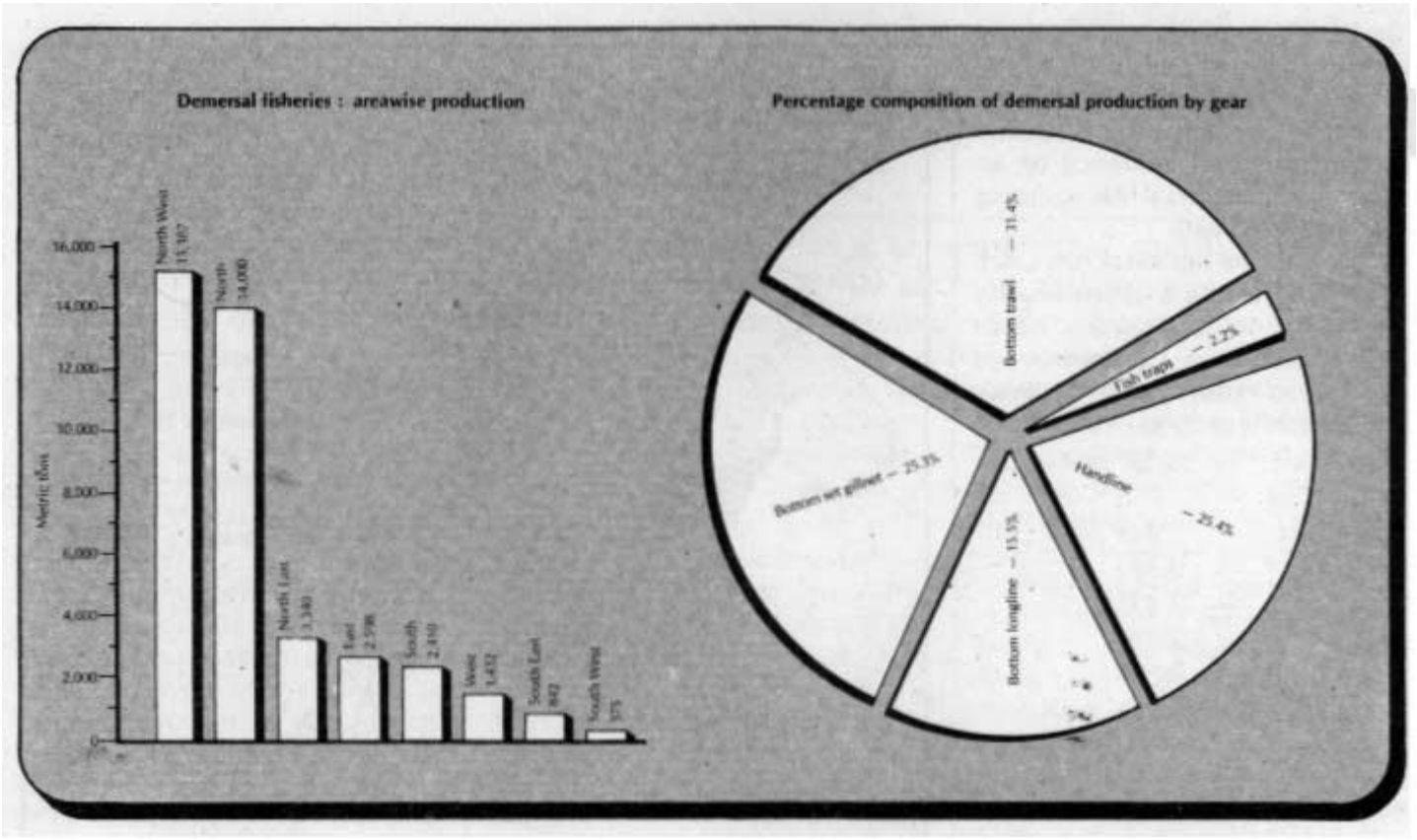
Bottom set gill'nets are very popular in the Mannar, Jaffna, Chilaw, Trincomalee and Negombo areas but seasonally used in Put.talam, Galle, Colombo, Tangalle and Kalutara districts. Bottom longlining is conducted year-round in Jaffna, Negombo and Galle but during limited seasons in the Colombo, Kalutara, Matara and Tangalle districts. Handlining is the most widely used demersal fishing method around the island but good results have been obtained only in the Chilaw and Trincomalee districts. Fish traps are deployed mainly in the Jaffna district and shrimp trawling is carried out from Negombo northwards up to the Palk Strait area. As evident from their contribution to the production, the northern and northwest districts engage in regular demersal fishing throughout the year.

The continental shelf around Sri Lanka is generally rocky, particularly between Colombo and Batticaloa. However, sand occurs even in the rocky areas. The northern part, particularly the Palk Bay and Palk strait areas, are predominantly muddy or muddy sand. From Puttalam to Colombo the shelf has an extensive

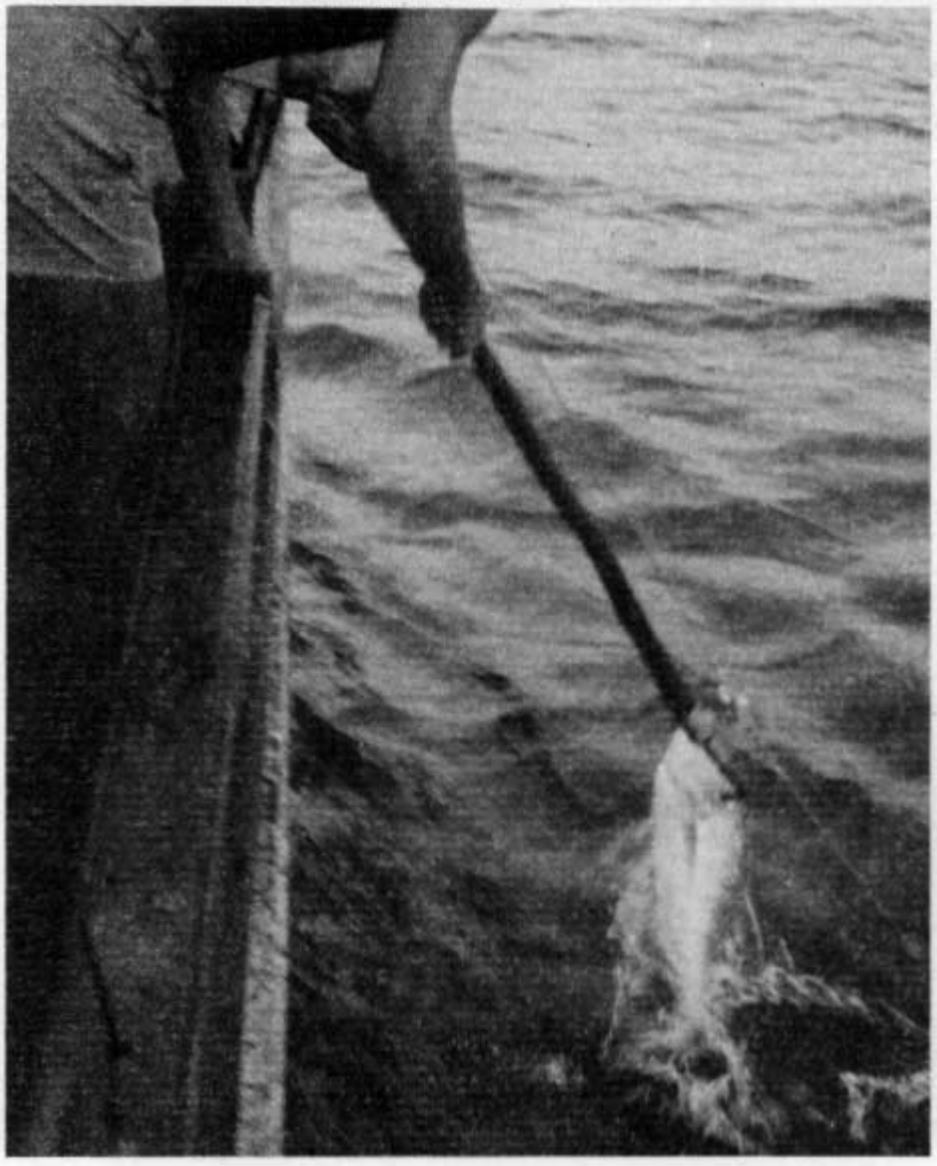


trawlable bottom but the southwest part has a rough and uneven bottom. The Hambantota area has a very limited trawlable bottom. There are smooth bottoms only in the inshore area south of Trincomalee. The slope begins very abruptly in most areas except in the Palk Bay, Gulf of Mannar and the Pedro Bank. The shelf. widens gradually south of Puttalam and narrows on the east coast.

About 55 families of fishes represented by about 215 demersal species have been observed in the trawl catches around the country. Emperor fishes (Lethrinidae), snappers (Lutjanidae), jacks and trevallys (Carangidae), groupers (Serranidae), grunts and sweetlips (Pomadasyidae), Ponyfishes (Leiognathidae), surgeon fishes (Acarthuridae), requiem sharks (Carcharhinidae) eagle rays (Myliobathidae), guitar fishes (Rhinobatidae), and sting rays (Da-syatidae) are the major varieties, and any one or more of these groups contribute 10% or more to the catch composition in each area. The demersal fishes are not, evenly distributed on the bottom, and certain high-density patches host more species than the rest of the ground. The emperor fishes are predominant on the west coast followed by trevallys, jacks, sharks and pony fishes. In the south, emperor fishes are displaced by groupers and snappers. On the east coast, snappers are the predominant variety followed by trevally/jacks, grunts, emperor fishes and groupers. The pony fishes are the predominant group in the northern and northwestern part of the island.



Gaffing of fish .... The BOBP has conducted experiments with bottom longlines at several locations in Sri Lanka.



Trawling crafts with less-than-100 h.p. engines catch between 100-200 kg/hr in the Palk Bay and Gulf of Mannar areas but much less in other areas: between 10-30 kg/hr on the average. Larger trawlers with more than-100 h.p. engines average over 600 kg/hr in, the' former areas and between' 100 - 300 kg/hr in other areas. The trawl catch rates for Emperor fishes tend to decline beyond 30 m depth, that of snappers beyond 40 m and the groupers tend to show a rather scattered distribution with relatively low density. However bottom long-line catch rates for emperor fish and snappers tend to reach a peak between 60 - 80 m, depending on the area, and those for groupers indicate a reverse trend. This is probably due to the fact that the trawl net catches a wider size range of fishes while the bottom longline hooks are very selective — not only of the species but also of their size range. As the larger sized demersals are in deeper water, the bottom longline catch,,rates are higher in relatively deeper water but the density pattern projected by the trawl catches is closer to the actual situation. The bottom longline average catch rates realized from past surveys and the BOBP trials are quite similar, varying between 5 and 15 kg/100 hooks, depending on the fishing location.'

In the BOBP trials at a number of fishing centres, operations conducted with about 1000 hooks per set were found to be economically viable in some fishing centres but not in others. Besides the catch rate, the prevailing price structure for demersals caught and baitfish used also contributed to this phenomenon.

Seasonal variations in the abundance of demersal fish are influenced by "recruitment" (entry of young ones into the fishing area), by immigration, by the emigration of different varieties in any one area and by changes in environmental factors, but there is no evidence of movement of specific varieties from -one area into an adjacent area, parallel to the coast line; there is probably a greater movement from shallow to deeper waters or *vice versa.* The peak season for demersals seems to fall mainly within the first half of the year for most areas except the north and northeast.

Data from all past surveys were reanalysed and assessed by BOBP. On the basis of this study, the maximum sustainable yield from demersal resources on the continental shelf is estimated to be in the region of 45,000 metric tons/annum, excluding the Palk Bay and Palk strait areas in the north. The maximum subtainable yield of valuable demersal varieties is about 25,000 metric tons/annum.

In the Palk Bay and Palk Strait areas; maximum sustainable yield of demersals is estimated at 30,000 metric tons/annum and that of valuable demersal species at about 3,500 metric tons/annum.

These estimates indicate that the yield of larger demersal varieties on the shelf would only be about 1 metric ton/km^2 - not a high value. Further, only an unknown fraction of this will be vulnerable to bottom longline gear. Hence a very significant improvement in the bottom longline catch rates, over those realized during the BOBP trials, is not likely. However, careful searching with suitable fish-finding equipment may give slightly better returns in certain seasons in a few areas.

Considering the present level-- of production of demersal species in various districts, the total potential yield available for further increase in production is considered to be 37,000 metric tons/annum for all types of demersal fish, and 14,000 metric tons/annum for valuable large varieties as shown below.

Area	Maximum sustainable yield of valuable species	Maximum sustainable yield of all demersals	Potential yield of all demersals	Potential yield of valuable large demersals
	(In metric tons)			
Mannar — Negombo	6924	11264	6500	2100
Negombo — Matara	9127	17064	14285	6300
Matara — Pattanangala	3347	6222	5500	2700
Pattanangala — Trinco	2608	5350	5000	2400
Trinco — Mullaitivu	2503	3356	240	0
Mullaitivu — Pedro Bank	978	1713	1400	690
Pt. Pedro — Mannar	3429	29815	4200	0
Total	28917	74784	37125	14190

In view of the varying density and exploitation levels in different parts of **the coastline, demersal** fishing on the shelf should be developed area-wise, and capital investments in the sector should be based on potential yield **levels for each area.**

glimpses into BOBP projects

(Continued from page 11)

or wild mango wood. The dugouts have many advantages — long service, easy repair — but the large wild mango-trees required to make them are getting scarcer and dearer. A thousand of the present 15,000 canoes will need replacement every year, and further, the canoe fleet needs to be expanded to cater to the additional fishermen who enter the fishery each year. All this points to the need for developing alternative craft — a process that takes a long time and must therefore begin now.

Fitting nozzles on Indian trawlers

A nine-week FAO-assisted experiment on improving fuel economy by fitting nozzles to two standard 32 ft wooden trawlers concluded recently on an optimistic note in Cochin. Specialist Alexander Kohone was engaged as consultant by the FAO to conduct the experiment with specially designed nozzles and propellers. He was assisted (in trial measurements and fitting) by BOBP's R. Ravikumar. CIFNET, Cochin, coordinated work on the experiment

Says Ravikumar: "A nozzle is a ducted propeller arrangement. It increases propeller thrust at low vessel speeds for the same engine power. And to maintain existing propeller thrust while trawling, lower engine power will -be required, meaning lesser fuel consumed.

"On small inshore trawlers this benefit can be put to use either to drag a bigger net for the same fuel **consumption** or drag the conventional net **at a reduced** fuel **consumption depending on the proportion** of trawling time to steaming time.

"In addition to two nozzles of 9° **and** 12 a Kaplan propeller and **a special slotted blade propeller** invented by Mr. Kohone were tried. **The results were promising."**

The FAO's services to the project **were made available under the** Technical Cooperation Programme **(TCP).** S

We listen to the fisherman" A -profile of Sri Lanka's ADB project

by S. R. Madhu

The 28-footer is Sri Lanka's most popular fishing boat. Making it more efficient and profitable is one of the main aims of a $16.8 million project funded by the Asian Development Bank for fisheries development on the island's west coast. The projéct's strategy and its progress are discussed in the article on these pages.

Experts from Norway, U.K., Belgium, Canada and the- Philippines are working together in Maligawatte, Colombo, to execute Sri Lanka's largest externally assisted fisheries development project. Working with them are Sri Lankan fisheries and banking officials, fishermen, boat-builders and industry representatives.

This impressive exercise in development and technology transfer has been generated by the $ 16.8 million "ADB Project", which covers six districts on Sri Lanka's west and south west coasts: Puttalam, Gampaha, Colombo, Kalutara, Galle and Matara..

Supported by a $ 13.3 million loan from the Asian Development Bank, the project seeks to expand annual fish production by 47,000 metric tons by 1986, boost the incomes and improve the socio-economic well-being of 9,400 fishermen, augment the protein intake of three million Sri Lankans, create 100 additional jobs in shore facilities, save foreign exchange.

To put it simply, by the time the project terminates (end-1986) fishermen on the west coast will be earning more and living better, Sri Lankans will be imbibing more protein, and the Ministry of Fisheries would have strengthened both its infrastructure and know-how.

The project's strategy was formulated by three missions of ADB consultants in 1980-81. Its main feature consists of several innovations designed mainly to improve the profitability and productivity of the island's 28-footers, and maintain their present fishing effort. (More than 2000 28-footers operate at present on the west coast) These innovations include:

- better sails for 1,500 boats.
- propeller ducts or nozzles on 200 trawling boats (to reduce fuel consumption and/or increase thrust)
- 400 boats with new and better hulls and, wherever possible, smaller engines, better sails and-propeller ducts.
- replacement of engines on 200 boats.

The project may also introduce a larger 10.5 metre vessel to the area in small numbers (about 50), to tap offshore fishery resources. This vessel will be better equipped than the standard 28-footers : it will have insulated fish holds and will be capable of two-day and three-day fishing trips. However, the project is adopting a cautious "wait and watch" -attitude on this component; it prefers to observe other projects in Sri Lanka that are presently experimenting with large boats:'

The project will also strengthen the post-harvest infrastructure on the west coast by providing five chilled rooms, 25 insulated trucks-, and a jetty. Overseas training for a selected few from the three "executing agencies" of the project – the Ministry of Fisheries, the Bank of Ceylon, the People's Bank – is another project component.

"This is an integrated project," notes Project Adviser Mandor Farstad. "It complements production investment in the private -sector by infrastructure investment in the public sector. It offers the right mix of investments to take advantage of Sri Lanka's coastline and fishing zone, the country's human resources, jhe fishermen's attitudes, preferences and skills."

This is actually the second ADB fisheries project in Sri Lanka. The first one, a $ 3.1 million project that began in 1973 and terminated in 1980, financed the construction of 200 28-footers, 30 38-footers, fishing gear for these vessels and associated facilities and services. The project substantially increased the earnings of fishermen, and the 28-footer component of it was particularly successful. No wonder then, that the II ADB project has made the 28-footer the focus of its development strategy.

In addition to the $ 13.3 -million loan, the II ADB project also provides a $ 360,000 technical assistance grant (funded by Switzerland) to monitor and implement the project. This grant finances the services of a Project Adviser and a Statistics Adviser.

Technical work is under way right now on the most crucial component of the project: improving the 28-footers. Pilot activities are on for the development of sails, propeller ducts, engines and hulls. When the technical experts finish their job, the bankers will take over: to pick the fishermen who,will get the loans to buy the project's goodies.

This-then is the A.B.C. of the ADB project. To learn more about how it works and what it means, this reporter visited the project in April and met a few of its specialists and counterparts.

Robert **Wiedemann, a freelance** yacht designer from Belgium, is the ADB project's sail consultant. On arrival in Sri Lanka, Mr. Wiedemann went three months studying the fishing craft on its west coast. He saw that the hulls of existing craft were not designed for sailing, but -was confident that the hulls could be modified.

Mr. Wiedemann designed two types of rigs – a "Genoa" and a "Sprit rig". "Both rigs are simple to handle and have high potential for further development," says Wiedemann. "They can help the vessel attain its maximum speed, in light weather (with engine support) or rough weather (without engine support).

Sails (of Dacron material) -were ordered from the Netherlands, and spars and fittings were fabricated at the CEY-NOR boatyard in Colombo.

Below left: "Our project combines knowledge and experience of the past with modern technology" says Mr. Mandor Farstad, ADB Project Adviser. Right: Statistics Adviser Candido Ramos (extreme left), at a fishing village. He has introduced a system of data collection new to Sri Lankan fisheries.

The two sail rigs were fitted on two boats in Galle harbour and comparative sea trials were carried out in May. The trial findings, now being evaluated, will guide the project's next step in sail development.

Mr. Wiedemann is quite optimistic about the economics possible through improved sails. "With a better sailboat and a better sailrig, one can save fuel to the extent of 30 per cent in course of time," he says. "A 28-footer may consume 10,000 litres of fuel per year costing some Rs. 75,000. With better sails, it could save Rs. 25,000. This is not a textbook concept but a practical possibility. There are two conditions, however—the rig should be effective; and the fishermen should be properly trained."

Demonstration of the sail rig, and the training of counterparts and fishermen in the making and repair of sails and in the handling of sail rigs, is part of Mr. Wiedemann's assignment.

Mandor Farstad, economist and management expert, cites facts and figures, sketches graphs and charts, and discusses scenarios for the future with assurance and eloquence. Mr. Farstad has helped execute development projects for the past 19 years throughout the world, including Africa and South East Asia, and has been working with NORCONSULT, a Norwegian firm of consultants, for the past 10 years.

Talking about the 28-foot boats whose improvement is the main ADB project component, Mr. Farstad says that fishermen have accepted the 28-footers. These boats obviously have many positive features, but also a few limitations — such as the amount of gear or fish they can carry, the duration for which they can carry the fish. "The fishermen seem to say : 'If I have caught 50 kg of fish, it's enough. And if I have'nt caught 50 kg of fish — well, I've had enough'."

"So we have taken up this boat, modified the hull a bit, made a few other alterations, and made it suitable for the most advanced type of fishing. It is not a drastic change. But it's something the fisherman will understand and appreciate.

"We don't shoot off new designs disregarding what has already been done. Our project combines knowledge and experience of the past with modern technology, research and evaluation methods. Our close association with the BOBP and the Ministry of Fisheries has helped us come up with concrete proposals for the fisherman. Most of the BOBP's experiences have been incorporated in our work, and I appreciate the help given to us.

"This should answer your question about how the ADB project is different from others. We are upgrading the fishermen's profitability with what they already have and what they already know.

"We don't believe in laboratory or drawing board solutions. We listen to the fisherman. And we find him helpful."

Nearly 10,000 fisherfolk of the West Coast, such as those shown here, will improve their incomes and socio-economic well-being through the ADB project. It will also expand fish production and augment protein intake.

Discussing the progress of some components of the project, Mr. Farstad said that the propeller ducts or nozzles (which can increase the thrust of a trawling boat), would be finalized and delivered by mid-1984; improved sails would be ready early 1984; technical work on new hulls and new engines for the 28-footer would be completed by 1984.

Pressed for details, Mr. Farstad said that different options on propeller nozzles — such as a locally designed and fabricated nozzle and a new type of nozzle now under design — would be studied. A new 28-ft hull design was being prepared and was expected to be ready in a few months.

An independent evaluation of this hull would undertaken by representatives of the Ministry of Fisheries and the Industry.

About the 10.5-metre boats, Mr. Farstad says "We are assessing the viability and the magnitude of investment in the 10.5 metre boats. For the present we are tapping the catch potential with small boats before we go into larger vessels." If adjudged viable, construction work on the 10.5-metre boats may commence early 1985.

The post-harvest components of the project — chill rooms, insulated trucks and a jetty — are technologically less demanding than the other components; they are being taken up early 1984.

Mr. Candido Ramos of the Philippines, Statistics Adviser to the ADB Project, is trying to introduce a system of data collection new to Sri Lankan fisheries. Normally, permanent employees of the fisheries department, who live far away from the landing centres, are assigned to collect data. Under the new system, this data will be collected by the resident villagers themselves — or rather, by two or three people selected from that village. This will save time, reduce transport cost — and, most important, ensure that data is collected regularly, accurately and in ti,me.

Further, the existing statistical system provides production data by district and by groups of fish species, not by individual species. This is insufficient for stock assessment. A Standard classification of fish species and of boats and gear in Sri Lanka is essential for development planning, also for effective interaction with international aid agencies.

The new system seeks to meet these requirements, says Mr. Ramos. He adds that twenty two people from fishing villages will be engaged as data collectors for the six project districts. They will obtain data by craft-gear combination and by detailed species, and fill simple forms. The data will include such details as distance of fishing ground, fishing time, number of fishing days and number of fishing trips. The gear and the boat type are easily recognizable and all other information can be got by actual observation.

Forms to be filled by the data collectors — now under recruitment — have been finalized. If this new data collection system works, it will be extended to the rest of the country.

Mr. Ramos is also helping initiate a socio-economic survey to begin in June. A complete list of marine households of the area will be prepared, and a sample survey will be conducted by extension officers of the Ministry of Fisheries. The ADB has provided a $ 20,000 grant for the socio-economic study and for the new system of data collection and analysis.

The Ministry of Fisheries wants a nationwide socio-economic survey. The island's fisheries statistics are based at present on a 1972 study, so such a survey is long overdue.

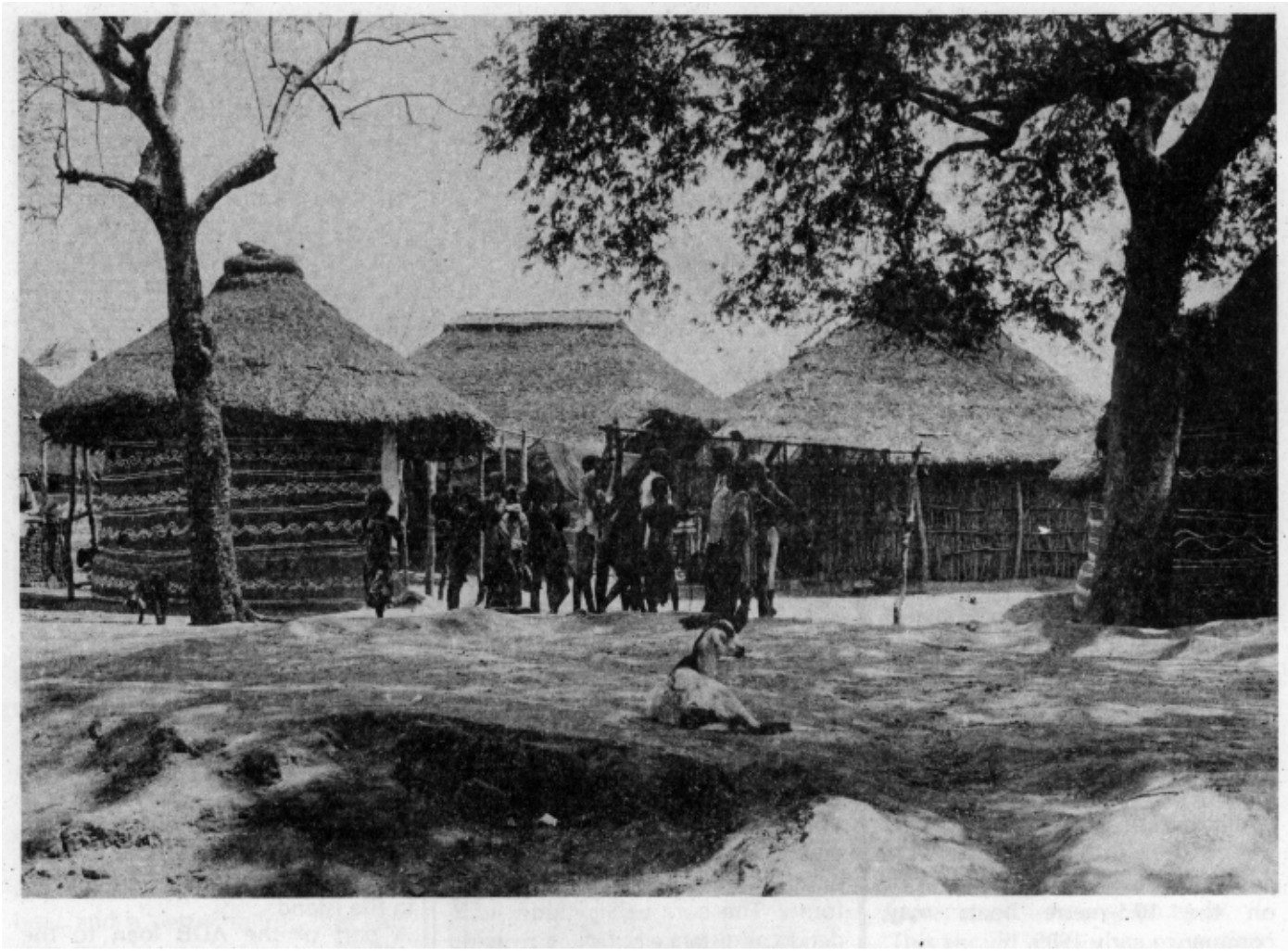
A committee on Improvement of Fisheries Statistics and Generation of Baseline Data has now been set up in Sri Lanka. It includes representatives from NARA, the Department of Census and Statistics, the Bank of Ceylon, the People's Bank, the ADB Project, the Abu Dhabi project and the Ministry of Fisheries. With the setting up of this committee, the new system of data collection and the socio-economic survey, a good foundation has been laid for a sound fisheries statistical system in the island.

A part of the ADB loan to the Sri Lankan Government will be re-lentto the Bank of Ceylon and the People's Bank. These banks in turn will sub-lend to the project's beneficiaries — the fishermen (for vessels, sails, engines, propeller ducts) or entrepreneurs (for chill rooms and insulated trucks.)

How are these beneficiaries to be picked? A District Project Committee has been set up for each of the six districts in the project area to screen and process applications. It will be headed by the District Fisheries Extension officer. The two banks will also be represented on it.

Says **Mr. H.B.A.** Forbes, Assistant General Manager of the Bank of Ceylon : "The I ADB project involved us for the first time in non-collateral loans. We learned a great deal from the experience ... and we are now better geared to handle a similar project. We have improved our reporting and management information systems and I expect a much better rate of loan repayment this time."

And that's an outcome that should delight a project that "listens to the fisherman," as Mr. Farstad puts it.



The fisherfolk of CBV Palem

by D. R. Mohan Raj

A writer from Hyderabad forays into a fishing village for the first time, and sets down his reactions as also vignettes of the men and women he meets.

The landscape is etched by winding creeks, the sea or the river never far away. Amidst the bushy mangrove trees running alongside the creeks are located several fishing hamlets, one resembling another. The hamlets got established presumably because the creeks are particularly rich in fish, combining the fertility of the river and the sea.

A long name belies its size. Chinna-bodduvenkatayapalem (CBV Palem, for short) is part of the cluster of small fishing villages 20 to 25 km south of Kakinada on the Andhra Pradesh coast. Long names seem part of a tradition where villages bear the names of gods or of notable men.

Fishermen are migratory by nature, just as the fish they pursue are restless and mobile. As their avocation requires them to wander into the **waters, wandering soon becomes a** habit; they move out of one village, into another.

And yet there are men who stay, building a way of life that grows as established as any tradition we know. We discover this in CBV Palem, a friendly hamlet not openly resentful of city folk intruding.

Palepu Tanukaliah, a fisherman in his 50's, owns a Rs. 2,000 *nava,* and a dragnet -worth Rs. 600. He has a son and three daughters, all but the youngest who is 13, married. The son, 30, lives separately, but often teams up with him to fish.'

For a typical "hunting" expedition, Tanukaliah leaves around 4 p.m. and takes 2½to 3 hours to reach his fishing area, a shallow spot on the Kakinada Bay where he anchors the craft and eats food he has carried on to the boat; when tired, he and his partner even sleep briefly, taking turns. At about 8 p.m. they walk in water knee-to-neck deep, dragging the net along; Triangular in shape, the net has its short end tied to the boat, the longer end held by the two men. Every 15 to 30 minutes, they empty the net into the craft, then resume dragging. This operation goes on for nearly 10 hours. Their catch, brought ashore around 8 or 9 a.m., would typically consist of small prawns, tiger prawns (some 5 to 6 pieces a night), a few crabs, occasionally a jewfish, and some miscellaneous varieties of fish.

Holidays from fishing are frequent. While the position of the moon and traditional beliefs play apart, approximately every 5th and 6th day is off fishing. Out of the night's earning of Rs. 20, Tanukaliah may reserve Rs. 2 to Rs. 5 for recreation or personal expenses, the rest goes to the family.

Rekadi Ramaswamy, a village elder, is in his mid 70's. He migrated from Kajulurü (perhaps Cuddalore), Tarnil Nadu, more than 50 years ago. There is little in fishing he has not seen or experienced.

Sometime -in 1964, he was out fishing at sea with five other men. Their catch was good. A cyclone developed rather suddenly; Ramaswamy's *nava* became unstable and was about **to** sink. He and his friends threw their ropes down and attempted to anchor the boat so it would be dragged along the drift of the sea, using their nets as protection against the lashing waves.

They stayed out at sea, seemingly forever. Due to- the cyclone, they could not judge their location from the stars, the moon, or the sun. Only, the direction of the swell pointed them to the location-of the shore.

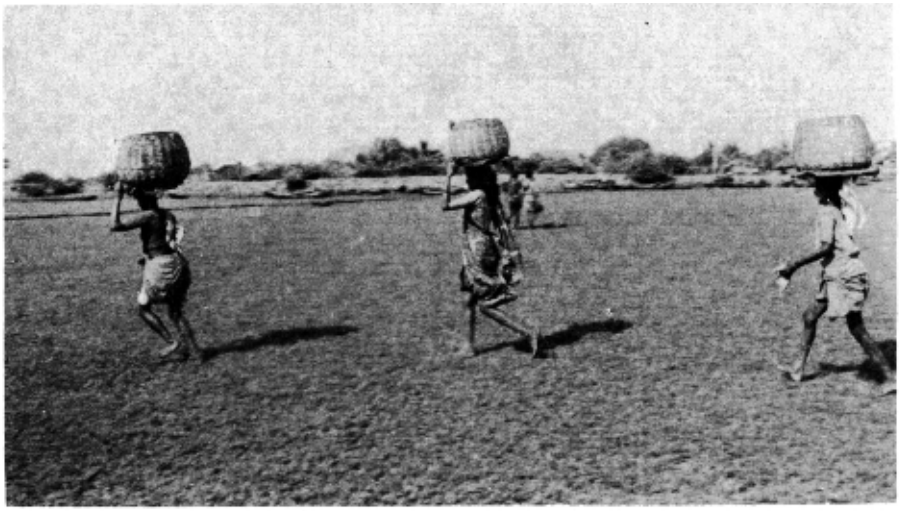
After the storm had subsided, they saw another navawith three survivors — two or three had died in the cyclone. They met the other nava, and shared provisions: one craft had rice, the other water and matches to light a fire with. They saw a relief helicopter and signalled for help; the helicopter just passed them by. They hit the shore at Rameswaram village, having drifted some 20-odd miles south at sea.

Ramaswamy views cyclones as routine, having met several in his fishing life. But he has not seen a tidal wave. His village now has a cyclone shelter, built in the, wake of the 1977 cyclone and tidal wave that destroyed several other villages in Andhra Pradesh. The structure is a waste, he feels; it should be used. A temple for Lord Venkateswara has long been an elusivQ village dream; may be the structure should house such a temple.

Ramaswamy's son Sathyam, 30, is not an active fisherman. He gets sick at sea. The family owns a shop — the only one in the village, a veritable storehouse, a supplier of several bottles of soda to us visitors. it also rents out bicycles. Sathyam helped the village cooperative raise Rs. 10,000 locally toward a fish transport van, a sum -they have deposited with the State Bank of India. About the cyclone shelter, Sathyam's views differ from his

A CBV Palem fisherman being interviewed by the writer.

Above : Fisherman Palepu Tanukaliah outside his home. Below : Women play a prominent role in fish auctions.



Women traders hurry to the market, fishloads on their heads.

father's. He believes it should be given to the village youth for community activities and for classes in vocational skills.

Natra chinnavenkateswara **41, the local tailor, also doubles up as a community health visitor on an honorarium of Rs. 50 per month. He brings medicines from the hospital, 5 km away, distributes them periodically; gives first aid and advises treatment where needed; goes and fetches the doctor himself at times. He tends to the village pond, adding chlorine periodically to make the water safe for drinking.**

Chi nnabodduvenkatayapalem is a village with deep roots, yet shows clear evidence of openness to change.

Suryakantamma is the wife of Rameswar Rao, a fisherman in his mid-40's who has been fishing for some 30 years. She gets up before sunrise, about 4.30 or 5 a.m., cleans utensils, tidies up the house, fetches water from about 300 m away, feeds her younger children a breakfast of porridge, sends them to school, and begins cooking, aiming to keep the rice cooked and ready as her husband and son- return from fishing. The hunters bring fish home for the curry, and cooking is completed by 11 a.m. As father and son eat and sleep, the mother fetches morewaterand cleans house again. (Rameswar Rao and his son earn Rs. 40 to 50 a trip.)

Next door to Rameswar Raó lives Kameswaramma, a cousin, also linked by marriage. Kameswaramma buys, processes, and sells fish. She has been in the trade some 15 to 20 years. She buys fish locally, and is established enough to have the goods delivered at her door. She cleans out the scales and impurities from the fish on a knife-board (neighbours often lending a hand), washes them, preserves them in tubs of salt for a day, dries them in the sun, and then sells; a part of the fish she buys is also smoke-dried, which makes it a delicacy. Kameswaramma's son does the bargaining and buying; she does the selling at the market twice a week, travelling 30 to 40 km to do so. She complains of storage losses, luggage and hauling charges, bribes for the bus crew who will decide at their whim and fancy when and where to carry the fish bags. Her daily turnover is Rs. 300 to Rs. 400; she sells in small heaps of Rs. 10 to 20; about profits she maintains a trader's silence.

Not all -buying of fish in the villages is done at merchant's doors. Most of it, in fact, is bought and sold at the beaches. We visit the spot for some first-hand impressions. The wet, uneven, marshy shore is a hub of activity. Men and women traders vie with each other, bidding for basketfuls of fish brought ashore.

We meet Rekada Tathiah, 75, one of the five grand old men who form an "elders council" that administers justice in the village.He explains the system. A case he can remember from the not-too-distant past is of a property dispute that resulted in physical assault. When a wrong occurs, the aggrieved party registers a complaint with one of the elders, paying a fee of Rs. 1.25, and informs the other four as well. An official messenger is sent asking both parties to maintain peace. Eye, witnesses are called to testify before the council at a week's notice, and hearings held under oath near the village temple.

Both parties are present when the eye-witnesses testify. Then a secret council is held by the five elders; guilt is established, compromise or agreement advised where appropriate, fines imposed in cases of wrong-doing. The money raised in fines is used for the temple. If someone does not obey the council, total social ostracism is practised — no water from the village, no firewood, etc. If the party disagrees with the council, it has the right to go to the police or the regular judicial process: this seldom happens.

CBV Palem does not seem like a migratory society to me, certainly not like one without roots. And for a village with such deep roots, there is clear evidence also of openness to change.

Inside CBV Palem

CBV Palem has a population of more than 1,800 with some 300 households and 400 families. An average family has 5 to 6 members. A quarter of the households have joint families. A ring road links the village with a cluster of villages in the area, and with the main road a kilometre away that runs south from Kakinada to Yanam. Buses pass by on this route every 20 to 30 minutes; they are always overcrowded.

The fisherfolk's houses are a study in themselves, an inner layer of timber or logs plastered neatly and smoothly with mud. Men build the log structure, women do the plastering and then paint the surface, or draw designs on them. The roof consists of woven thatches, the work of skilled, hired labour.

There are no taps in the village. Most people draw water from wells, some fetch water in mud or brass containers from a village tank. Electricity has come to the village, though its distribution is uneven. As for education, the village has a primary school (classes up to the fifth standard), but the nearest hospital, cinema house and 'panchayat samiti' office are five km away, at Tallerevu.

A health inspector visits CBV Palem every week, and a "Community Health Visitor" appears more often. Stomach diseases are frequent, T.B. hits the area occasionally. Some 25% of the villages' 300 couples are said to practise family planning.

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