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COCKLE CULTURE IN MALAYSIA

If you've eaten fried, boiled or curried noodles in one of Malaysia's ubiquitious noodle shops, you've probably tasted the cockle, *Anadara granosa.* You may also have tried them lightly boiled and served with a spicy chilli sauce as a condiment. Thanks to Malaysia's premier aquaculture crop, you have enjoyed a nutritious and inexpensive product.

While the cockle is collected from natural populations in several ASEAN countries, intensive culture is practised only in Thailand and Malaysia, and has reached truly impressive proportions in the latter country. As far as anyone knows, the industry was started in Malaysia by the innovative headman of Bagan Panchar village in Perak state back in 1948. He transplanted a bit of cockle seed from a nearby natural bed to a small area of mudflat in front of the village. It didn't take long to appreciate the commercial possibilities of the rapid growth and high survival shown by this first attempt. Cockle farming spread rapidly, especially on Penang Island and nearby Perak state, until today at least 40000 tons are harvested annually, some of which is exported to neighbouring Thailand. In fact, it might be said that the industry has "matured" in the sense that all known seed resources are utilized and most readily accessible culture beds, at least in Perak state, are farmed.

From humble beginnings in 1948, cockle has become *Malaysia's premier aquaculture crop. The growth of the cockle industry, its problems and prospects,* are *highlighted* here *by American aqu.aculturist Charles Angel!, who recently spent two months in Malaysia as BOBP consultant to assist* the *Fishery Research Institute, Penang, in cockle research.*

Cockle farming is relatively simple, but ultimately depends upon a supply of small seed cockles from natural beds. The government has limited the use of these areas to seed harvest and collection of "wild" marketable cockles — no farming is permitted.

Because of the dependence on natural seed, other management measures have been introduced by government and include size limits on both seed and marketable cockles, whether harvested from farms or natural beds. A minimum size limit of 6.4 mm on seed harvest is presumably designed to ensure maximum seed survival and accumulation on

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the seed beds. A minimum size of 31.8 mm 'imposed on marketable cockles is intended to ensure adequate spawning by adult cockles, which in turn will result in greater seed production.

In the case of seed beds, fisheries enforcement officers monitor the young cockles on the beds and when they have reached a minimum size of 6.4 mm, licenses are issued to seed collectors and the bed is opened for harvesting. The seed collection may be permitted on a particular bed from a few days to several weeks. There appears to be considerable clandestine seed harvesting before licenses are issued or fisheries officers are even aware that seed has appeared on a bed. Indeed, cockle farmers do not hesitate to state that they prefer seed a few millimeters smaller than the legal minimum.

Seed collectors, usually fishermen from villages adjacent to the seed beds, sell to wholesalers who in turn sell directly to farmers. The marketing unit is the "tin", based on a 5 gallon kerosene tin and holding about 16.5 kilograms of seed. The appearance of cockle seed represents an opportunity for local people to make some substantial short-term income. Up to $1000 can be earned by a family on a good collecting day! The price received by the collector is determined by size and quality; as the season progresses the price declines because cockles increase in size and quality falls, i.e., more extraneous matter is included in the seed as collectors move into marginal areas.

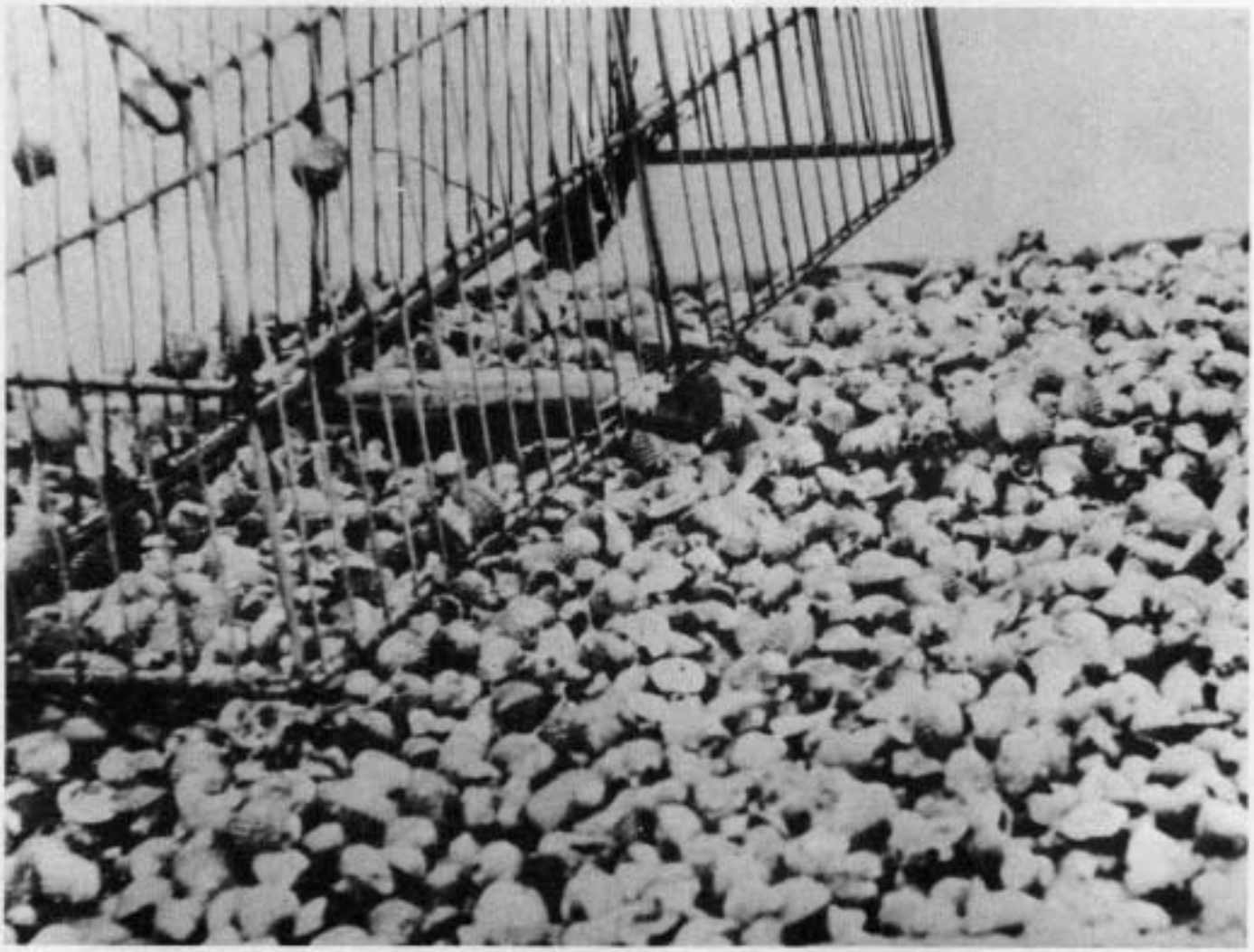
Seed beds are found all along the west coast of peninsular Malaysia, but the major producers are found on Penang Island and along the shores of Selangor state. The present seed supply situation is difficult to ascertain because of the dispersed nature of seed collection, so that in addition to clandestine harvesting, it is difficult to collect statistics. Until now, little has been known of the fate of the tiny cockles from the time they first appear or "set" on the beds until they are harvested.

Scientists at the Institute of Fisheries Research on Penang Island are intensifying and expanding their study of cockle seed mortality and growth from setting to collection as one activity under the BOBP-supported cockle research program already in progress at the Institute.

Besides the difficulty of quantifying seed production, cockle seed beds appear to shift location in some areas, Penang being one example. A bed may be productive for several years, then seed suddenly fail to appear, only to reappear several years later. Although the reasons for this are unknown and do not appear due to any human cause (pollution, for example), the shifts may be rglated to changes in currents during-the pelagic phase of the cockle's existence. Drift bottle experiments are planned for the future and should help clarify distribution patterns and the relationship between culture beds – those in Perak state, for example, and major seed beds in Selangor.

(Continued on page 4)

A close-up of harvested cockle along with the gear.



A Letter from the Publisher

TIME FRAME FOR DEVELOPMENT

The BOBP's SIDA-funded project for small-scale fisheries development has just entered upon its seventh year of active operation. There is not much more than a year to go before it winds up. BOBP's support to small-scale fisheries will hopefully continue, but under different forms of funding and organisation.

In the recent past, some clear and measurable results have been attained. These have been featured in earlier issues of the Bay *of Bengal* News. Notable successes are the impact of aqua-culture demonstration in Thailand, high-opening bottom-trawling in India and Sri Lanka, and the credit scheme in Orissa. Several other activities in progress have a high potential impact, but have yet to reach fruition. These cover complex technical subjects like beachlanding craft and people-oriented extension work concerned'with income generating-activities for women and non-formal education for fisherfolk, both men and women.

If a project is to make an impact during its own lifetime, it will have to be of long duration. Ours has been more fortunate than many others, thanks to the foresight of the designers of the project and the funding agency. But is eight years sufficient?

Let's look at our development work on beach-landing craft in India as an example. If the project had been limited to the original five years, it is very likely that the work would have remained unfinished without further follow-up, negating most of the previous effort put into it. It was only during the sixth year that a breakthrough was attained in engine performance and economic viability. Further nursing of the introduction of the craft i's required and it is not at all sure that the work can be completed during the period that is left.

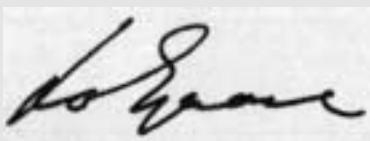
It has been stated repeatedly at expert consultations and seminars that small-scale fisheries projects need to be of long duration to enable any improvements to be devised, accepted and widely applied. There is universal agreement on this issue, unlike those related to the whats, whys and wherefores of development.

Yet, development agencies often disregard the need for long-term involvement and agree to projects of short and insufficient duration. Result : half-done jobs, inconclusive findings – which often mean that the jobs have to be done again from scratch. More expenses. The funding agencies are often unable to make long-term commitments because of their bureaucratic procedures; the recipient governments concerned are usually and understandably interested in quick results, often for political reasons, and the "experts", both national and international, while conceptually adhering to the need for long-term engagement, often fall into the trap of enthusiasm and optimism and think that the world can be changed overnight. All those involved are to be blamed for the inadequacy in project planning.

In general, small-scale fisheries development would benefit from target-oriented technical assistance inputs, rather than from time-bound inputs. Projects need to be more open-ended to effectively meet the hopes and aspirations of those concerned. It may be argued that such an approach might lead to "endless" efforts not commensurate with the ultimate benefits. This point is very valid, and the target approach must include thorough analyses of alternative development scenarios and evaluations of progress – so that directions are determined and unproductive avenues are cut off.

Whatever we do will take time, and if we are committed to small-scale fisheries development we must be ready for a long hard slog.

LARS 0 ENGWALL



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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COCKLE CULTURE IN MALAYSIA

(Continued from page2)

The results of studies of growth and survival of natural seed will enable government to review the minimum size restriction on seed on the basis of adequate data.

The cockle farmer purchases seed through a wholesaler, who may have a long-standing relationship with the villagers from whom he buys the seed. The wholesaler has to organize transport so that transit time will not exceed 12 hours. This is particularly important for the more desired smaller sizes. Larger seed of around 1600 pieces per kg can withstand considerably longer periods of time, up to 24 hours; this was often exported to Thailand before the recent stepped-up enforcement of a long-standing export ban.

Culture practices vary among farmers, but the general pattern is to plant the seed at high density in a portion of the farm set aside as a nursery. Thinning is done when the cockles have reached a count of about 480 per kg. On some farms this may take 3 to 4 months, while some farmers who are working older beds claim that as long as nine months are required before the cockle can be transplanted or thinned. One of the great difficulties of assessing the productivity of cockle farms in Malaysia is that of obtaining accurate data on seeding rates and areas farmed from the farmers themselves. In many cases the actual area cultivated may considerably exceed that authorized by license, hence an obvious reluctance to divulge precise data.

Harvesting of cockle– a job for specialist fishermen.

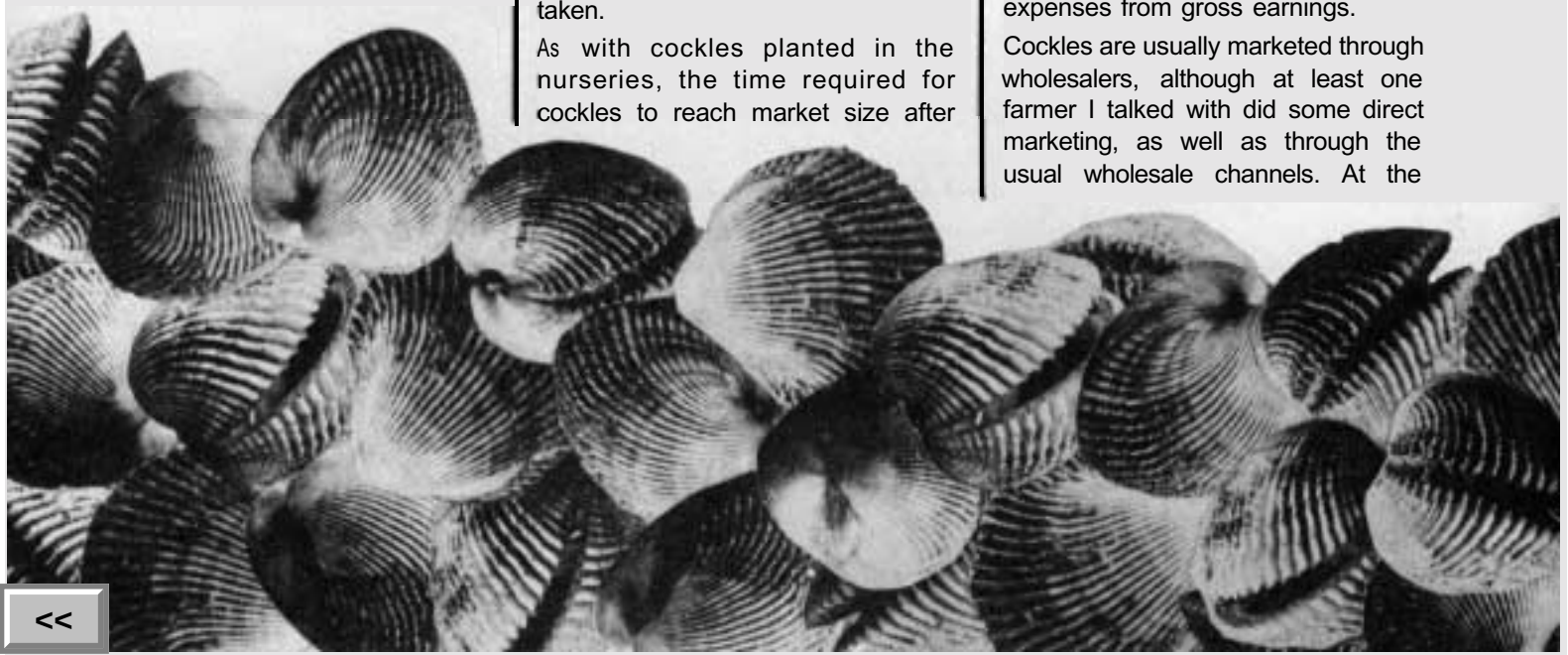
Cockles are harvested by fishermen who specialize in this task. Often they own their own boats and bear all operating expenses. Harvesting gear is simple, consisting of a scoop fabricated from steel bar and operated manually. As the boat's rudder is set to drive the vessel in a tight circle, the 'scoop is lowered directly to the bottom, at most 2 meters during high tide. By means of a long pole, the scoop is kept firmly planted in the bottom as the boat turns on the circular course.

The mesh size of the scoop is set to permit escape of undersized cockles, but as the scoop fills up, the full range of sizes on the bed is probably taken.

As with cockles planted in the nurseries, the time required for cockles to reach market size after thinning varies from area to area and is influenced by the age of the culture bed. Again, growth rates decline as the culture area ages. In new beds, as few as eight months of growth will produce a marketable cockle, whereas those that have been farmed for a number of years require 15 months or longer. Yields are reckoned as the amount of cockles, or gunnys, produced per tin of seed. A gunny contains four tins of cockles. During my recent but brief visit with farmers, I heard estimates ranging from four to ten gunnys per tin.

The farmer purchases cockles daily from his harvesters, paying in the neighbourhood of Malaysian $5.00 per bag. A collector can harvest 20 to 30 bags a day, depending on tide and cockle density on the beds. He must subtract all his operating expenses from gross earnings.

Cockles are usually marketed through wholesalers, although at least one farmer I talked with did some direct marketing, as well as through the usual wholesale channels. At the



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Collection of seed. Seed beds are found all along the west coast of Peninsular Malaysia.

time of my visit during March, farmers were receiving about $16.00 per gunny (four tins of cockles).

Cockles are farmed within the framework of several business organizations. These include individual "entrepreneurial" farmers, fishermen's cooperatives and farms owned and operated by the Fisheries Development Institute of Malaysia (Lembaga Kemajuan Ikan Malaysia). Plots must be licensed under the authority of state governments and fees vary from state to state. National policy is to restrict new licenses to fishermen's cooperatives. Eventually, those farms operated by LKIM will be turned over to fishermen's cooperatives.

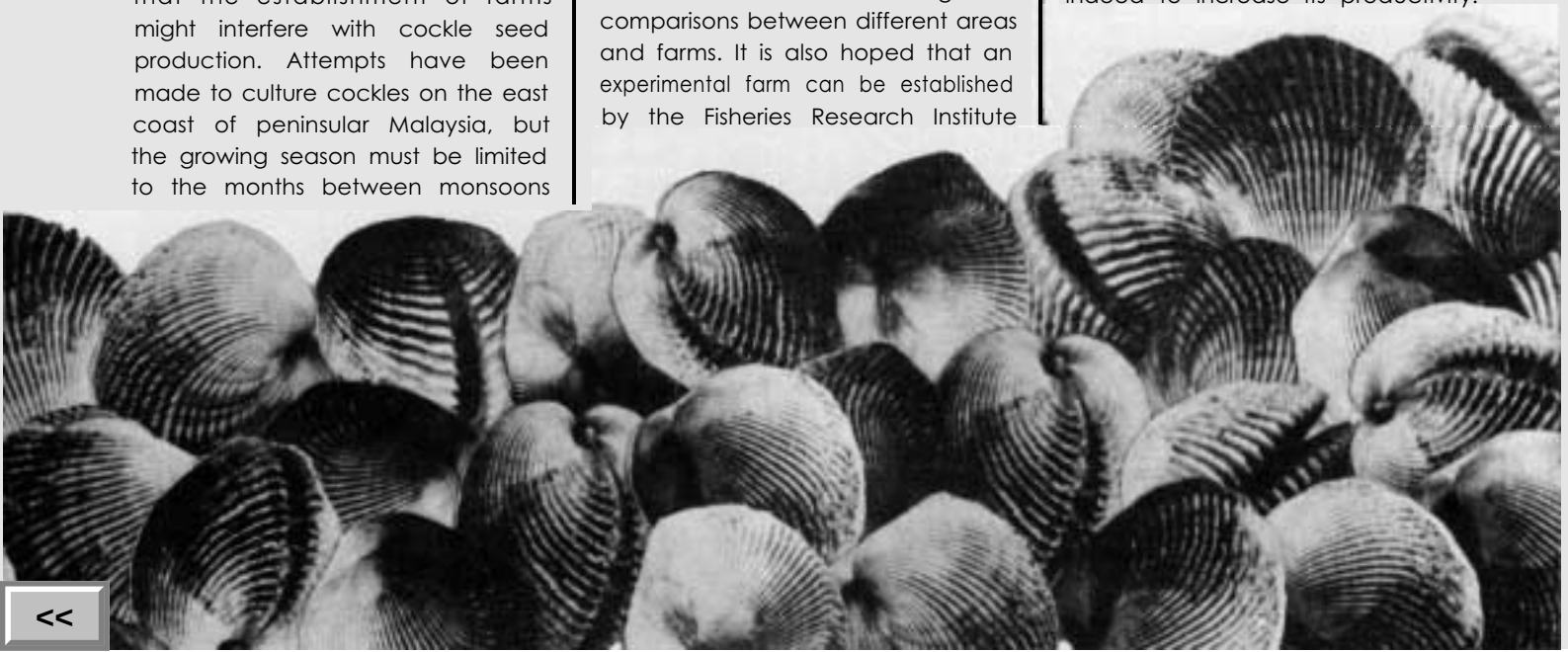
Potential areas for expansion of cockle farming exist, but in the case of Selangor state, there is concern that the establishment of farms might interfere with cockle seed production. Attempts have been made to culture cockles on the east coast of peninsular Malaysia, but the growing season must be limited to the months between monsoons with the result that cockles cannot reach the legal size restriction.

Thus the industry is confronting a variety of management problems which require additional knowledge that must be obtained through research. Indeed, the BOBP programme in Malaysia is supporting several research activities intended to fill these gaps. I've mentioned the studies of seed growth and survival. In addition, an exhaustive study is under way of growth rates using length frequency data collected from a number of farms. There will shortly be a consultancy to assess the feasibility of using daily growth marks on the shells as an ageing tool. Length frequency data is now being analysed with the ELEFAN series of programme developed by ICLARM which will enable growth comparisons between different areas and farms. It is also hoped that an experimental farm can be established by the Fisheries Research Institute which will lead to improved farm management techniques.

The minimum harvestable size regulation of 31.8 mm is by far the most controversial conservation measure taken by the government. Although cockles spawn initially when they are about 25 mm, the frequency of spawning between size at first spawning and the legal minimum size is not known. However, as part of the field work under way by staff of the Fisheries Research Institute, data is being collected on seasonal changes in the condition index, which reflects spawning activity and which should shed considerable light on the minimum size question.

Little has been previously known about the pelagic phase of the cockle's life cycle; consequently I recently spent several months at the Institute assisting staff biologists develop a laboratory rearing system for cockle larvae. If larvae can be successfully reared in the laboratory, their positive identification in plankton samples will be possible. And this capability could lead to the prediction of spatfalls, both as to time and location. The effects of environmental factors on the length of the pelagic phase will aid in studies of the dispersion mechanism. However, the success of the work will depend on overcoming a severe water quality problem brought on by heavy construction in the vicinity of the Institute.

The aim of all this activity, at times frenzied, is to provide a solid base on which to conserve the natural source of a productive industry and indeed to increase its productivity.



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TWO YEARS AFTER In-Service Training of Orissa. Fisheries Extension officers: An Assessment

The in-service training organized by BOBP for Orissa marine fisheries extension officers during 7982-83 was wide-ranging in scope and spurred some significant development activities. In this article, BOBP's extension training officer, Dr. U. Tietze, takes a critical look at the whole scheme, its achievements, impact and replicability.

In March 1982, BOBP started an in-service training programme for marine fisheries extension officers in India's east coast state of Orissa. The programme yielded tangible results in several areas including fisheries finance and fisherfolk education. The programme came to a close in July 1983, but led to several development activities which are still continuing.

Two years after the completion of the training programme, which is the only one of its kind in India's east coast – with officers posted in fishing villages all along the coastline directing their efforts exclusively at small-scale, mainly artisanal, fisherfolk – a number of questions arise. These are particularly relevant to fisheries administrators of other coastal states in India or elsewhere in the region who still wonder whether a small-scale marine fisheries extension service will be administratively viable.

- What did the extension service in Orissa actually achieve? Are the achievements accountable in terms of common criteria of administrative performance?
- What did the in-service training programme contribute to the performance of the extension officers?
- In what way does the programme differ from traditional departmental pre-service and in-service training activities?
- Could a similar training scheme work without BOBP involvement? Can it be easily adapted to other states and organizations?

This article briefly summarizes the objective and functions of the extension service evolved in cooperation with BOBP. The article then outlines the rationale and structure of the BOBP training scheme and describes its implementation, and also the tangible results from the scheme.

Functions and responsibilities of extension officers

Orissa's fisheries extension service was established in 1981 to cater to an artisanal marinefisherfolk population of more than 100,000 including about 30,000 active fishermen. They account for the major part of Orissa's marine catch and operate what are mainly non-mechanised craft and gear from open beaches or river mouths close to the 236 fishing villages of the state distributed over a coastline of 480 km. All 15 extension officers, assisted by two subordinate staff each, are posted in fishing villages at the sea coast and not in the block headquarters as is the usual practice in India. Harbours and major landing sites of mechanised boats are looked after by a separate group of fisheries officers.

fisherfolk settlements of Orissa often lack such amenities as clean drinking water, electricity, education, medical care, communication, etc. Superstitions and feudal and/or exploitative relationships abound. The comparatively low living standard of marine fishing communities in Orissa – as elsewhere – is due not only to low productivity and per capita production or due to low economic returns but also due to the socio-cultural and economic conditions within these communities.

Accordingly the task of Orissa's Marine Fisheries Extension Service has been two-fold: it aims on the one hand at improving the socio-economic conditions of the fisherfolk; and on the other, at the efficient exploitation and conservation of the fishery. Extension work also includes attempts to change attitudes, beliefs and norms, and to eliminate social injustice and exploitation.

The present functions and responsibilities of extension officers in Orissa can be classified into seven groups, containing altogether 17 different tasks or schemes.

1. Financial Assistance to fisherfolk : This includes Central Government-assisted schemes such as the Integrated Rural Development Programme (IRDP) **(1.1)** and State Government-assisted schemes such as Assistance to Traditional Marine Fisheries (ATMF) (1.2) schemes financed by the Scheduled Caste Finance Cooperative Corporation (SCFCC) (1.3) as well as direct bank finance coordinated by BOBP (1.4).

Financial assistance to fisherfolk includes supply of information to fisherfolk about prices, types and availability of known and new fishing inputs as well as organizing actual supply in the context of various schemes

2. *Social Welfare and Relief* includes Central Government-assisted programmes for Economic Rehabilitation of the Rural Poor (ERRP) (2.1), and Abolition of Bonded Labour (2.2), the Saving-cum-Relief Scher ne (2.3), the

Cyclone Relief Scheme (2.4) and the Accident Insurance Scheme (2.5).

3. Fishing Methods and Fisheries Technology : Introduction of motorized beachlanding boats developed by BOBP, under the scheme of the National Cooperative Development Corporation (NCDC) (3.1). Replacement of traditional by modern accessories for fishing as well as dissemination and diversification of traditional craft and gear under various financial schemes.

4. Community Development/Instrastructural Facilities: Non-Formal Primary Education of Fisherfolk (4.1), in cooperation with the Orissa State Council of Educational Research and Training (SCERT) and BOBP, under the Central Government-sponsored scheme 'Comprehensive Access to Primary Education' (CAPE). Construction of Landing Platforms (Central Government scheme) (4.2).

5. Fishermen's Organization : Technical advice to fishermen's cooperatives (for administrative/management and organizational matters cooperative inspectors are posted).

6. fisheries *Statistics* : Collection of catch and effort data conduct and up-dating of fisheries census.

7. Marine Regulations : Registration of traditional craft and gear under Marine Legislation Act.

In the area of Community Developmentilnfrastructural Facilities, additional schemes such-as sinking of tube wells are at present prepared at the headquarters but are likely to come under the purview of the Fisheries Department soon.

Marketing/distributing of fish and fish products, as well as handling and processing of fish are not at present among the functions of extension officers.

In view of the variety and diversity of these functions, the extension officer is regarded as a generalist, who has to be supported by specialists in various fields.

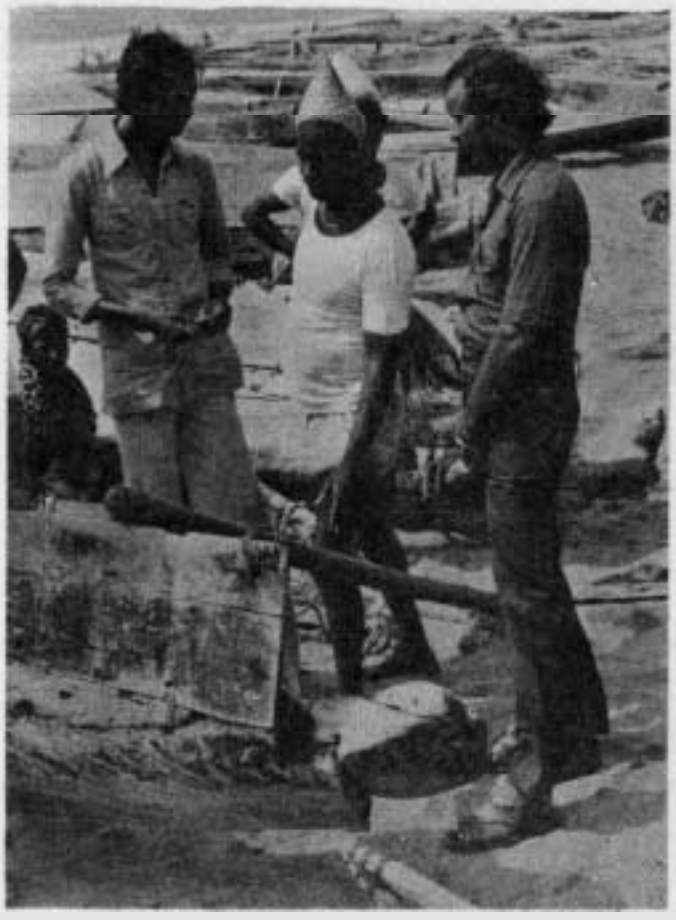
Rationale and Implementation of BOBP In-service Training Scheme

The only training usually provided for fisheries extension offices by the Directorate of Fisheries consists of a 3-month pre-service training on fish and pond culture,

Table 1 : History of Orissa's in-service training programme for marine fisheries extension officers (March 1982 - July 1983).

Period	Techno-demographic study	Module I Financial assistance to fisherfolk	Module II Community Development	Module III Fishing gear and methods
— March to December 1982 —	Conduct of techno-demographic census of artisanal marine fisheries of Orissa: compilation and analysis of data Assistance in conduct of socio-economic study in fishing villages.	*Survey of credit needs and sources*, spending and and saving habits. *1.5 week training course in extension work and fisheries finance.* Negotiation with banks, devising strategy for credit flow; specifying need for special formats and procedures. Designing of formats & procedures for loan application and appraisal: calculation of costs and earnings of common craft and gear combinations; drafting of financial schemes; *field workshops & on-the-job-training*, sponsoring of loan applications to banks.	*Survey of community needs* in areas such as education, housing, health, hygiene, nutrition, etc. *One-week residential training course on community development and extension techniques.*	Compilation of *inventory* of artisanal fishing craft and gear.
— January to July 1983 —	3-day seminar to inform public about result of socio-economic study. *Result/follow-up :* - Techno-demographic census - Socio-economic study.	*Result/follow up :* Preparation/ implementation of a Rs. 65 lakh NABARD fisheries credit scheme, operational up to June 1986 including 9 banks with 27 branches in all coastal districts of Orissa.	Identification of educational needs of children. Motivation of fisherfolk to send children to school and to contribute/ construct addl. schools. Assistance for development of learning materials. Field workshops and on-the-job training. *Result/follow-up :* Establishment of 40 experimental non-formal primary schools in fishing villages in cooperation with the State Council of Educational Research & Training and UNICEF for development of special learning materials.	*2-week residential training course on fishing gear and methods.* Consideration of scope for diversification and further dissemination of traditional craft and gear while preparing financial schemes. Study of economic, technological and social viability of innovations in craft and gear. Field workshops and on-the-job training. *Result/follow-up :* Preparation of schemes for introducing 20 motorized beachlanding boats.

In Puri,, proud recipients of fishing craft distributed under BOBP's credit scheme for fisherfolk, pose with one of the craft. Below : Orissa extension officers collect data *for* a socio-economic *survey.*



conducted at the Training and Research Institute of the Indian Council of Agricultural Research at Kausalya-ganga. This does not relate either to the technological and socio-economic particularities of marine fishing or to methods and techniques of extension work. Therefore, the training scheme to be evolved by BOBP had virtually to cover all major aspects of marine fisheries extension.

This was possible, however, only to a certain extent – since the Directorate of Fisheries insisted that the fisheries extension officers should not be absent from their duty stations for too long a time attending training courses. Therefore the training scheme actually covered only the following areas :

a. Techniques and methodology of extension work,
b. Methods of techno-economic and socio-economic surveys',
c. Traditional and modern small-scale fishing gear and methods,
d. Community development,
e. Preparation and evaluation of financial/develop-mental schemes, fisheries finance,
f. Social and economic organization of artisanal marine fishing communities.

Areas which were considered to be important but had to be excluded because of lack of time were: handling/ processing and marketing/distribution of fish, conserva-tion of aquatic resources. oceanography, and fishing craft.

To prepare the officers adequately for the functions to be carried out by the fisheries extension service, the

training scheme to be evolved had to meet two broad requirements. Firstly – and this concerns the content of the training and its macro-didactic structure – it had to be action-oriented training, with a strong direct impact on the performance of the trainees and thereby on the economic and social conditions of the target group, the fisherfolk.

Secondly – and this concerns more the micro-didactic structure of the course – the training had to develop the analytical, reflective and'innovative thinking of the trainees, as well as initiative and self-directed action.

In order to meet the first requirement, the training scheme was designed as in-service training, based on the "project method" of learning and teaching. How does the "project method" work in this context? A problem facing the fisherfolk is identified – for example inadequate financial assistance. Detailed information is collected about the present situation and various aspects of the problem; possible solutions are considered; skills and knowledge are acquired, which are relevant to the solution of the problem and are applied in the field on a trial basis; the application of the newly acquired skills and knowledge in the field and their practical contribution to the solution of the problem are evaluated; modifications are made; and general conclusions are drawn.

Each project was designed as a module consisting of a preliminary survey, a residential training course of 1-2 weeks duration, practical field work and field workshops. During the survey, the trainees collected information from the villages in their jurisdiction concerning the topic of the module. On the basis of this information, the residential course served to assess t'he present situation as well as options and means for improvement. The course imparted knowledge and skills and also considered solutions to problems encountered in the field. Resource persons from other government departments, voluntary agencies, local associations, etc., also participated in the courses.

Towards the end of each course, follow-up activities to be carried out in the field were discussed in cooperation with other. departments and agencies. During and towards the end of the follow-up activities in the field, workshops were held to exchange experiences gained during practical field activities and to impart additional knowledge and skills.

Altogether three training modules were conducted: "Financial Assista ce to Fisherfolk," "Community Development" and "Small-Scale Fishing Gear and Methods". Prior to the in-service training programme, the fisheries extension officers participated for two months in small-scale fishing operations of mechanized and non-mechanized boats in Sri Lanka. To familiarize themselves with the artisanal marine fisheries of Orissa and the fisherfolk, as well as to provide a sound data base for extension work, the fisheries extension officers assisted in compiling an inventory of artisanal fishing craft and gear of Orissa, conducted a techno-demographic fisheries census, and assisted in a socio-economic study of selected fishing villages in Orissa.

Even though it was initially planned to conduct the training modules one after the other, each module taking about three months, overlaps and extensions could not be avoided because of unforeseen factors: flood relief duty, cyclone relief duty, election duty, etc., for fisheries extension officers.

Table 1 summarizes the history of the in-service training scheme as well as the follow-up activities.

In order to develop the analytical, reflective and innovative thinking of the extension officers as well as initiative and self-directed action, certain subjects were included in the training concerning the methodology of extension work – such as principles and scope of extension; 'communication process and extension; factors influencing adoption of new techniques and methods; programme planning, implementation, monitoring and evaluation; cooperation with other departments and agencies; 'role analysis; action planning; etc *(Continued on page 12)*

Table 2 : Achievements of Marine Fisheries Extension Service, Orissa

		1983-84	1984-85
Financial assistance (no. of cases disbursed)	Integral Rural Development Programme (IRDP)	699	131
	Scheduled Caste Finance Cooperative Corporation	340	–
	Assistance to Traditional Fishermen (ATMF)	112	9
	BGBP - Direct Bank Finance without Subsidy	345	362
	Financial Assistance : Total	1496	502
Welfare/ Relief Schemes (no. of beneficiaries)	Economic Rehabilitation of Rural Poor (ERRP)	2151	570
	Saving cum Relief Scheme	–	563
	Accident Insurance	6505	6276
	Abolition of Bonded Labour	175	424
	Cyclone Relief	800	–
	Welfare/Relief : Total	9631	7833
Education (no. of centres opened and maintained)	Non-Formal Primary Education for Fisherfolk (SCERT/BOBP)	20 schools with 600 children	20 schools with 600 children
Infra-structure (no. of landing platforms established)	Construction of landing platforms	1	1
Fishing technology (no. of schemes prepared)	Preparation of schemes for introduction of beachlanding craft	–	20
Information/ Data collection	Collection of catch/effort stat. fisheries census, inventory		
Fishermen's Cooperatives	Technical guidance to cooperatives	23	23

MARINE RESOU THE BAY O

by K. SIVA

The waters of the Bay of Bengal are also in the types of craft, gear and f discusses production trends in coun stocks, the potential for developn print that updates and analyzes curre

The Bay of Bengal covers a large area bounded by the equator in the south; the Maldives and the east coast of India in the west; Bangladesh in the north; and Burma, the west coast of Thailand, the west coast of Malaysia and the northern half of Sumatra (Indonesia) in the east Within this large area are to be found diverse craft, gear, fishing methods, species, etc.

The crafts range from the log rafts of India and Sri Lanka to purse seiners-in Mjlaysia and Thailand; fishing methods range from pole and line•c,erations in Maldives to two-boat trawling in India. A wide variety of gear including gillnets, set bagnets, shore seines, etc., is used in the area.

Available information suggests that the fish stocks in this area are probably shared by two or more countries in the region, yet joint management measuures are absent. It is with a view to filli g this lacuna and also to assist countries in resource studies that the FAO/UNDP project "Marine Fishery Resources Management in the Bay of Bengal was initiated. Under the project's auspices a few important fish stocks have been selected for joint studies by participating countries. Examples: the mackerel resource in the waters of Thailand, Indonesia and Malaysia, demersals in the southern Malacca Straits shared by Malaysia and Indonesia, and the tuna resource shared by Maldives and Sri Lanka.

Recently, a report was prepared to review existing knowledge of resources in the area and to identify gaps in that knowledge. This article summarizes the findings of the report. Data included in this article relates mainly to the period 1974-82.

Fishing craft and gear

About 325,000 craft of various types, but primarily traditional, operate in the area studied. Craft composition varies between countries of the area. Example Traditional non-mechanised crafts dominate in Bangladesh, Burma, Indonesia and India, but the mechanised fleet accounts for almost 90% of the total in Malaysia and Thailand. In Sri Lanka, the two types maintain a rough balance, with the non-mechanised fleet making up 51% of the total. The corresponding figures for Maldives, Bangladesh and Sumatra (Indonesia) are 80%, **75%** and 72%, respectively.

In Bangladesh and Burma, the number of fishing craft has increased significantly in recent years; no such increase is visible for other countries in the area. Only Malaysia and Thailand exploit half or more of their respective EEZs.

The traditional crafts operating in the different countries are not, in general, comparable in design or operational and fishing efficiency. There are a few exceptions, however, such as the log rafts of India and Sri Lanka and the pole-and-line craft in India and Maldives.

Production trends

The EEZs of countries in the region cover approximately three-fourths of the project area. Within this area, the annual production of fish is about 2.2 million **t,** while the production in international waters of the region — by nations such as Japan, Koreaand Taiwan - is around 6,000 **t** per annum. Available information indicates that the production in international waters may have peaked in 1980 though confirmatory evidence is still lacking.

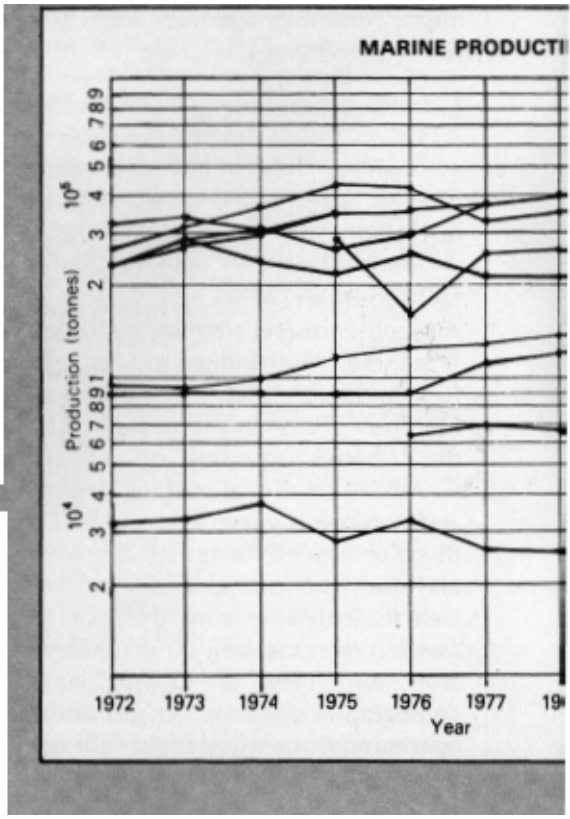
Malaysia and Burma contribute most to the total production from the project area, each accounting for about 20%. They are followed by India (19%), Indonesia (15%), Sri Lanka (8.8%), Thailand (8.7%), Bangladesh (6.6%) and Maldives (1.4%). Production in Bangladesh and Sri Lanka As:: rising whereas in the other countries it has already peaked, and is probably either declining or stable at a lower level.

The peak production in Thailand (west) was achieved in 1973; in India (east coast) and Sumatra in 1975; in Malaysia (west coast) in 1980; and in Burma and Maldives in 1981... However, these dates are only indicative: the reliability of catch statistics in at least some of the countries is problematic and a cause for concern.

Fish species: Over 340 species of fish and shrimp, consisting of about 215 demersal fish species, 65 pelagic species, 20 shrimp species and 40 cartilagenous species, enter the fisheries of the project area. The species composition of the catch differs from country to country.

Estimates of catch composition vary widely in reliability with estimates being reasonably good in some countries, incomplete in some others, totally lacking in the remaining.

Available information indicates that the production of pelagics exceeds that of demersals in Maldives, Sri Lanka and the west coast of Sumatra. The reverse is the case in other countries of the area.



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FISHERY RCES IN F BENGAL

AMANIAM

y varied not merely in fish species but g methods that tap them. This article of the region, the status of exploited It summarizes a paper presently undet)Owledge on the subject.

In recent years while the production C) some sp.c ies has increased that of mans' others has been static or dedining. Production ponyfishes in the east coast of India, of small demersals (trash fish) and mackerels in Malaysia and of hilsa in Bangladesh has increased signiticantly. On the other hand, shrimp production has declined — except in Sri Lanka and Bangladesh which, however, are not fllajOr producers The production of coastal tuna has been fluctuating without clear evidence of any trend in India and Maldives and has increased slightly in Sri Lanka, Sumatra and Thailand. The production of oceanic tunas does not seem to have increased after 1980.

The production of small pelagics has declined in India (especially in the state of Tamil Nadu), Indonesia, Sri Lanka and Thailand. Similar is the case with valuable demersals in Bangladesh, Malaysia and Thailand. Demersal production declined sharply before 1980 in Indonesia when a ban was legislated on trawling. This measure should have arrested the decline, though the study to determine this is still under progress.

The trawl fishery in Malaysia and Thailand has moved to deeper waters and this has resulted in an increase in the catches of threadfin breams *(Nemipterus* spp.) and bulls eye *(Priacanthus* spp.).

Status of exploited stocks and potential for development

Good estimates of catch in relation to etfort are lacking in almost all the participating countries. Available biological studies are almost qualitative — militating against their use in stock assessment. Sometimes correct species identification poses problems too. Example: there is some uncertainty over whether Decapterus russelli or 0. maruadsi is, the dominant scad mackerel species in the waters off the northern part of Sumatra, Indonesia.

Several methods have been to estimate the resource potential and the types of shared stocks Past studies have been used to, estimate maximum sustainable yield and potential yield. But the basic uncertainty over available estimates imposes its own limitations on these exercises and as such the results have to be viewed with caution.

Tuna and tuna-like fishes are the main targets of the Maldive islands fisheries. This has resulted in overexploitation of the tuna resource in the presently exploited portion of the EEZ. Further increases will have to come from the presently unexploitedrangesoftheEEZ.However, the production of other pelagics and demersals from the reef waters might be increased.

The trend concerning the production of large pelagics in Sri Lanka in the presently exploited ranges of the EEZ too is similar to that in the Maldives. The status of small pelagics, however, is unclear. The production of demersals could rise, with the increase in valuable demersals being less significant than that in small and less valuable demersals.

The major stocks on the east coast of India in the presently exploited range of the EEZ having been intensively exploited, further increases will have to come from the presently unexploited ranges of the EEZ. A possible exception to this inference could be the northern paTrj of India's east coast.

In presently exploited range of the EEZ in Bangladesh, the production of demersals may be close to optimum yield levels while shrimp production might be close to or above the MSY. The status of pelagics is uncertain.

In Burma, recent surveys indicate that the production from the continental shelf area could be pushed up by about 35%.

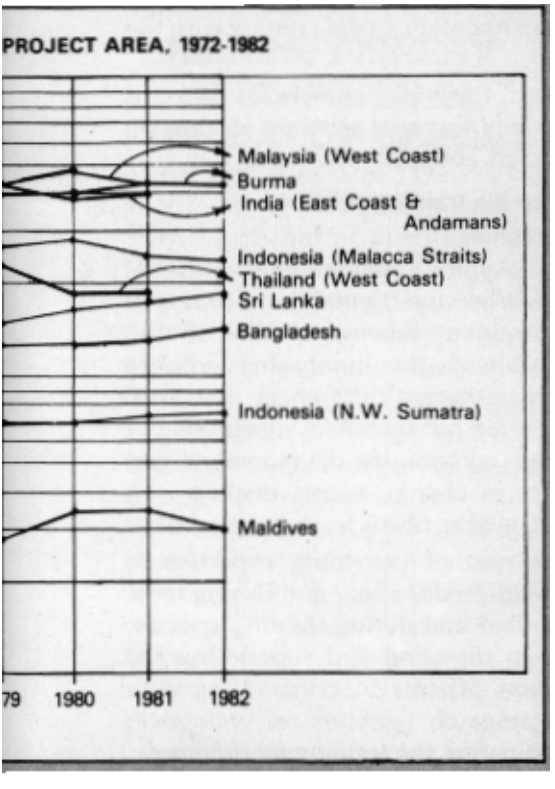
In Malaysia and Thailand major resources are already being heavily exploited. It is not evident that a rational increase in production from the presently exploited ranges of the EEZs is possible However lobstersandcephalopodsinThailand, and crustaceans and molluscs in Malaysia could be exceptions to this general rule.

In the Indonesian waters of the Malacca Straits, the production of demersals and shrimp exceeded the MSY before trawling was banned in 1980. It now seems possible that the production of small pelagics can be increased by about 20% over the 1980 level. On the west coast, demersal production mnight be increased by about 40%, but the prospects for small pelagics1and shrimp the presently exploited range are not bright.

Potential in the unexploited ranges of the EEZs

Acoustic surveys and experimental trawling operations indicate that substantial resources of deep sea fish, shrimp and lobsters are available

(Continued on page 13)



In-service training of Orissa marine fisheries extension officers : an assessment.

(Continued from page 9)

Even more important, micro-didactic arrangements were made in such a way as to specifically match the requirements mentioned above. Compared to traditional pre- and in-service training programmes which aim primarily at strengthening the trainee's general vocational knowledge using lectures, demonstrations and excursions as main teaching methods, the BOBP programme aimed at including various domains of learning, such as pragmative components (behavioural and linguistic skills and abilities), normative components (attitudes and values), as well as transfer components concerning the critical re-examination of traditional structures and the readiness and ability to change and improve them.

Learner-oriented and active learning and teaching methods such as role plays, simulations, games, paracticals, group work, individual work assignments and plenary discussions were frequently used.

Achievements and Impact of Fisheries Extension Service Training

Apart from assisting in the preparation of various information documents about Orissa's artisanal marine fisheries, such as an inventory of traditional fishing craft and gear, a techno-demographic census, and a sociological study of the major ethnic groups and castes involved in sea fishing, Orissa's Marine Fisheries Extension Service recorded a number of achievements (Table 2).

Keeping in mind that there are only **15** Marine Fisheries Extension Officers in Orissa, each one supported by an "attendant" and a "fisheries demonstrator", the output per officer is substantial. On an average, each extension officer handled as many as 733 and 556 cases during 1983/84 and 1984/85 respectively under various financial and welfare/relief schemes, besides looking after a couple of schools and cooperative societies, preparing at least one 'scheme for introduction of mechanised boats, and collecting catch and effort statistics on a regular basis. In comparison, an inland fisheries extension officer in Orissa does not handle more than 100 cases every year under various schemes.

Typical scene at ***an Orissa fish landing centre.***

Table 2 shows a decline in 1984/85 from 1983/84 in the number of fishermen who received financial assistance or welfare benefits. This decline resulted from reduced government funds, not from reduced extension effort.

The performance of the extension officers should be assessed not only in quantitative terms also by qualitative criteria. The BOBP fisheries credit scheme, for example, achieved an unusually high degree of credit utilization and loan repayment. Similarly, the non-formal primary schools show very good attendance by children and active involvement by the fishing community.

Utilization of assets and assistance received under various welfare and subsidy schemes is satisfactory. So is the cooperation of fisheries extension officers with other government department and agencies, including voluntary agencies.

Question : to what extent is the performance of the marine extension officers of Orissa an outcome of the BOBP-in-service training scheme? When asked about the difference between BOBP training programme participants and non-participants (inland fisheries extension officers), the supervisors of the marine fisheries extension officers (3 Assistant Directors, 2 Deputy Directors and an Additional Director of Fisheries) mention five points. They relate directly to the objectives of the BOBP training scheme.

- Marine fisheries extension officers have a clearer understanding of the objectives of extension work and the factors involved.
- They display more initiative and responsibility.
- They know better how to contact and cooperate with other departments and agencies involved in developmental work.
- They establish and maintain closer contact with the fisherfolk.
- They reveal better technical knowledge when it comes to preparing of financial schemes, evaluating artisanal fishing craft and gear, etc.

Adaptability of in-service training scheme to other states and regions

The BOBP in-service training programme for fisheries extension officers in Orissa functioned more or less as an action-oriented training scheme, similar to the Training and Visit System in agricultural extension work – with a number of important differences, however. The extension officers are not technical specialists but generalists trained in community development and social work, who act as change agents dealing with social, cultural and economic obstacles to development.

BOBP assumed the role of providing expertise in fisheries finance, fisheries education, and fishing technology, both in the field and during training courses. BOBP also assisted in directing and supervising the work of the extension officers in cooperating with developmental and research agencies, as well as in organizing and coordinating the training programme.

Bicycles for marketing were distributed under the credit scheme for fisherfolk.

The role of BOBP can in principle be easily assumed by the Directorate of Fisheries, if certain organizational arrangements are made.

Specifically :

- An experienced and qualified officer should exclusively be in charge of the marine fisheries extension service at the headquarters. The officer would perform the following functions – developing in-service training programmes; maintaining contact with research and development institutions; programme execution, implementation, monitoring and evaluation; administration; personnel management; finance; programme planning.
- Supervisory staff at present represented by Assistant Directors of Fisheries would have to modify central programmes to local needs, develop detailed work plans for extension officers, assist extension officers in field work, assist in their training, maintain contact with the local administration and do the budgeting.
- Specialists in specific subjects (institutional finance, fishing technology, education) – some of them on deputation from other departments – are to be posted either at the headquarters or at supervisory level to train the fisheries extension officers. assist them in their practical field work and maintain contacts with research and development institutions.
- "Develop" and "change" rather than "administer" should constitute the work ethic of the administration. And a more outgoing approach is called for. Initiatives should be encouraged at lower levels of the hierarchy... Departmental isolation should give place to interdepartmental cooperation.

Since the problems of traditional sea-fishing communities in Bangladesh, Sri Lanka and the other east coast states of India are quite similar to those of the fisherfolk of Orissa, similar in-service training programmes could be evolved for these areas taking into account local particularities, needs and resources. In South-east Asia, viz., Thailand and Malaysia. conservation of fisheries and fish culture, rather than development of capture fisheries, will play a central role in the work of the marine fisheries extension service.

MARINE FISHERY RESOURCES IN THE BAY OF BENGAL

(Continued from page 11)

in the unexploited ranges (depths of 80 to 350 m) of almost all the EEZs. However, it is not quite clear as yet whether harvesting deep sea shrimps and lobsters in these ranges would be economically viable. Uncertain too is the commercial value of deep sea fishes.

The main pelagic resources in the unexploited ranges of the EEZs, exclusive of Malaysia, are tunas and sharks. The surface tuna fishery in the unexploited ranges of the EEZs could profitably be expanded in India, Indonesia (west coast of Sumatra), Maldives, Sri Lanka and Thailand. The oceanic longline fishery for deep-swimming tunas in the Indian Ocean as a whole exceeded the MSY in 1970. Future entry into this fishery within the project area, therefore, depends on the reduction of fishing effort by far eastern nations.

Management of marine fishery resources in the region

The management of marine fishery resources is difficult enough at the national level. The difficulties increase sharply at the multi-national and regional levels. Nonetheless, management measures are absolutely essential.

Some of the more common management measures encountered in the region include mesh size regulation, allocation of fishing ranges according to craft size and type of fishing, ban on trawling and closed fishery seasons and areas. These, however, form only a part of the required package. There are a number of problems and limitations that make difficult the determination and application of appropriate management measures. Some of them are – lack of biological and economic information; poor linkage between research and statistical institutions; insufficient coordination; enforcement problems such as those arising from uncooperative fisherfolk; socio-political factors; difficulties in inspection and the limited power vested in enforcement officials; and the cost of the whole process of implementation, inspection and legal action against erring fishermen.

The list is quite formidable. But a beginning has to be made in tackling these problems if rational and effective management measures are to be evolved.

glimpses into BOBP projects

Fish aggregating devices — BOBP's experience in Sri Lanka

Fish Aggregating Devices (FADs) are structures in the water that attract fish to aggregate more densely than elsewhere in the surrou-ndings. There are natural FADs such as coral reefs, uneven rocky bottoms, islands, etc. Here we are dealing with man-made FADs which actually have been used in different shapes over centuries. A simple but efficient FAD may consist simply of an anchored tree or a bunch of branches placed at the bottom or on the surface, in shallow waters. Offshore FADs have been tried with various degrees of success for many years till now. The main problem with an FAD deployed over deep water is to make the device durable enough and therefore viable.

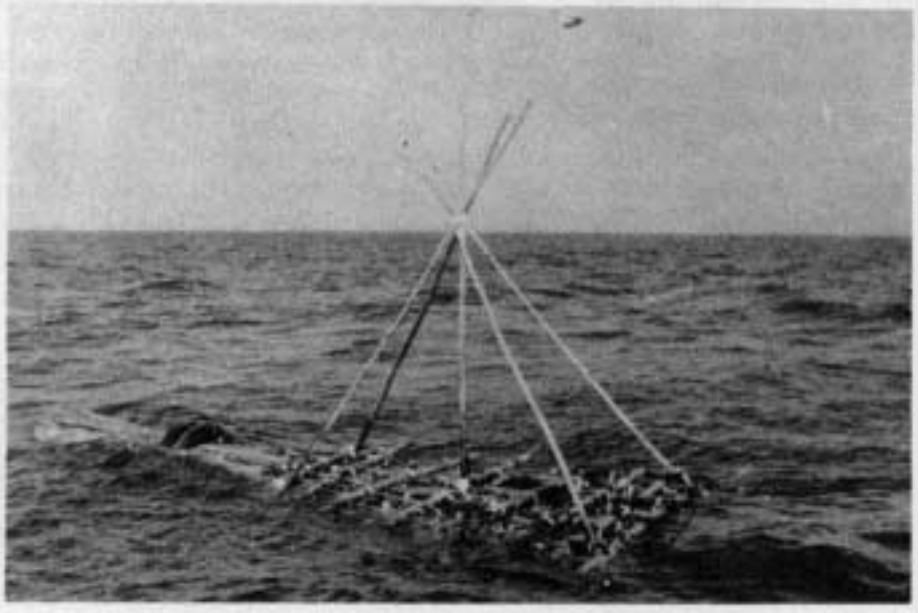
Successful results have been achieved with' offshore FADs in Philippines, western Samoa, Hawaii and elsewhere. These FADs yielded good catches of valuable pelagic species, such as skipjack and yellowfin tuna, which have been caught mainly by purse seine, pole and line, and handline.

These, and other promising results, made the BOBP and Sri Lanka's National Aquatic Resources Agency (NARA) attempt to find out whether FADs might be suitable in Sri Lankan waters too.

Late 1982 and early 1983, six tyre FADs were deployed off the west and southwest coasts. They were constructed with foam-filled tyres as floating bodies. Small-meshed netting served as main "fish attractor': They were anchored within the continental shelf in depths ranging from 60 to 100 meters. The life-span of these FADs ranged from 24 to 323 days. The result of that first trial was not too encouraging. A total catch of about 7 t of fish was recorded in the direct vicinity of the devices. Further trials with three low-cost FADs failed due to their disappearance within 10 days.

These three FADs were constructed out of the cheapest possible material — such as bamboo for buoyancy material, coir rope for mooring etc. The sizes of the floating rafts were rather limited. They were deployed quite close to the shore at 30 to 50 m depth. It is most likely that they were too weak to withstand the local conditions.

This low-cost FAD — made from a double-layer bamboo platform reinforced by tyres — has yielded promising results in Sri Lanka.



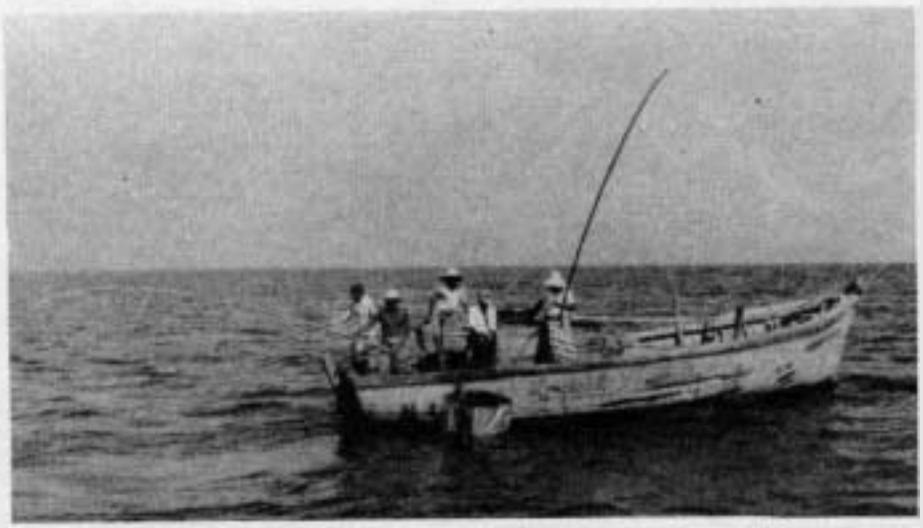
Early 1984, a single- low-cost FAD similar to the Payaw design used in the Philippines was deployed. It had a double layer bamboo platform reinforced by tyres and lashed with ropes. The appendages (apart from the raft itself) were a combination of palm leaves and fine-meshed netting. Results from that FAD have been the most promising so far, from the standpoint of both yield and cost/benefit ratio. The yield was more than 4 t giving the fishermen around Rs. 45,000 (1800 US $) after deducting fuel costs. The cost of such a device will not exceed SL Rs. 10,000 (400 US $).

The life-span of that FAD was only around three months, as bamboo has a limited durability in seawater and should be replaced after a few months. On the other hand, bamboo is cheap.

Encouraged by results from the bamboo FAD, BOBP continued trials with low-cost FADs. Several different designs of rafts and moorings are currently being tried out. It seems that it is possible to simplify designs and substantially cut costs without reducing the life expectancy of the FAD

The main conclusions from the trials so far are that although FADs off western and southwest Sri Lanka attract fish, they attract valuable larger pelagic species such as skipjack and yellowfin tuna only marginally. The aggregation starts almost immediately after deployment with shoals of baitfish and smaller pelagic species. Within a few weeks larger species — such as dolphin fish, rainbow runners, small frigate tunaimackerel, some seerfish (spanish mackerel) and caranx — are drawn.

Small-scale fishermen who fish mainly with *hook* and line have expressed satisfaction with the FAD for various reasons. They know that they may be able to catch fish around a FAD if fishing in traditional areas has failed; they don't need to waste excess fuel searching for fish; the raft also serves as a reference point for navigation.



Pole-and-line fishermen of Sri Lanka hunt for fish around an FAD.

FADs are not equally popular among fishermen using large mesh driftnets. They complain that their nets get entangled and damaged because of the FADs. Interviews with fishermen and their organizations in Sri Lanka show that fishermen generally are in favour of the FADs and want more of them. A drawback is that neither private parties nor fishermen's cooperatives seem to be willing to invest anything more than some contract labour in new FADs.

Factors limiting the FADs life-span are primarily "natural factors" such as limited durability of mooring/ hardwares and raft, oversailing by ships etc. The life expectation may in such cases be improved by using more durable and better-rigged moorings and rafts. The cost-benefit ratio has always to be considered, and BOBP is trying to make small FADs as cost-effective as possible.

Human interference is more difficult to guard against. It is known that sometimes masts, lights and markings have been removed from the rafts. It is also assumed that mooring lines have at times -been cut and rafts released.

Publicity and extension programmes to promote community awareness of the benefits of FADs should help to prevent such vandalism. – S.E.A.

High-opening bottom trawling trials in Orissa

A BOBP-designed high-opening bottom fish trawl was tried out off Chandipur on the Balasore coast of Orissa from December 1983 to March 1984 by Orissa's Department of Fisheries. The trawl (360 mesh of **160** mm) was towed by a 38-foot CIFT-designed stern trawler fitted with a 75 hp air-cooled, 6 cylinder Ruston engine.

The net was tried out for 39 fishing days. During this period, it brought in a catch of 21.3 t (pomfret, jew fish, sciaenids, catfish, and other varieties) valued at just over Rs. 71,000 on the beach.

The catches recorded during the trials were much higher than those obtained using more traditional trawl gear. Result : a substantial demand for the new high-opening fish trawl from entrepreneurs in the area. BOBP agreed to supply some trawls at actual cost. In addition, fisherfolk in Chandipur were exposed to a fortnight's training on fabricating the nets. The training was provided by Ezhumalai, the net-maker whom BOBP engaged earlier in Tamil Nadu and Sri Lanka.

The encouraging catches of shrimp during the 1984-85 fishing season (mainly *Penaeus monodon*, *P. indicus* and metapenaeid species) resulted in many requests to BOBP for suitable gear to exploit the shrimp resource. Accordrngly, the trawls listed below were fabricated and put through trials aboard a private operator's trawlers. The trawls used were :

- 370 X 120 mm high-opening fish-cum-shrimp trawl (HOFST)
- 620 X 60 mm high-opening shrimp-cum-fish trawl (HOSFT)
- 550 X 60 mm high-opening shrimp-cum-fish trawl (HOSFT)
- 484 X 80 mm high-opening fish-cum-shrimp trawl (HOFST)

The 620 X 60 mm and **550** X 60 mm – sized trawls were the most effective in catching both shrimp and fishes over a period of five months. The earnings from the trawls were higher by 30% and 23% respectively, when compared to conventional shrimp trawls. To satisfy the demand for HOSFTs, BOBP, in collaboration with the Fisheries Department, organised a three-week training course on trawl fabrication at Chandipur. Ten 620 X 60 mm HOSFTs were made available for sale. Before the sale of the trawls, BOBP's fishing technologist G Paiot inspected the vessels that would operate the gear and made detailed suggestions on vessel preparation for the 1985-86 fishing season.

These trials indicated that high-opening bottom trawling for food fish is a viable alternative to conventional shrimp trawls during the off season for shrimps. Fisherfolk operating the new trawls feel that increased earnings have helped them go in for additional gear.

An important outcome of the trials is the finding that in HOSFTs, the cod-end mesh size should be 40 mm. (In conventional shrimp trawls, cod-end mesh sizes as low as 18 mm are used.) Enforcement regulations on minimum mesh size seem advisable and feasible.

The landing of large-sized jew fishes, which find a ready export market in the Far East, is another important plus point with the HOSFTs.

Some people who indiscriminately use small-mesh shrimp trawls have expressed the fear that large-scale introduction of high-opening bottom trawls might lead to over-exploitation of resources traditionally exploited by artisanal fisheries; this seems unfounded as high-opening bottom trawling exploits mainly those resources that are neither at present exploited nor seem to be exploitable in future by artisanal fisherfolk.

P. Mohapatra, Additional Director of Fisheries, Orissa &B. B. Mohapatra Deputy Director of Fisheries (Marine), Balasore, Orissa.

Thai fishery officials tour BOBP extension projects

Four officials from Thailand's brackishwater fisheries division — Mr Manu Potaros, Ms Laddawan Praditpolpanich, Mr Kanit Chaiyakam and Ms Sucksri Sumpawapol — engaged in a three-week study tour of BOBP extension activities in Bangladesh, Sri Lanka and India (Orissa and Tamil Nadu) during April. They were accompanied by BOBP's project officer in Thailand, Mr Duang Tejakomal.

The visitors studied the varied activities for fisherwomen in villages near Chittagong, conducted with the help of link workers; the income-earning activities for women in Sri Lanka; the Killai shrimp pen culture project in Tamil Nadu, which has entered upon an extension phase; the fisherwomen link workers' schemes in Tamil Nadu; the credit project for fisherfolk and the non-formal education project for fisherfolk children in Orissa.

On behalf of the team (seen above at BOBP's conference hall in Madras) Mr Manu Potaros, Senior Fishery Biologist in Thailand's brackishwater fisheries division, said : "The tour has introduced us to various extension methodologies. We were impressed by the way the needs of the target groups are surveyed, and the way the fisherfolk participate in efforts to improve their lot. There were no "hand-outs" in any of these projects as is widespread in extension work. Also notable was the systematic organization to facilitate technology transfer and to prepare a suitable receiving mechanism in villages, so that the fisherfolk absorb the benefits of such projects. We see that extension work is complicated, and that a long time is needed for good results. But the enthusiasm of the extension staff in the projects we saw was infectious".

Talking about Killai, Mr Potaros said : "The natural fish resources here seem rich as compared to those in Thailand which have been exploited to the full. Hand-picking of fish was possible in Thailand about 30 years ago, not any more. Perhaps there is good scope for capture fisheries in Killai, using gear like cast nets, longlines, traps and FADS"

Andhra Pradesh yard builds BOBP boats

Two BOBP fibreglass boat types — IND-20 and IND-25 — are being built at the boatyard of the APFC (Andhra Pradesh Fisheries Corporation) in Kakinada.

BOBP assisted the boatyard by supplying an IND-20 mould free of cost besides a plug for IND-25 at cost. Technical inputs from BOBP also included the services of Naval Architect R Ravikumar in training boatyard personnel, in supervising the construction of the first boat, and in advice concerning production, planning and inventory.

The APFC yard plans to cater to the needs for BOBP-designed FRP beachlanding craft of not only Andhra Pradesh but also of other states. The yard already has orders for four boats from A.P. and 10 boats from Orissa.

The APFC yard is also at present building two 23 m wooden trawlers for the state under a World Bank scheme.

Abstracts of BOBP Publications

Given below are abstracts of BOBP papers out recently.

1. BOBP/WP/33 *: Factors that Influence the Role and Status of Fisherwomen* by Karuna Anbarasan.

This paper is based on a year's study of three fishing villages of Chingleput district, Tamil Nadu, conducted during 1983-84. It profiles the villages and analyses the many factors that influence the role and status of fisherwomen there. It also include< three case studies which describe" the work, lifestyle, family and social status of three women. The paper was prepared during the course of follow-up action programmes by the BOBP in cooperation with fisherwomen who took part in a IO-week residential training course held between May and September 1982.

2. BOBP/REP/22 *: Report of the Ninth Meeting of the Advisory Committee, Bangkok, Thailand, February 25-26, 1985.*

This document records the deliberations and conclusions of the most recent Advisory Committee Meeting of the small-scale fisheries project of the Bay of Bengal Programme. The meeting constituted a part of the 3rd session of the Indian Ocean Fishery Commission's Committee for the Development and Management of Fisheries in the Bay of Bengal (briefly Bay of Bengal Committee or BOBC).

The paper includes a description and analysis of progress made by the small-scale fisheries project in 1984, the sixth year of its operation.

3. BOBP/WP/35 : *Pen Culture of Shrimp in the Backwaters of Killai, Tamil Nadu,* by M Karim and Victor Chandra Bose.

This paper describes the results of a 21-month experiment on pen culture of shrimp and finfish in the backwaters of Killai, near Chidambaram. It concludes that shrimp pen culture is technically feasible and that *Penaeus indicus* is the most promising of culture species.

Conserving the Mackerel Resource : Thailand declares closed areas and seasons on West Coast

by UDOM BHATIA

Chub mackerels *(Rastrelliger* kanagurta and *Rastrelliger brachysoma)* are commercially important small pelagic fishes on the west coast of Thailand, contributing nearly 5,000 tonnes/annum. No significant increase in production has taken place in recent years, and it is suspected that these resources may have already reached the maximum sustainable yield level.

Malaysia and Indonesia also fish for chub mackerels in the Malaccp Straits, and the need for identifying the possibilities of intermingling and sharing of the stocks in this area was recognised. In December 1983, a working group meeting of biologists from these countries was organised by the BOBP's Marine Fishery Resources Management Project (RAS/81/051) to discuss this subject (see Bay of *Bengal News,* June 1984) and to initiate an intensive investigation programme using standardised sampli'ng techniques.

In April 1984, the Fisheries Department of Thailand received reports that iuvenile chub mackerel were being caught by light luring purse seiners and that this has touched off a conflict between the operators of Thai purse seines, Chinese purse seines and light purse seines. The Fisheries Department requested the Phuket Marine Fisheries Station to investigate the issue and provide scientific evidence. Biologists of the station used historical data, data compiled under the ongoing mackerel study programme supported by BOBP (length frequency, maturity and spawning season, etc.) and the results of the tagging programme and submitted evidence on areas and seasons of juvenile mackerel fishery on the west coast of Thailand.

On the basis of these findings, the Department of Fisheries decided to declare a closed season for mackerel fishery from 15 April to 15 June in the area demarcated (see figure). The following fishing gears are prohibited in the area during the closed season :

(1) Any kind of motorised trawlers except "rope trawlers" (for shrimp, using ropes instead of wire and generally 14 m LOA).

(2) Any kind of purse seiners with purse line. This is in pursuance of a proposal made by a fishermen's meeting in Krabi (11 March 1985).

(3) Encircling gillnets and gillnets of mesh size less than 4.7 cm.

Exceptions : (a) Anchovy purse seines may be operated in the closed area and season, only during the day time (6 a.m. to 6 p.m.) and (b) Barn boo stake traps

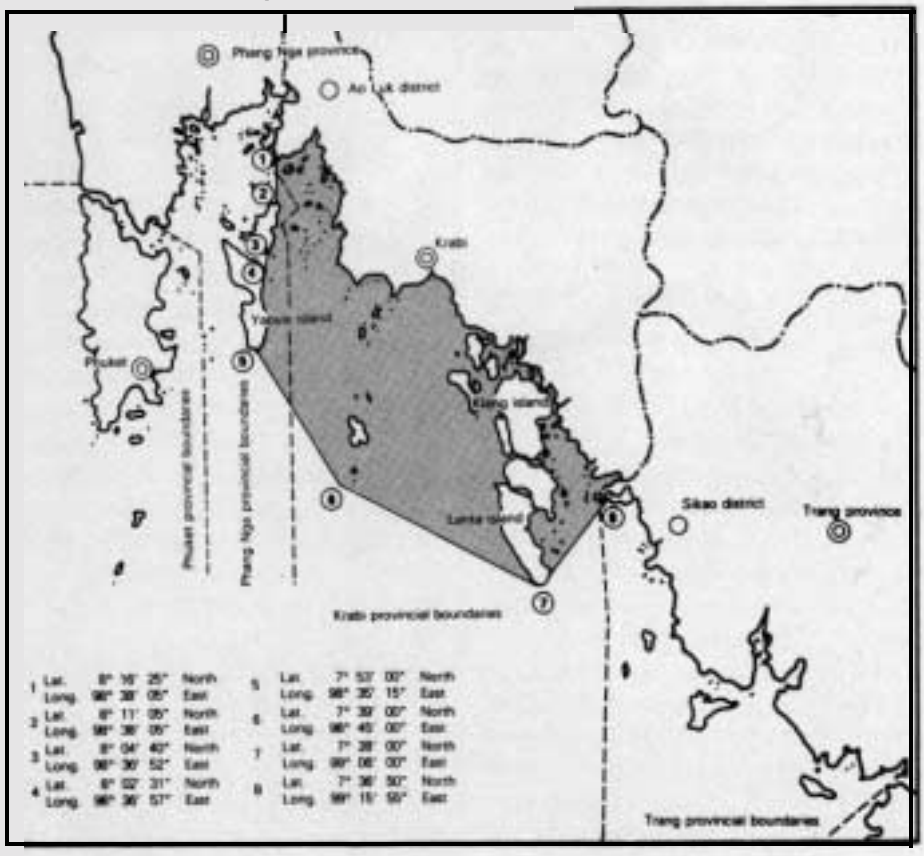
After repeated discussions with fishermen in five provinces on the west coast of Thailand, the Fisheries Directorate drafted the above regulation which was presented to representatives of fishermen from the five provinces at a meeting held in Phuket on 4 March 1985.

The fishermen responded readily to this management measure. They were very cooperative in accepting the regulation and in proposing that further steps be taken to prohibit landing or selling mackerels below an established minimum size and. to prohibit the use of the light luring technique by purse seiners. The former proposal has been submitted to the cabinet for consideration and the latter is being carefully studied by the Fisheries Department, because of its impact on other species caught by this technique.

It is expected that affected fishermen will continue their fishery outside the demarcated area during the closed season. The Department of Fisheries is preparing to patrol the area during the closed season.

About the Author : Mr. Udom Bhatia is a senior marine fishery biologist at the Phuket Marine Fisheries Station, Thailand, and Technical liaison Officer for the BOBP's Marine Fishery Resources, Management Project.

Boundary demarcating the closed area for mackerel fishery on the west coast of Thailand, April 15-June 15.



Helping small-scale fisherfolk in Tranqubar: DANIDA project a helping hand

Tranquebar (Tarangambadi in Tamil) in the Thanjavur district of Tamil Nadu, is not exactly a household name. But its place in history is secure : This is where the first Danish settlement was set up in India more than 300years ago. And this is where the first Indian book in English "A guide to the English tongue" was printed.

The Danes are understandably fond of Tranquebar. In 1979a'Tranquebar committee' was established in Copenhagen to help fisherfolk in the former Danish settlement. The committee was active : and last year the integrated Marine Fisheries Project came into being at Tranquebar. The project is funded by DANIDA, the Danish aid agency. The funds are routed through PADI (People's Action for Development), a Government of India body. For implementing the project, a society — "Tranquebar Organisation .of Fishermen Efforts for Development" (TOFED) — has been formed.

Some 640 fisherfolk families live in "the village of dancing waves", as Tranquebar is sometimes known. More than 300 kattumarams operate from here, and fish with trammel nets. The peak fishing season is from June to August, and prawns and mackerels are the main income-yielding fish species.

The Integrated Marine Fisheries Project aims at improving the conditions of Tranquebar fisherfolk by making available some basic fishing assets, by upgrading technology, by improving access to institutional credit. The project became operational in June 1984; it has made its presence felt in a very short time. Says P N Srinivasan, an official of PADI deputed to Tranquebar as coordinator of the project : "We would like to ensure that even the poorest of the poor acquire some kind of asset : this is possible in course of time. Another object is to free fisherfolk from the clutches of middlemen".

The two-year project, which is likely to extend to a third year, has an outlay of about Rs. 15.3 lakhs. DANIDA's contribution is about Rs. 11.6 lakhs; bank loans and state government subsidies account for Rs. 3.4 lakhs.

The project's first activity was a house-to-house socio-economic survey conducted with the help of TOFED members. It revealed that nearly a third of Tranquebar's 640 fisherfolk families live below the poverty line, with a per capita income less than Rs. 700 per annum. A survey number was allotted for each family, and this helped identify the people whom the project should help.

Following the survey, the project took up its major activities in earnest :

- Distribution of kattumaram sets to selected fishermen.
- Purchase and distribution of kattumaram logs to replace worn out logs.
- Purchase and distribution of fishing gears of different types.
- Marketing loans to fisher-women.
- Use of BOBP's IND-25 to push up production and earnings.

Statistically speaking, the project has so far provided kattumaram logs to 40 fishermen (including full sets to 37), gears (trammel nets) to 66 other fishermen, and a combination of logs and nets to about IO. Nearly 60 women have been given small short-term loansforamounts ranging from Rs. 200 to Rs. 500. An IND-25 fibreglass boat designed by BOBF has begun fishing.

"We have thus directly helped nearly 200 fisherfolk families so far. We hope to at least double this figure", says Srinivasan.

The project's "beneficiaries" are picked carefully. Applicants are given printed and numbered forms which they must fill and hand in along with their photographs. They are interviewed by Srinivasan, who consults with other TOFED members before making his recommendation.

A project service that has greatly impressed Tranquebar fisherfolk is the supply of kattumaram logs at concessional prices : Rs. 770/cubic metre, -against the normal commercial price of Rs. 1800. This was made, possible through Mr. Srinivasan's representations to government.

Mr. Srinivasan takes successful applicants to Nagercoil, where Albyzzia logs are felled. Some 750 logs (300 cubic metres) have been sanctioned for Tranquebar fishermen : so far 275 logs (80 cubic metres) have been made available.

Albyzzia was never so cheap — and the local timber business has been hit hard. Says Dhanabalan, 34, a timber trader : "I used to buy Albyzzia logs in Kozhikode for Tranquebar fishermen and transport them here. Last year, I brought in IO lorry loads, not a single one this year. What can we do if fishermen get timber so cheap from this project?"

Surprisingly enough, there is no animosity between the timber traders and Mr. Srinivasan. They good-humouredly demand that the project should engage them as contract labourers and pay them wages, since it has deprived them of their livelihood.

Another useful project activity is short-term marketing loans for fisherwomen. Says Srinivasan : "Tranquebar fisherwomen sell fish in centres within a radius of about 30 km — Mayavaram, Poraiyur, Ayarpadi, Katambhavadi, Manganallur. They walk, carrying headloads of fish, or go by bus after bribing the conductor. Our loans give the women a little working

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1. *Project coordinator P N Srinivasan (left) with two members of the society that runs the project.*
2. *This is where the fisherfolk live : . .*
3. *. . and these are the craft (kattumarams) they use. The project makes' available whole kattumaram sets or individual logs to selected fishermen.*
4. *Returning to the shore with catch.*
5. *The project provides small short-term loans (Rs. 200 – 500) for fish marketingto women.*

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capital to buy fish, from which they earn income.

"Widows and divorcees – those without means of support – are given top priority for such loans. They are asked to repay in three months. Their repayments finance loans to others, and the credit chain goes on.... We plan to acquire a mini-truck to help the women. Half of the money will be got through an IRDP subsidy, the other half will be a bank loan in the society's name".

The project seeks to increase production and upgrade fishing craft technology through the BOBP-designed fibreglass IND-25 which it acquired in February. (It was built locally by a private yard). A crew of five operate the boat. Catches were low during the first two months – mainly because the crew used trammel nets rather than gillnets, the gear recommended for the craft, also because the main fishing season (June-August) was yet to start.

Future project schemes include construction of a building (land for which has been donated by a local businessman) with an auction hall and facilities for fish storage. The project also proposes to mobilize voluntary agencies in improving welfare services for fisherfolk.

What are the problems the project faces? Whenever loans are to be sanctioned, pressures operate from various directions. "Overcoming these pressures and sanctioning loans strictly on the basis of need and merit is a delicate exercise", says Srinivasan. "It calls for tact, patience and firmness".

Project coordinator Srinivasan lives in Kumbakonam, two hours away by bus from Tranquebar. He has struck a good rapport with the fishermen. "They are usually a nice lot", he says. "In the course of a whole year I have had an unpleasant argument with a fisherman only once. I had turned down his application".

Favourable comments from fishermen? Ask ex-coolie fisherman Chinnaswamy, 40, now a proud kattumaram owner earning Rs. 20 a day. Or Emperumal, 41, who made two visits to Bombay and spent a few thousand rupees in a futile bid to migrate to Dubai. He has got a five log-kattumaram through the project; he hopes to add two more logs and engage in kola fishing in distant waters – hard work but decent returns.

Perhaps A. Anbalagan, president of TOFED, best expresses what the Integrated Marine Fisheries Project means: "We are a source of help for those Tranquebar fisherfolk who are determined to help themselves".

– **S.R.M.**

The Tranquebar lifestyle: some glimpses

On the basis of the project's socio-economic survey and interviews with fishermen, the following picture emerges:

– Ofthe640fisherfolkfamilies, almost all Hindus, 30 engage in inland fishing (in rivers, tanks, creeks). 38.7% of the families possess a kattumaram and gears; 6.1% have only nets; the remaining 55.2% of the families have no assets. Yet food isn't a serious problem – thanks to the sea – except for a couple of months a year. Agriculture ranks next to fishing as the main village occupation.

– The fisherfolk do not assign a high priority to education. More than 55% of the population is illiterate. About 34.2% read and write. Graduates and post-graduates constitute 0.5%. Children prefer to play on the beach or join parents out at sea rather than go to school. There's no rush for school admissions, except in a missionary school which feeds the kids.

– Drinking water scarcity is a chronic problem, fisherwomen walk at least 1 km to fetch drinking water. Women queueing up with their brass vessels before one of the few community taps is a common sight. Salt water is what most families bathe in, or wash clothes and utensils with. Electricity is a luxury – "at night it is like a forest".

– The town has a dispensary run by an evangelist organization. There are two hospitals in Poraiyur, 2 km from Tranquetar.

Like fisRermen elsewhere, those in Tranquebar are poor providers for the morrow. For marriages and other major expenditures, loans are taken from relatives or middlemen at interest rates ranging from 50% to 300%. Enthusiasm for the bottle is pronounced: there isn't a single fisherman who doesn't imbibe. Other recreations are few; the nearest cinema is in Poraiyur.

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