BAY OF BENGAL NEWS

A PUBLICATION OF
BOBP For Fisheries Development
BAY OF BENGAL PROGRAMME

Danida

ISSUE NO. 28
DECEMBER 1987

"We are hungry only for SEAWEED"

So say the remarkable women seaweed collectors of Chinnapalem fishing village, Tamil Nadu, India. This photo essay records a day in their life, and provides glimpses into their lifestyle and workstyle, and the skills, stamina and vivacity they display in their unusual vocation.

S.R. Madhu

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" We are hungry only for SEAWEED"

Photo essay by S.R. Madhu

It was a sunny October morning in Chinnapalem fishing village, which is a few hundred kilometers from Madras, but poles away in lifestyle. For Muniyayi, Nambiswari, Namburani, Prema, Rani, Ambuthai, Nambuvalli and Pushpavalli, it was a day of promise : seaweed-picking day. These young women, ranging in age from *14* to 26, tap the sea's bounty, just as the menfolk do; but instead of catching fish, they pick and sell seaweed. The seaweed passes up a chain of agents to processing factories who convert the seaweed to gold – or rather, to agar, a product with a myriad applications in the food and pharmaceutical industries.

Back to Chinnapalem. It was a day of promise also for Bay **of Bengal** News, which had decided to observe and photograph some women seaweed collectors at work for a day. (Of the 200-odd women in Chinnapalem, about 70 collect seaweed regularly).

The girls rose early, partook of a light breakfast of *kanji* (rice gruel), and set out with their tools – a wind goggle and a "forecal" (waterproof) bag to load seaweed. Muniyayi, 25, mother of three and expecting a fourth, was reluctant to make the trip. She was sick that morning. But the other girls persuaded her to join, and she agreed.

By 8 a.m., the girls were at the Chinnapalem beach nearby. They traipsed through a few hundred yards of shallow water in a jiffy and boarded a **vathai** (the traditional craft of the area) that would take them to Mannali island close to the seaweed ground. The Bay **of** *Bengal* News reporter was to follow the seaweed nymphs on another *vathai.* He walked gingerly toward the craft on the slushy, slippery track, his hands nervously clutching his cameras. Two of the girls raced back the beach as if it were a football field, and eased him of his load. 'They move like squirrels", a proud Chinnapalem fisherman said.

The girls were in high spirits as the two craft proceeded to Mannali. Most of the time, the girls rowed their *vathai* themselves; taking turns, three at a time. The fisherman piloting our vathai challenged the girls to overtake him. They squelched him : "We are going for work, not fun".

Note : Chinnapalem *is* located in Ramanathapuram district, one km from Pamban, which in turn is about10 *km from Rameswaram.*

1. ***All set*** *for the seaweed collection trip.*
2. **Proceeding to Mannali island near the seaweed ground.**
3. **Chinnapalem** lass **camping at Mannali preens** *herself* **before a mirror.**
4. **Pots** *and pans are out for a meal at Mannali island,*
5. **"Seaweed - watch out, here we come!"**
6. **A fistul of paasi (seaweed), and going for a bagful.**

It was around a 1030 that we reached Mannali. Bathed by seaweed-laden waters, the island is rich in palm trees. Chinnapalem women often live here for days, even weeks, just to collect seaweed, making occasional trips to nearby Vedalai (a few km from Mandapam) to replenish supplies. Sometimes children and the menfolk accompany the women to Mannali island and camp in tents. More often, the men stay home but come a-visiting. Life is then partly a slog, partly a picnic, the island's seclusion being conducive for both. We encountered a few Chinnapalem families camping in Mannali; they were diverting themselves with a pet monkey and a parrot.

The sun is blazing fiercely now. Pleasantries with their friends in Mannali island over, the nine Chinnapalem girls walk to the other side of the island, put on their goggles, strap the forecal bags around their waists and enter the sea. Soon they are in neck-deep water and also in the thick of seaweed territory. They fan out in different directions. They dive, grope around and come up withthick bushy seaweed, which they slip deftly into the forecal bag.

The girls are now animated, like a hunter after prey, as they repeatedly dive and grab the precious paasi as seaweed is known in Tamil. It belongs to one of three varieties – Gracilaria edulis, Gelidiella acerosa, sargassum.

It is past noon, and the sun sends down poison arrows of flame. The skin tingles, the throat goes dry. Between clicks of the camera, the journalist on the vathai helps himself to generous swigs of Limca and Gold Spot. But the seaweed nymphs are indifferent to the heat, as if it's tranquil twilight. Their forecal bags bulge with weed; each girl has collected more than 10 kilos, but is lusty for more. The girls also get sprightly and frolicksome, as they frisk round in the water like children of nature. One of the girls showers seaweed on her mate. Another, in a spontaneous gesture of insouciance, garlands herself with seaweed.

"Aren't you terribly hungry and thirsty right now?" the reporter calls out. "Engalakku passipachi dan" is the perky reply. ("We are hungry only for seaweed"). The men on the vathai call out to the girls to stop and return, it's time to go home. It's very reluctantly that the girls stop operations and load their seaweed bags on the two vathais.

It's nearly 1 p.m. as the trip home to Chinnapalem begins. Over lunch, the girls discuss their workstyle with Bay of Bengal News.

"We go out to collect seaweed 10 to 15 days a month," says Muniyayi. "The best period is two days before and four days after full moon and new moon." Reason : the tidal variation during these days makes for easy sea trips.

"On every trip we collect 10 to 15 kg of seaweed. We get *0.40* Rs./kg for wet seaweed, 1.80 Rs./kg for dry seaweed. If our collection is consistently poor for four or five days, we

7. Seaweed garland or necklace? Muniyayi is aglow with sargassum.
8. & 9. Some work and some play. The seaweed nymphs banter as they hunt.
10. A man-size catch calls *for* feminine skills.
11. Bargaining with the agent on the shore – he buys by weight.

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go and stay in an island for a few days at a stretch. We take with us rice, chillie powder, tamarind, salt, plus a barrel of fresh water for cooking and drinking. At the island we catch fish by hand, and that fortifies us. From a single stay in an island, we can return with a few hundred kilos of seaweed."

What hazards do they face? "We bruise our hands and feet on shells and coral stones, sometimes we suffer scorpin stings or even snake-bite. . Then we get bedridden for days. We take some medicines and ointments with us to the island (Aspirin, Om water, Vicks Vaporub), but if something serious occurs we have to return home."

The girls are usually married off within the community. The parents borrow from seaweed agents or money-lenders to meet the wedding expenses. Family planning hasn't caught on yet, though no one opposes it as such. Recreations? There is a cinema in Pamban, a few Chinnapalem residents have transistors. But social interaction is the main entertainment in this well-knit community. An annual 10-day temple festival in Chinnapalem has elements of music, dance and drama; mud pots, one from each household, are immersed ceremoniously into the sea. "We look forward to the festival "says Rani.

The energy, the skills and the stamina of Chinnapalem women, their bonohomie, their joie de *vivre* and smiling good humour in the face of adversity, are splendid to watch, Whoever said that our rural folk are passive and fatalistic should meet the women of Chinnapalem. Salute them!

12. Seaweed nymphs get back to the water for a group shot.
73. Muniswari (left) and Nambiswari are the youngest of the seaweed collectors and among the most energetic.
14. Prema has been collecting seaweed for the past 15 years. . .
15. . . . . and Namburani for more than five.
76. At Chinnapalem village.

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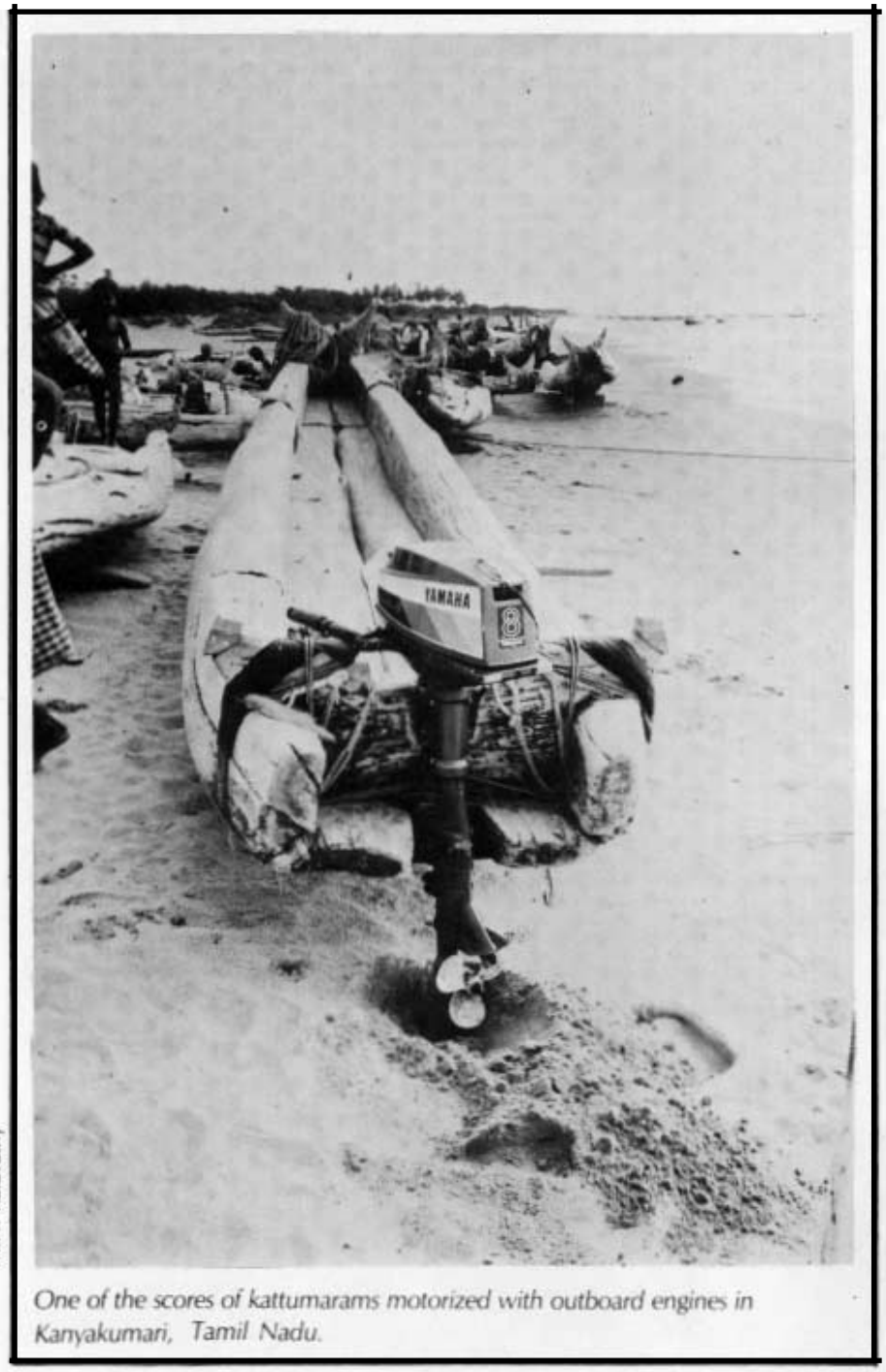
Motorization of traditional craft on the east coast of India

B.T. Antony **Raja**

Does motorization of traditional fishing craft help India's fisherfolk? Does it push production? If so, is it a short-term phenomenon? What problems does it pose? What are the solutions? A BOBP study for the east coast tackled these questions and came up with some answers, summarized in this article.



M.H. Kalavathy

One of the scores of kattumarams motorized with outboard engines in Kanyakumari, Tamil Nadu.

Motorization of traditional fishing craft has been generally regarded in India as the first step of a strategy to augment fish production. It has received governmental support and patronage whenever fish production has shown signs of stagnation or decline. It was for the latter reason that Kerala took to motorization in the early '80s. It is for the former reason that the Government of India has launched a programme to motorize 5,000 traditional fishing craft with outboard motors (OBM) with the hope of increasing the fish production by about 200,000 tonnesduring the period 1985-90.

At the 11th meeting of the BOBP's Advisory Committee in March 1987, the Indian delegation suggested a study on the subject for the east coast of India. Accordingly, a 2-member BOBP team initiated a preliminary study to quickly appraise the present status of motorization and to suggest how far motorization can be attempted in this region. The team covered the contiguous area of Kerala to seek guidance on various aspects governing the phenomenal growth of motorization there — why, how, at whose cost, for whose benefit, and what next.

The study was conducted between June and September 1987. It was based on published accounts, interviews with fisherfolk, representatives of engine manufacturing firms, officials, and people associated with some voluntary organizations.

Why motorize? To improve the operational efficiency; to enlarge the operational area; to increase the fishing time; to seek additional resources; to bring ashore fish of better quality; to generate extra income for fishermen; to reduce their physical strain. Justifiable reasons; sound logic! But what is the level of achievement? What objectives are likely to be met? What obstacles are expected? What are the lessons from the past?

First, let us define motorization. In the narrow sense, strictly for the present study, it is taken to mean installing in the traditional country craft an outboard motor (OBM) or an inboard engine (IBE) up to 15 hp without making any major change in the design of the craft.

What are the schemes encouraging motorization? There is a centrally sponsored scheme on motorization of

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country craft with OBM. If an OBM costs Rs. 15,000, the central and state governments share equally a subsidy amount of Rs. 7,500; 45% of the cost is to be raised through institutional finance and 5% put in as seed money.

The MPEDA (Marine Products Export Development Authority), provides a subsidy of 25% of the cost of OBM, subject to a maximum of Rs. 5,000.

The NCDC (National Cooperative Development Corporation) scheme for members of fishermen cooperative societies offers 20% of the cost of OBM as subsidy, and 60% as loan; the balance 20% will be provided by the state government or raised by the fishermen.

Besides these, some state governments have their own schemes. In Tamil Nadu there is a subsidy-cum-loan scheme for supply of both OBM and IBE. The subsidy amount is Rs. 2,500; the balance has to be raised first before applying for the subsidy. Yet another scheme is on the NCDC pattern; with 80% financial support from NCDC and 20% met by the state government. The latter apportions the entire amount as 20% subsidy, 55% loan and 25% share capital contribution to the society.

In West Bengal, financial assistance is given for the full complement of boat, engine (IBE) and fishing gear with a ceiling of Rs. 96,000; 50% of this amount comes as subsidy, of which one half is provided by the Department of Fisheries and the other half jointly by the DRDA (District Rural Development Agency) and the Schedules Castes and Tribal Welfare Department; of the balance amount which is the loan component, one half is refinanced by NABARD (National Bank for Agriculture and Rural Development) and the other half by the Scheduled Castes and Scheduled Tribes Development and Finance Corporation.

What is the present state of motorization on the east coast of India? Notable development has occurred only in the extreme southern end of Tamil Nadu, in the districts of Tirunelveli, Chidambaranar and Kanyakumari, where over 90% of the total Tamil Nadu fleet of 1,700 motorized crafts is based. Even this rapid development has taken place mainly since 1985. In Andhra Pradesh, it is still more recent – since 1986 – and is Jimited to 40 navas (plank-built canoes) in Kakinada. In Orissa, save for stray craft here and there, the only place of concentration is Pun where there are about 20 motorized kattumarams since mid-i987.

In Tamil Nadu, OBMs and IBEs are more or less equally distributed; motorization is limited in Andhra Pradesh and West Bengal to IBEs and in Orissa to OBMs.

Tamil Nadu: Although the motorized canoes (IBE) and kattumarams (OBM) in Tamil Nadu cover deeper areas than the non-motorized crafts do, they seem to catch the same species and size groups of commercial varieties. The canoes net heavier catches because they carry a fairly large quantity of nets but the kattumarams do not – their gear carrying capacity is limited. The plywood canoe (callçd Kottarcat in Muttom, Kanyakumari district), developed as an alternative to kattumarams, overcomes this limitation to some extent. Motorized canoes carry more crew members than the traditional canoes, party because of the extra gear, partly because of "kinship obligation" (relatives and friends like to join the motorized craft bandwagon).

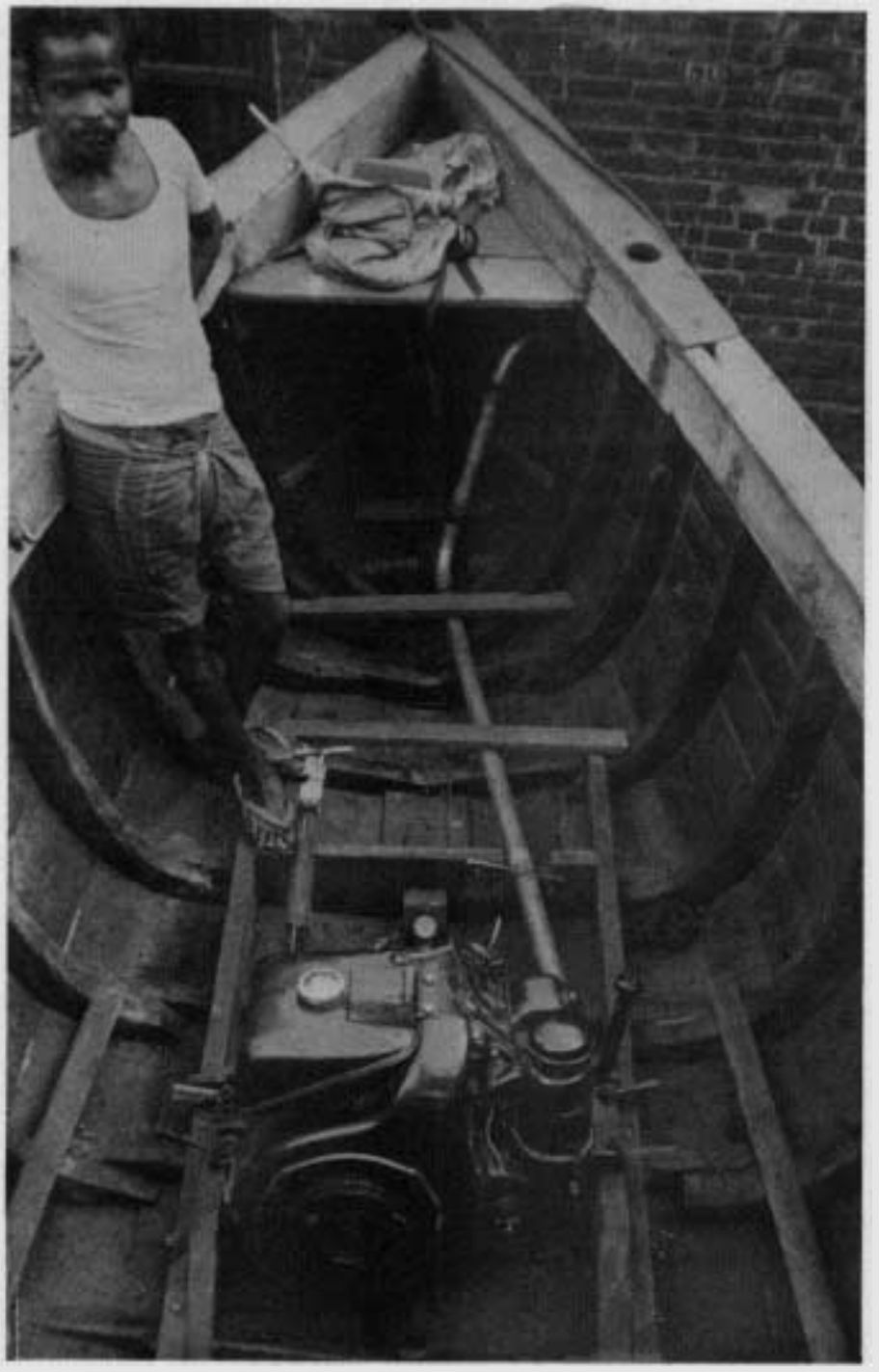
Although motorization seems to have benefited fishermen enterprising enough to venture afar (much beyond the usual distance from the shore) and boosted their gross incomes, the level, of their indebtedness has gone up as

The motorized Nava of Kakinada. The motorization was carried out by the fisherfolk themselves on their own initiative.

well. In some places, where access to government sponsored schemes is difficult, motorization has been sponsored by moneylenders and merchants; in return they retain the auctioning rights and a share of the catch. In certain villages, smugglers have encouraged motorization to facilitate their business.

OBM users are full of complaints about the motors. The principal complaints are : frequent breakdown of motors, poor after-sales service, no workshop facilities in the neighbourhood, spare parts either not available or exorbitantly costly, expensive repairs and maintenance. When queried about the these complaints, the agents of engine manufacturers argue that import of spare parts is allowed only on "actual users licence", that they are consequently able to import only a limited quantity of spares utilising their replenishment lience obtained from export of marine products, that import duty is very high, sometimes with an added component of penal duty because certain components of spare parts happen to be banned items, that subsequent import of such spare parts is confiscated, etc. It would therefore appear that unless government changes its policy, users' grievances about repairs and spare parts cannot be redressed. Local manufacture of OBMs with well-developed after-sale service is the ideal solution for the future.

Inboard motorization of *the dinghy* in Kasafal, *Orissa, tried out by BOBP.*



Andhra Pradesh : The motorized navas (IBE) of Kakinada are said to operate in deeper waters than the traditional navas, and reap richer catches – both in value and quantity. Reasons : more nets, more fishing time, greater mobility to choose productive grounds, regular use of large mesh drift nets and tapping of remunerative distant waters during the lean fishing season. Motorization of kattumarams did not find favour for sustained operation in Kakinada because of the problems with OBMs mentioned earlier.

Orissa : In Puri, motorization of kattumarams is only a few months old and no major problems have cropped up yet (as of July 1987). The State Bank of Indiain Puri (the lending institution) and the operators of motorized kattumarams are equally optimistic about motorization. The fishermen are happy about what their boats can do; the banks are satisfied with the rate of loan repayment. But even in other places, motorization always began with a bang, and problems began cropping up after a few months.*

Motorized navas from Andhra Pradesh fishing in Puri and Paradeep have set off a few ripples in Orissa. A couple of Paradeep fishermen have installed second hand engines in their navas on a trial basis. But the experiments to motorize the dinghy in northern Orissa have not met with success. The fishermen here and in West Bengal prefer large boats with high-powered IBEs for operation as gillnetters-cum-trawlers.

West Bengal : In West Bengal, small boat motorization has covered 8-l 1 m-long plank - built boats with IBE up to 25 hp. The larger-sized of these boats are said to have improved their fishing efficiency because of greater gear carrying capacity but the dominant species composition is reportedly the same.

IMPACT OF MOTORIZATION IN KERALA

Now let us take a look at Kerala. In about four years, 25% of the artisanal craft in the state have been motorized. What is the impact? Have the objectives of motorization (outlined earlier) been met? Here are the findings.

* The latest report (October 1987) is that 1 7 out of 25 OBMs are out order.

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The ***motorized*** vallam ***of*** Kerala.

– No sustained increase in total fish production.

– The actual gain in the catches of motorized craft is largely at the expense of non-motorized ones. Result : a shift in income within the artisanal sector, a minority group with the means to acquire OBMs getting ascendency over the majority of 'have-nots'.

– Inter-sectoral re-allocation of the same limited resource.

– Despite escalation of operational, repair and maintenance costs of the engines, despite declining rate of returns per effort as well a5 on investment, and despite increasing indebtedness, motorization has come to stay in Kerala. The fishermen have got addicted to engines; they are not willing to return to traditional rowing or sailing even in favourable weather.

– Likelihood of the non-motorised sector losing some of its labour force. There's a distinct possibility that today's type of production units in the artisanal sector may get obsolete tomorrow. Example : The dug-out-canoe-boat seine combination may disappear and be replaced by the plank-built canoe-mini-purse seine combination.

– A further schism within the motorized sector is inevitable – those who have acquired longer boats with higher-powered engines will get the upper hand;

– Motorization might have helped enlarge the area of fishing off some regions; but it has not located new resources, nor found different size groups of species that are at present commercially tapped. However, motorization has sparked two significant trends :

– More efficient fishing gear are being used. The mini purse seine has supplanted the less efficient boat seine of yesterday.

– To accommodate this gear, today's canoes are larger in size than before.

The larger-size canoes operating mini-purse seines offer fairly effective competition to trawler and purse-seine units, and discourage them from encroaching on to artisanal territory. This is a positive development.

This apart, the OBMs of Kerala have failed to establish any of the projected advantages of motorization for the fishery or for socio-economic betterment of the traditional sector.

What is to be done? Mr R C Choudhuri, Secretary (Fisheries) to Government of Kerala, opines : What is important is to evolve proper systems to protect the interests of traditional fishermen.

CONCLUSIONS .

The experience of Kerala and southern Tamil Nadu points to the following :

– Abundant caution is called for concerning the motorization of OBMs on the east coast. It would be wiser to encourage indigenous production of sturdy, cost-effective OBMs. Manufacturers within India may be able to ensure sound, reliable and reasonably cheap after-sales service. Spare parts may not be outrageously costly, as they are now. (A few Indian companies have been issued letters of interest for manufacture of OBMs. However, there has been no further progress).

– Till indigenous production of OBMs starts, import of spares for OBMs must be liberalized and import duties reduced; besides, easy access to repair facilities should be created so that fishermen who have fitted OBMs on their boats do not suffer hardship. (That's how Sri Lanka has managed its programme of OBM motorization during the past decade). The issue, therefore, calls for coordination between the Ministry of Agriculture, the Ministry of Commerce and the Ministry of Finance in the interest of development.

Other suggestions concerning OBMs :

– Assistance to set up repair workshops wherever needed.

– Manufacturers should investigate and stop the frequent breakdowns of. engines.

– Production of high grade kerosene exclusively for OBMs.

Inboard motorization of canoes may help improve fishing efficiency and augment fish production in Tamil Nadu, Andhra Pradesh and southern Orissa. This may even help tap unexploited and underexploited resources in the inner continental shelf, and to some extent the outer continental shelf as well. It will not conflict with the interests of the non-motorized artisanal sector. In fact, it may even help relieve some of the pressure now exerted on the intensely exploited inshore resources.

In northern Orissa and West Bengal, the expressed desire of fisherfolk for higher powered, larger boats rigged for trawling as well as for gillnetting, should be examined.

New ODA project aims at better fish utilization

A U.K.-funded post-harvest fisheries technology project launched this year, supplements and strengthens BOBP work with small-scale fisherfolk communities in the Bay of Bengal region.

The Overseas Development Administration (ODA) of the British Government will help to improve fish utilization and reduce post-harvest wastage in the Bay of Bengal region through a post-harvest fisheries project based at the BOBP headquarters' in Madras, India. The project commenced in August 1987 with the appointment of Mr. David Walker as Regional Post-Harvest Fisheries Adviser.

Funded and executed by ODA, the 2-year $415,000 project will examine the handling, processing and marketing of fish in the seven countries which presently comprise the BOBP — Bangladesh, India, Indonesia, Malaysia, Maldives, Sri Lanka and Thailand, Good management of fisheries resources requires that fish landed should be effectively utilized. There is little point in putting a lot of time and effort into catching fish if they are allowed to deteriorate or even spoil before they reach the consumer. During times of plenty, when fish catches are high, there is an added danger that large quantities will be wasted. Additionally, as fisheries resources in the Bay of Bengal get more fully exploited, the need to minimize post-harvest losses will be critical.

king of fish (above) and salting (below), common post-harvest techniques *in the Bay of* Bengal *region, will be studied by the* ODA *project.*

The fisheries sector in the region provides a very important input to the countries' economics and the people's nutrition, Naturally, the reported high levels of post-harvest losses and wastage cause concern. The project's broad objective is to reduce avoidable losses (which often occur through lack of education or training, use of poor or inappropriate techniques, inadequate handling facilities or equipment) and to improve utilisation, thereby ensuring that a greater supply of better quality fish and fish products reaches the constimer.

The post-harvest project results from a series of discussions between the BOBC (Bay of Bengal Committee) and the ODA, which has a wealth and depth of experience and expertise in post-harvest fisheries technology and is already active in the region in related programmes on a bilateral basis. The project strengthens the impact and widens the scope of the BOBP's small-scale fisheries project, which does not deal with post-harvest technology.

The project's administrative framework was determined by a senior ODA fish technologist who visited the area in 1986 and held preliminary discussions. While the project complements and is technically fully integrated with the FAO-executed projects of BOBP, it operates as an independent British project with regional responsibilities, It shares office facilities with the BOBP and has the same operating strategy,in that it will identify situations where a .

particular problem is acute and offer a solution. If effective, the solution will be promoted in other fisheries throughout the region; thus the project will act as a catalyst for developmental activities.

The project adviser has been seconded from the Overseas Development Natural Resources Institute (ODNRI), formerly known as TDRI; an organization itself active in a wide range of post-harvest programmes in warm water fisheries. The adviser will identify, plan, organize and evaluate the activities, participating where appropriate, and apply known or adapted technology which will help reduce post-harvest losses and optimize utilization. However, the main technical support will be in the form of short-term consultants, both national and international, and counterpart staff brought in for specific purposes.

Much flexibility has been built into the project to enable a rapid response to the needs of different countries and also to the various fishing communities within these countries. Actual activities could take any form, but the types envisaged include feasibility studies, pilot projects, adaptive research and development programmes, training courses, workshops and general technology transfer. It is expected that the project will help bridge the gap between the work of research institutions and the actual practice at landing or processing sites. The emphasis will be on field work in the small-scale fisheries sector, but this will not preclude involvement with large-scale technology, which would result in far-reaching benefits for the fishing and processing communities.

Being less than four months old, the project is still in its establishment stages; visits to participating countries are being made to discuss post-harvest problems and thereby identify and prepare for future activities. Some of the topics currently being considered include improved handling and processing of seaweed, use of waste fish material and by-catch in prawn feed, more effective use of ice on board fishing craft, improved utilization and marketing of large pelagic species, the potential for fish leather production and quality maintenance of prawns after harvest.

Drying of fish is a technique with vast potential for improvement.

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Marine Small-Scale Fisheries on the East Coast of North Sumatra Province

Low productivity and incomes characterise small-scale fisheries in *North* Sumatra, Indonesia. Coastal aquaculture and offshore fisheries seem to offer the best promise for higher production and better living standards, says this factual overview based on government data.

North Sumatra is one of the 27 provinces of Indonesia. Its east coast, facing the Malacca Straits, is a potentially rich fishing area. The length of the coastline on the east is 364 km and the region has a population of 5,520,706 (1985) of whom 60,118 are engaged in fisheries. There are four coastal districts on the east coast : Langkat, Deli Sardang, Asahan and Labuhan Batu. The two major cities in the region are Medan (Deli Serdang) and Tanjong Balsi (Asahan).

The marine small-scale fisherfolk of the east coast of North Sumatra are said to be economically depressed, with low productivities and incomes. They lack access to credit at reasonable rates of interest, to modern.fishing technology and to adequate marketing opportunities. As of 1985, there were 18,092 fishing craft in the area, about.50% of them (9,494) being non- motorized. There were 211 craft with outboard engines and 8,378 craft with inboard engines (see table),

The total production in 1985 was 127,260 metric tons with a retail value of Rs. 74.8 billion (US$ 46.7 million). The bulk of landings came from shellfish collection (32,851 metric tons), traps (30,815 m. tons) and the purse seines (23,275 m, tons). Together, these three accounted for 86,941 metric tons or 68% of the total catch. Gillnets (19,457 m. tons), seine nets, liftnets and hooks and lines contribute less than these three methods to the total catch. In terms of productivity, purse seines were the most productive, contributing 23,275 tons of fish from just around 500 fishing units. Most of the fish produced is either consumed fresh or iced. Roughly a fourth of the production is processed into salted and dried fish or into fermented and frozen products. Some 5,200 t of frozen shrimp were produced in 1985 and of this 1,540 t were exported, Total earnings from export to other provinces of Indonesia and to foreign countries were close to US $26 million. The total freezing capacity available is 1000 t. In addition, there is a storage capacity of 1000 t.

G. Pajot

This motorized **craft (Asahan** district) is out to capture catfish **with bamboo traps.**

Coastal aquaculture, for the production of both shrimp and cockles, holds out considerable promise. Only a small proportion of the available potential is, however, currently exploited.

There have been two surveys of the fishery potential on the east coast of north Sumatra. The 1976 Bandung RIMBA RAYA survey placed the maximum sustainable yield (MSY) of the area at 107,127 t (37,829 t pelagic + 69,838 t demersal). A later survey in 1983, however, put the figures much higher. The overall MSY was estimated at 256,500 t, with pelagics accounting for 126,000t and demersals for 130,000t (see tables). Most of this increase comes from assessing the potential of the hitherto unexploited offshore waters. Given that the current fishery mostly exploits resources in the inshore

Fishing craft on the east coast of North Sumatra

District	Non-powered	Outboard engine	Inboard engine	Total
Langkat	1,672	211	2,490	4,373
Deli Serdang	5,593	–	1,702	7,295
Asahan	1,419	–	3,693	5,112
Labuhan Batu	810	–	502	1,312
Total	9,494	211	8,378	18,092

region, it appears likely that there is no further scope for expanding this fishery; all future growth will have to come from offshore waters.

This would require some changes in the composition of the fishing fleet which now consists mostly of non-motorized boats or motorized boats in the less than 5 GT class. These two together accounted for 17,092 of the 18,092 craft in 1985. There were 560 boats in the 5 - 20 GT class; 297 in the 11 - 20 GT class; 134 in the 21 - 30 GT class and nine in the 31 l 50 GT class.

The gear composition on the east coast of north Sumatra also reinforces the conclusion that the fishery there is mostly traditional and limited to the exploitation of inshore waters. In 1985, there were totally 20,091 pieces of gear in the area. Their distribution is given in the table below.

There is one national fisheries harbour on the east coast of north Sumatra at Belawan, Deli Sardang. This harbour is not yet fully operational. It is constructed to eventually service the 165 purse seiners in the 20 - 50 GT range operating in the sea. In addition to the national harbour, there are nine fish auctioning centres each comprising a wooden jetty and a fish auction hall with cold storage facilities. There are also 358 private jetties. Most fishing boats in the area use these jetties to land their catches and sell them. This way, fisherfolk are closely tied to private jetty owners. The fish auctioning centres are aimed at breaking this nexus.

Cycle vendor of fish on his way to the *market.*

Fish marketing is mostly in the hands of private fish traders. Since most of the catch is landed in private jetties, the owners of these jetties are able to control the marketing and distribution of the catch. The system, as it exists, has many imperfections. For instance, there is not much by way of competitive buying of the landings. Though a government order (PERDA 25/80) exists which mandates public or open auctions, it has not yet been implemented fully even in the government-owned fish auctioning centres. In these centres, the landings are often sold without being auctioned. North Sumatra is a net exporter of fish and is the only province in Indonesia to have reached the national goal of per caput annual fish consumption of 17.5 kg. The national average is 14.5 kg. Exports from North Sumatra to the rest of Indonesia and to foreign countries amounted to 5026 t in 1985 (provisional figures). This is lower than figures achieved in 1984 and the years before that up to 1981.

The major fish processing activity is salting and drying. Cooking and drying, fermentation into paste and fish sauce, and fish meal making and freezing, mainly for the export market, are also undertaken on a relatively small scale.

The culture of penaeid shrimp in brackishwater ponds in mangrove areas and of cockles in coastal mudflats holds out considerable promise. Potential mangrove areas suitable for aquaculture have been estimated at 50,000 hectares. Only a small fraction of this potential (1400 ha) is currently exploi-

Maximum sustainable yield in the east coast of North Sumatra (1976)

(metric tons)

District	Inshore (up to 12 miles)	Offshore (12-40 miles)
Langkat	15,246	5,965
Deli Serdang	22,946	8,978
Asahan	24,178	9,460
Labuhan Batu	14,630	5,724
Total	77,000	30,127

MSY in the east coast of North Sumatra (1983)

(metric tons)

District	Total MSY	Pelagic	Demersal
Langkat	50,757	–	–
Deli Serdang	76,447	–	–
Asahan	80,551	–	–
Labuhan Batu	48,745	–	–
Total	256,500	126,500	130,000

G. Pajot

This *rowing* boat (Asahan *district)* is equipped with trammel *nets.*
Below : Boatbuilding *in* langkat district.

G. Pajot

ted. Total 'production of shrimp from existing ponds amounted to 1,234.2 t in 1985. Further expansion is very attractive from the point of view of income generation for fisherfolk as aquaculture yields high-value species with excellent export potential for fisherfolk and their families. Cockle culture also looks promising, especially because cockle collection already exists on a small scale and the technology of culture can be introduced without too many absorption problems.

In 1985, there were 17,955 households engaged in marine capture fisheries. This figure represented a recovery from the all-time low figure of 13,588 households in 1983, the latter probably being caused by the ban on trawl fishery in the early 1980s. The 1985 figure was, however, still lower than the 1981 figure of 19,184 households engaged in marine capture fisheries. Of the 17,955 households, 8,183 possessed in board motor boats, 185 outboard motor boats and 9,322 non-motorized boats. A few households (265) possessed no boats at all. There were a total of 60,188 registered fishermen of whom 35,485 were full-time fishermen, 23,393 part-time fishermen with fishing as their main activity and 1,240 casual fishermen. Several fisherwomen engaged in the harvesting of cockles and shrimp. The fisherfolk are located in 47 coastal villages spanning the eastern coastline of North Sumatra. In addition, there are a number of small fishing settlements associated with these villages. Most of these settlements are accessible only by footpaths or by boat. The settlements being small and isolated are generally economically depressed.

Most of the fisherfolk engage in small-scale fishing activity using traditional gears. As such, the inshore waters are probably over-exploited. Further, there is no legislation at present to regulate commercial fisheries which also exploit the same fishing grounds. This affects artisanal fisheries adversely and this is reflected in the low productivity (about 2 metric tons per fisherman per annum) and low incomes for small-scale fisherfolk. As incomes are low, living standards, too, are correspondingly low with most fishing villages lacking essential infrastructural facilities such as water and power supply. Fisherfolk live in small wooden houses. In the poorer villages, the houses are often congested and in a dilapidated condition.

Types and numbers of fishing gear

Gear	Langkat	Deli Serdang	Asahan	Labhun Batu	Total
Seine net	282	'760	320	103	1,465
Purse seine	—	265	302	34	501
Gillnet	1,731	4,230	2,106	623	8,690
Liftnet	801	—	209	25	1,035
Hook & Line	279	1,903	297	76	2,555
Trap	1,595	79	317	643	2,634
Shellfish collection	—	1,350	1,692	26	3,068
Castnet & Harpoon	80	—	—	63	143
Total	4.768	8.487	5.243	1.593	20,091

Fish processing in North Sumatra (1985)

(metric tons)

District	Salted & Dried	Cooked & Dried	Fermented			Fish Meal	Frozen Fish
			Shrimp	Fish	Sauce		
Langkat	2,641	185	176	317	—	—	—
Deli Serdang	4,047-	—	134	404	23	588	946
Asahan	10,716	587	985	859	—	520	594
Labu han Batu	5,960	—	147	1,599	—	—	—
Total	23,364	722	1,442	3,179	23	1,108	1,540

Fisheries extension : The fisheries extension service, till now a part of the Directorate General of Fisheries, has now been integrated with other agricultural extension services as part of the government's programme of streamlining all general extension services and bringing them under one roof. Under the new scheme, the extension service (Agency for Agricultural Extension and Training, or in Bahasa, Balai Pendidikan Latihan dan Periyuluhan Pettanian, BPLPP) will provide only technical support and specialist service to the agricultural extension system.

The methodology of extension is the training and visit system. At the grassroots level are the field extension agents who meet their clients regularly and service them. If any matter beyond the agent's competence crops up, it is. referred to the district level Agricultural Extension Centre. There are 15 of these centres servicing coastal fishing villages in North Sumatra. Above the district-level centres are the provincial agricultural offices which coordinate integrated agricultural extension services through a Secretariat for Mass Guidance.

— C.S.G. Prasad

Left : Processing of blue crabs by fisherwomen. Right : Children from the fishing community in Langkat district.

G. Pajot

G. Pajot

Bay of Bengal Fisheries Information System (BOBFINS) : What it is, what it does

by K. Sivasubramaniam

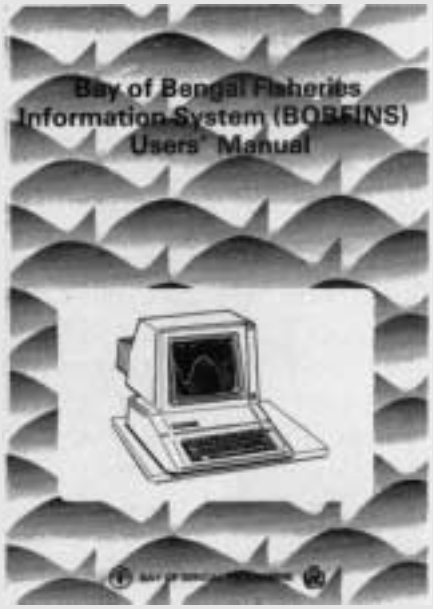
Reliable fisheries statistics are essential for fish stook assessment and the management of fishery resources. The Marine Fishery Resources Management project of BOBP (RAS/81/051), therefore, placed high emphasis on improvement of data collection and analysis by member-countries. (The project operated from 1983 to 1986; Bangladesh, Sri Lanka, Maldives, Indonesia, Malaysia and Thailand were members).

One of the project's activities was the design and development of BOBFINS (Bay of Bengal Fisheries Information System), a database system which provided a suitable method for compiling and analyzing fishery statistics. The basic features of BOBFINS are set out below.

Q : What is the purpose behind the development of BOBNNS?

A : In most countries of the Bay of Bengal region, the limiting factor in stock assessment exercises is fishery statistics. The required data take time to gather. What is more, their analysis through existing manual methods is laborious, time consuming and prone to error. One normally finds that countries publish their fishery statistics every year with a timelag of two or three years. That is, the most current statistics available in 1987 would be those pertaining to 1985 or even earlier. BOBFINS was thought of to reduce the time taken to analyze fisheries data, to minimize the errors inherent in manual analysis and to reduce the time gap between data collection, analysis and publication.

The system is designed to store, retrieve, sort and analyse large quantities of fisheries data. It provides a standard system of data compilation and analysis for the project's member-countries. Data from members can either be pooled for joint analysis or exchanged, once they implement a common database management system like BOBFINS.



Q : What *were BOBP's efforts in* developing *BOBFINS?*

A : BOBP first investigated the existing statistical systems in the member countries along with the nature of the fishing fleet, the types of gear in use, the species being fished and the fishing grounds being exploited, and developed a basic framework for marine fisheries in the region. This enabled BOBP to fix the ranges of numbers (craft, gear, production etc.) involved and to stratify the fisheries. A systems analyst converted this framework into a series of computer programs -the Bay of Bengal Fisheries Information System under NOBP's guidance. This took about 18 months. Member countries were then invited to try out the system. Feedback from them helped modify and improve BOBFINS.

Q : Can BOBFINS be used by someone not trained *in* computer programming?

A : Yes. BOBFINS provides a set of "user-friendly" interactive programs for the benefit of biologists and statisticians who might not have had any specialized training in computer programming. The computer's monitor displays stepby-step instructions on the procedure that the user is to follow.

Q : What are the hardware requirements for implementing *BOBFINS?*

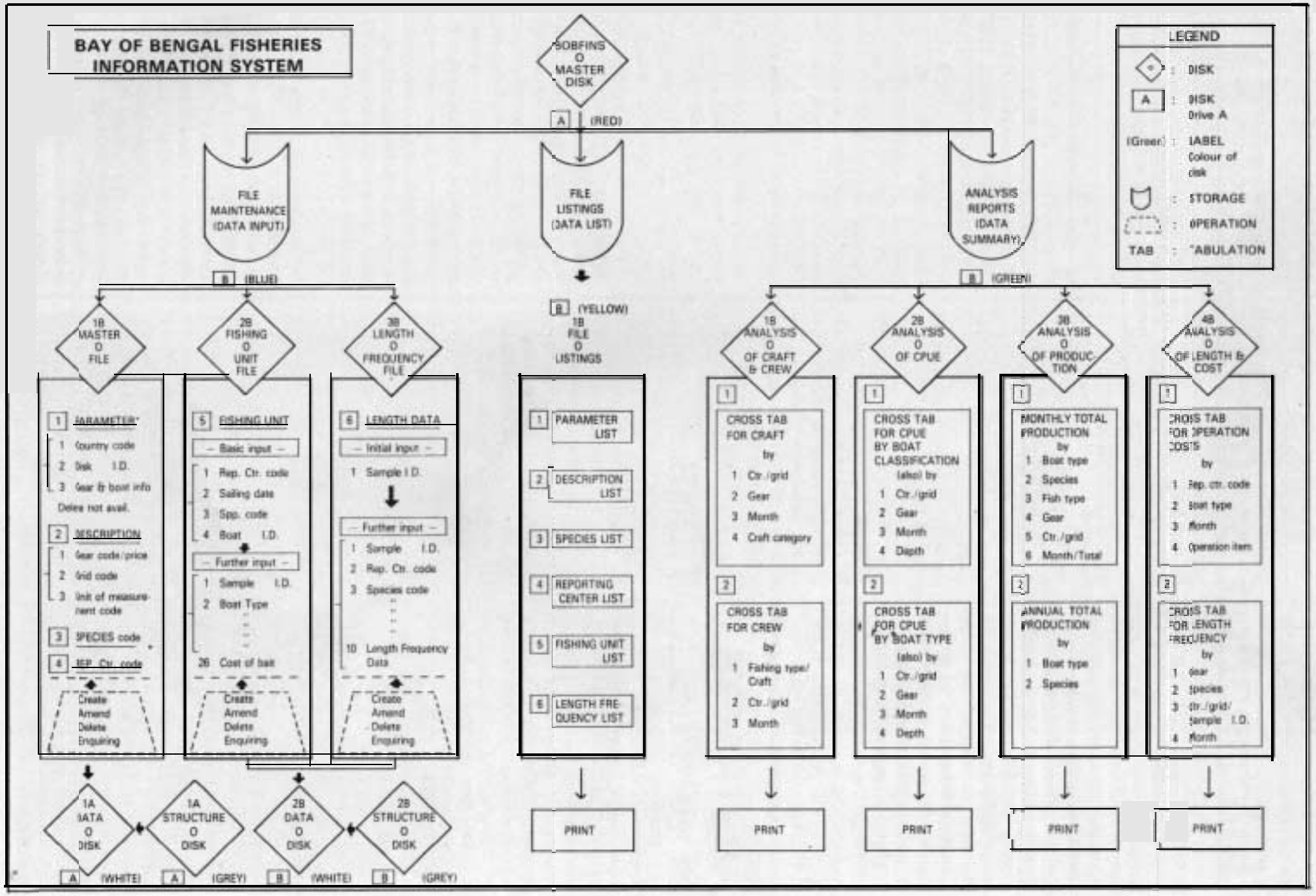
A : BOBFINS is available in both floppy disk and hard disk versions. It is designed for the APPLE IIe computer with 128K RAM expansion. This system along with two floppy disk drives and a 10MB fixed disk drive (SIDER) have been provided to each country that participated in the project.

Q : How is data entry handled *in BOBFINS?*

A : Data entry is handled by a menu-driven creation program. This program automatically checks the validity of all data fields before they are entered into an appropriate field. Data cannot be entered in any arbitrary form. They have to be given an appropriate format before they are entered into the appropriate file. BOBFINS performs numerous checks to verify whether data conform to the proper format and whether the corresponding data exist in the relevant master files as well. All these checks tend to slow down data entry operations but this delay is worthwhile as it is possible to ensure that no "garbage" gets into data files. If the floppy disk version of BOBFINS is used, data need to be manipulated across several diskettes, but if a hard disk version is used, the speed of the input/output operations can virtually be doubled in the case of very large files.

Q : Does BOBFINS come with a standard system of codes, etc., or is the user permitted to develop his own codes as necessary?

A : The country codes, gear codes, species codes and grid (or area) codes to be used with BOBFINS, have been provided to membercountries along with a comprehensive users' manual. Users are also free to apply their own codes if they' so desire. However, if these codes are developed independently it becomes necessary to ensure that two or more countries in the region do not use the same area code for different areas, or different species


BAY OF BENGAL FISHERIES INFORMATION SYSTEM
SOBFINS O MASTER DISK
A (RED)
FILE MAINTENANCE (DATA INPUT)
FILE LISTINGS (DATA LIST)
ANALYSIS REPORTS (DATA SUMMARY)
LEGEND
: DISK
A : DISK Drive A
(Green) : LABEL Colour of disk
: STORAGE
: OPERATION
TAB : TABULATION
B (BLUE)
B (YELLOW)
B (GREEN)
1B MASTER O FILE
2B FISHING O UNIT FILE
3B LENGTH O FREQUENCY FILE
1B FILE O LISTINGS
1B ANALYSIS O OF CRAFT & CREW
2B ANALYSIS O OF CPUE
3B ANALYSIS O OF PRODUCTION
4B ANALYSIS O OF LENGTH & COST
1 PARAMETER*
1 Country code
2 Disk I.D.
3 Gear & boat info
Delete not avail.
2 DESCRIPTION
1 Gear code/price
2 Grid code
3 Unit of measurement code
3 SPECIES code
4 REP. Ctr. code
Create Amend Delete Enquiring
5 FISHING UNIT
— Basic input —
1 Rep. Ctr. code
2 Sailing date
3 Spp. code
4 Boat I.D.
— Further input —
1 Sample I.D.
2 Boat Type
26 Cost of bait
6 LENGTH DATA
— Initial input —
1 Sample I.D.
— Further input —
1 Sample I.D.
2 Rep. Ctr. code
3 Species code
10 Length Frequency Data
1 PARAMETER LIST
2 DESCRIPTION LIST
3 SPECIES LIST
4 REPORTING CENTER LIST
5 FISHING UNIT LIST
6 LENGTH FREQUENCY LIST
CROSS TAB FOR CRAFT by 1 Ctr./grid 2 Gear 3 Month 4 Craft category
CROSS TAB FOR CREW by 1 Fishing type/ Craft 2 Ctr./grid 3 Month
CROSS TAB FOR CPUE BY BOAT CLASSIFICATION (also) by 1 Ctr./grid 2 Gear 3 Month 4 Depth
CROSS TAB FOR CPUE BY BOAT TYPE (also) by 1 Ctr./grid 2 Gear 3 Month 4 Depth
MONTHLY TOTAL PRODUCTION by 1 Boat type 2 Species 3 Fish type 4 Gear 5 Ctr./grid 6 Month/Total
ANNUAL TOTAL PRODUCTION by 1 Boat type 2 Species
CROSS TAB FOR OPERATION COSTS by 1 Rep. ctr. code 2 Boat type 3 Month 4 Operation item
CROSS TAB FOR LENGTH FREQUENCY by 1 Gear 2 Species 3 Ctr./grid/ Sample I.D. 4 Month
PRINT
1A DATA O DISK
1A STRUCTURE O DISK
2B DATA O DISK
2B STRUCTURE O DISK
A (WHITE)
A (GREY)
B (WHITE)
B (GREY)

codes for the same species, if their data are to are to be exchanged or pooled at any stage.

Q : What are the *different types of analysis possible with BOBFINS?*

A : BOBFINS can analyze craft and crew compositions by class (length, tonnage or horse power). It can also analyze catch rates, fishing effort, production, costs and earnings, etc. Catch rates for different types of craft or gear in different areas and different seasons, different fishing depths, different species -- these can be got from BOBFINS and are tailored to suit the statistics required for stock assessment.. The results of the various analyses are printed as tables. The fishery biologists conducting sampling programmes can use the system to compile and analyze data collected on some specific fishery or species. It also possible for statisticians to use BOBFINS to estimate total fish production at least in some of the countries in the region. In some cases, it is very difficult to obtain precise estimates of total fishing effort. BOBFINS provides a simple alternative method to estimate total production by sampling landings per day in such cases.

With BOBFINS, length frequency data for any species may be analysed according to area, season, craft and gear for direct comparisons; samples can be raised to the catch for any pooling or combination or strata, as required. The system also facilitates analysis of costs and earnings for any specific type of craft. This can be done on either a monthly or an annual basis. The diagram (previous page) shows the BOBFINS layout.

Q : How *were BOBFINS users* trained in the use of *the system?*

A : Biologists and statisticians from the participating countries attended two training courses on computer and software usage, including BOBFINS, in 1984 and 1986. In addition, the project's statistician visited these countries to demonstrate the system to other biologists and statisticians. He also helped clear any doubts that users had and overcome the difficulties they faced. These trips helped the project to modify BOBFINS wherever necessary, and the final package was ready in 1986.

Q : *How* can one get more information about *BOBFINS? Are the* programs available to anyone who is interested?

A : Further information on BOBFINS can be obtained by writing to BOBP. The program listing for BOBFINS runs well over 250 pages. It is, therefore, not being supplied. Eight floppies are required to accommodate the BOBFINS programs. A set of these diskettes and a BOBFINS Users' Manual (published as BOBP/MAG/5) are available on request at cost (about US $ 25).

ABSTRACTS OF BOBP PUBLICATIONS

BOBP/WP/55 : *Study on* income, indebtedness and savings among *fisherfolk of* Orissa, India. T. Mammo. Madras, India, November 1987.

This paper presents the findings of a study on ownership, income, indebtedness and savings patterns in two Orissa fishing villages, Udaypur and Gopalpur. The study was conducted on the basis of a field survey of 80 households in each village by four trained investigators.

BOBP/MAC/4 : Separating *mixtures of* normal distributions : Basic programs for Bhattacharya's method, and their applications to *fish* population analysis. *H.* Goonetilleke & K. Sivasubramaniam. Madras, India, December 1987.

This manual, prepared by the BOBP's resources project, contains a package of programs, including a modification of the famous Bhattacharya method for separating normally distributed groups from a mixture of normal distributions; Sparre's, Jones's and Van Zalinge's method for estimating total mortality co-efficients from length-frequency data; and a new method for estimating the asymptotic length and mortality co-efficent.

The programs have been written in microsoft BASIC for use on an Apple lle micro-computer (with CP/M operating system) and EPSON Rx-80 F/T printer.

BOBP/MAG/5 : Bay of *Bengal* Fisheries information *System (BOBFINS) : User's* Manual. Madras, India, September 7 987.

BOBFINS is a database management system designed for the compilation and analysis of fisheries statistics. The system will, it is hoped, improve at-id' expand fisheries information emanating from countries around the Bay of Bengal, facilitate exchange of data, and enhance stock assessment possibilities at the national and regional levels. The system was prepared by the BOBP's marine fishery resources project.

An Orissa fisherwoman deposits money into her own domestic bank.

glimpses into BOBP projects

Pen culture at Chilaw, Sri Lanka

In October 1986, BOBP launched a pen culture pilot project at the Chilaw lagoon in Sri Lanka, in collaboration with the Sri Lankan Ministry of Fisheries.

Two pens, 0.25 ha and 0.18 ha respectively, were constructed in a location with good water exchange. Rearing technology relies on the use of hatchery-produced post larvae of the tiger prawn and on a compounded feed prepared by a local private feed mill. Three villagers who had expressed interest in farming the pens were selected to execute the project with assistance from the Ministry and BOBP staff. Though the performance of these farmers is monitored regularly, they have the main responsibility for execution, and they are encouraged to suggest improvements to the culture technology.

When the project started, its objectives and the role of BOBP were perhaps not adequately communicated to the people of Marawela village. The fisherfolk did not understand what the project was about, who was undertaking it and how, if ever, they could benefit from it. In fact, some people thought that it was a private venture employing three of their people, and that it could infringe on their traditional user-rights on the lagoon.

The first harvest was dismal; only 300 prawns out of the 5,000 stocked in the 0.25 ha pen were recovered. It is not possible to infer whether the prawns had escaped or had been poached but the majority of villagers assumed the latter. The only positive result was that the prawns had grown to a size of nearly 30 g average, a fairly large size.

Before and during the second trials, efforts were made to explain to the villagers the real nature of the trials and to get the local fisheries society more closely involved in the day-to-day running of the pens. The idea was that this would possibly make future technology transfer to the community easier and increase the pressure on the project fishermen to perform well. Whatever the reasons for the poor first harvest, the second was much better; about. 200 kg of prawns were harvested in August, and definitely attracted a lot of interest from the villagers. Some of them wanted to start immediately on their own, with BOBP support. It was unfortunate to have to check such enthusiasm but the technology was sit too risky to be extended without further trials. Instead, the local fishermen's organization was encouraged to take on the management of the pens for the third trial, which is now on. After a long internal debate, the organization declined the offer but agreed that BOBP, together with the Ministry of Fisheries, should continue the trials. Preliminary results of the third trial are encouraging. The three project fishermen are now well-trained and capable of managing the pens on their own provided they get the necessary inputs. The selection of participants among the local fisherfolk remains controversial, perhaps partly because of, competition for scarce jobs.

Should the present trials be a success, forceful requests from villagers for assistance in pen culture are likely.

D.R.

Feeding **tray is lowered** *into one* **of** *the pens* **at Chilaw, Sri Lanka.**

Modified SRL-34 demonstrates potential as offshore boat

The SRL-34, the Neil Marine boat modified by BOBP, has during five and a half months (mid May-October 1987) of demonstration fishing at Beruwala in south Sri Lanka recorded gross earnings of Rs. 270,417 and net earnings of **Rs.** 211,648 following a catch of about 14,842 kg during 78 fishing days.

The fishermencrew and the boat-owner are delighted with this well-endowed offshore fishing boat. The 10.30m 25 hp SRL-34 has kitchen and rest facilities for a crew of four. It can stay out at sea for four days and operate 120 miles from the shore; for offshore fishing it can engage in driftnetting, drift longlining and trolling; it can carry simultaneously 2 km of driftnets (hung length), 6 km of drift longlines and six trolling lines; it can carry 1.6 t of fish in ice or chilled sea water and 200 litres of fuel and fresh water.The boat can operate throughout the year. A simple sail can be hoisted if the engine breaks down.

The boat-owner comments : "We catch more of offshore species (like tunas, shark and billfish) and earn much more than the 28-footers. Multi-day operation is a very interesting experience. Though we spend so much time at one stretch in the sea, we do not feel fatigued, since the boat is designed to allow basic comforts. A hot meal and a cup of tea, for example, is possible on board any time." The fishermen crew would like radio communication equipment on board, but the boat owner doesn't agree, because of its high cost. "Is it essential for this class of boat?", he asks.

BOBP has, with the approval of the Ministry of Fisheries, sold the boat to the highest bidder – who happens to be the boat owner cooperating in the fishing trials. .

The new SRL-34 is effective because it is the product of several years of effort, critical assessment and modification. The first version of this boat was introduced by Neil Marine boatyard in . Negombo during the late 70's; its spaciousness and extra carrying capacity as compared to the 28-footer found favour with fishermen for offshore fishing. Several of these craft are now fishing in the southern parts of Sri Lanka.

In 1982 BOBP took up this boat, modified its general arrangement and layout, and added several new features to make it more effective for offshore fishing-a small cabin for crew shelter, a fish hold to preserve catch, a sail that could be hoisted during emergencies. The commonly used 33- 40 hp engine was replaced by a 25 hp engine to reduce fuel cost. SRL-34, as the boat was labelled, fished for three years from Beruwala.

Several improvements for effective multi-day operation were highlighted during these three years of fishing trials. It was suggested that the engines should be provided with a hand start besides an electric starter; the single sail rig should not interfere with handling of fishing gear; the cabin should be more spacious; fish hold capacity should be increased to 1.5 t of fish. Early 1986, a consultation was held with fishermen, they urged that all these improvements should be effected. Consequently Neil Marine got to work on the SRL-34, and it was re-born in March 1987, incorporating these improvements. The results (shown by the May-October 1987 fishing trials) have been gratifying.

The modified SRL-34, a well-endowed offshore fishing craft.

G. Pajot

Small-scale brine shrimp production in Tamil Nadu — is it possible?

The development of aquaculture into a large, thriving economic enterprise depends, among other factors, on the appropriate supply of inputs such as seeds for further ongrowing. India, like other countries with large tracts of technically suitable land, has embarked on a comprehensive programme of shrimp aquaculture. This naturally includes the construction of shrimp hatcheries in various locations along its coastline. MPEDA (Marine Products Export Development Authority), for instance, has commissioned the construction of two large hatcheries using up-to-date technology in Orissa and Andhra Pradesh.

The newly hatched larvae of *Artemia,* called nauplii, are crucial for successful hatchery production of shrimp fry. Adult Artemia are nutritious food for post-larval and juvenile shrimp and both products are widely used in the aquarium or decorative fish industry.

In nature, the survival of brine shrimp depends on its ability to tolerate very high salinities which are lethal to its predators. It is very prolific, and can reach very high population densities. Under certain ecological conditions it produces a cyst, an egg in which embryonal development is temporarily arrested, which can be collected, dried

and stored as in an inert brownish powder. These cysts resume their development when placed in water of appropriate salinity. The nauplii which hatch from these cysts are convenient food for larval prawns.

Natural occurrence of *Artemia* sp. in India is reported from south Tamil Nadu and from Gujarat. Production from these sources is very small and generally of a bad quality. The proposed MPEDA hatcheries will require larger quantities of properly processed and preferably small cysts.

It is in this context that BOBP is exploring the possibility of demonstrating and promoting the production of brine shrimp. Brine shrimps require high-salinity water and have a beneficial impact on salt quality and production when present in salterns; a brine shrimp culture project would therefore probably concentrate on the existing small-scale salt producers. It would be a welcome additional source of income.

A socio-economic study of small-scale salt producers of the Kovalam-Kelampakkam area south of Madras was conducted recently by BOBP. It showed that most producers belong to the Harijan community, and are educationally and economically backward. The problems faced by the small-scale producers are numerous; water scarcity, inadequate transport facilities, lack of capital. This results in low labour productivity and a low quality product. The families of the salt producers depend for survival on loans granted by the local salt merchants and agents. The cooperatives of producers do not function well. The study showed that these small-scale producers would benefit greatly if welfare and development schemes meant for the rural poor are extended to them, and if their cooperatives functioned better. Some additional income from *Artemia* cysts would be a boon.

During the next salt production season, a consultant from the Artemia Reference Center (ARC), Belgium, will visit the salt producing regions of Andhra Pradesh and Tamil Nadu, and advise BOBP on the feasibility of brine shrimp production. (ARC has provided. technical assistance earlier to similar projects in South East Asia and in Latin America). BOBP also plans to organize a seminar to review opportunities and strategies for the development of *Artemia* culture in India.

BOBP beachcraft land flying fish

Past experience with BOBP beach-landing craft (BLC in Orissa and Andhra Pradesh has shown that the main fishing gear used with them, offshore gillnetting for large pelagic species, varies in performance round the year. During some months other fishing methods need to be tried. The same is true of Tamil Nadu, where offshore fishing trials were conducted this year from the Besant Nagar beach near Madras. Daily catches of large pelagic species with driftnets were good in April, but languished subsequently (May-October), and BLC operations started becoming uneconomical. A more productive fishing method for this season was urgently needed.

Flying fish species are common in Tamil Nadu and Andhra Pradesh during June, July and August. They are caught by small-scale fishermen, who deploy tree branches as FADs to aggregate spawners, and catch them with scoop-nets operated by large size kattumarams. But the carrying capacity, mobility and endurance at sea of kattumarams are limited; it was believed that BLC could catch flying fish more efficiently. Gillnets were selected as the fishing gear to enable fishing over an extended period (a few months). The craft would go out to fish in the morning and land the same evening or the following morning.

The strategy worked well. While kattumarams deploying FADs yielded only a few flying fish, the BLC – with a limited amount of gillnets – was landing them by the hundred, and provoked serious competition among fish marketing women at Besant Nagar buying catch at the beach. The highest earning from flying fish recorded in one trip from the BLC was Rs. 1350 (late September). On another occasion, a combination of shark and flying fish was landed, and sold for about Rs. 1 700.

Thea main reasons for the success of BLC in tapping flying fish – apart from the efficiency of the fishing gear (gillnets) – were the craft's mobility and endurance.

Though carried out on a limited scale, the fishing trials have shown that BOBP beachcraft can yield higher catches and earnings if fishing operations are diversified. Further, kattumaram fishermen now know how well the flying fish resource can be tapped, if motorized gillnets are used. Further fishing trials over another season may confirm these findings.

Fisherwoman at Besant Nagar, Madras auctions flying fish caught by BOBP beachcraft.

LETTER FROM THE PUBLISHER

AN IDEA WHOSE TIME HAS COME

Fisheries development in Sri Lanka has taken a remarkable turn during the recent past. The larger fishing boats, which are only 9-11 m in length, have started to venture out on 3-day and 4day trips, going as far as 120 n miles from the coast. The use of ice to preserve fish has become a must; and fish holds are being insulated, or separate insulated boxes are being carried on board.

It is also remarkable that although the need and potential for such development was felt more than 20 years ago and promoted in many different ways, it didn't materialize all this time – and suddenly it has!

After the successful introduction of a motorised inshore boat (28 ft. long, 31/2 tonner) in the late '505, the first step in developing an offshore fleet was a 11 -tonner (38 ft. long) made of steel in the mid '60s. It failed completely, and all the boats sank or corroded along the beaches pretty quickly.

A smaller attempt was made in the mid '70s to convert 3% tonners to multi- day-trip boats by insulating the fish hold and improving protection for the crew. Drawings and specifications were given to the boatyards by the Ministry of Fisheries and meetings to promote the idea were held. Nothing happened.

The next major effort was the introducing of 38-footers under an ADB loan in the late '70s. These boats were made of FRP and equipped with insulated fish hold, crew accommodation, hydraulic net hauler and radio communication. They were thus well suited to undertake longer fishing trips both in time and space. But it didn't happen. A few of them are still operating as shrimp trawlers in the Chilaw-Kalpitiya area. The others were abandoned and the scheme flopped.

In 1982, BOBP acquired a 34-footer (extended version of the 28-footer) and equipped it with an insulated fish hold, basic crew accommodation, sail and a low powered engine with the purpose of demonstrating better economy through multi-day trips and fuel savings. It was difficult to pursuade the fishermen to make longer than one-day trips. It is only from this year that this practice has become a routine.

A more significant phase of fleet development started in the early '80s with the introduction of the "Abu Dhabi" boats. They are 34 feet long but very bulky, the largest boats so far. They are made of FRP, have a 60 hp engine, a hydraulic net hauler and of course an insulated fish hold and crew accommodation. The entire project, which also includes a trawler version, is financed by a loan from the Abu Dhabi fund. Because of its size, the boat has become much more expensive than any of the earlier designs. During the early introduction phase this scheme too seemed headed for failure. But it all changed after a few successful fishing trips of longer duration.

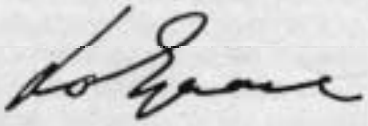
The Abu Dhabi boats have led the way in multi-day operation, but others, including the 3 1/2 tonners, followed. It is reported that fishermen are changing their lifestyle and workstyle because of higher incomes. Some of them walk off the boat as soon as it lands and go home, sometimes on their own motorbike, where they stay until the boat is ready for the next trip. The unloading of fish, cleaning, loading of fuel and provisions, hull maintenance, etc., are now done by other labourers hired by the owner. The fishing gears used are large mesh driftnets and drift long lines, and the target species are tuna and shark. Radio communication equipment is used on the Abu Dhabi boats; satellite navigation equipment may also probably make its entry into commercial fishing. A SATNAV on board one of the boats operated by NARA under a FAO/BOBP-sponsored exploratory fishing scheme has generated a lot of interest.

There are signs that this fishery has reached a level of self-sustained development without need for much further input from experts and advisers. This has been long predicted or rather hoped for, but why did it take 20 years to materialize?

The Abu Dhabi boat is a very stable and comfortable fishing platform, but far from ideal. It is expensive to acquire and operate. The same development could have taken place with the ADB 38-footers, but why didn't it? Was it a diminishing inshore fishery resource that made it necessary for the larger boats to venture further out? Did any change in fish prices and fishing costs trigger the development? Did it have something to do with the education and training of fishermen? Are there any other specific reasons? Or is the phenomenon of multi-day fishing operations just an idea whose time has come?

It would be interesting to find out to what extent earlier failures contributed to the ultimate success. Were they necessary? Should the earlier approach have been different? In that case would the success have come earlier? Or did we just have to wait for the idea to "arrive"?

LARS. 0. ENGVALL



Published by Lars 0 Engvall for the Bay of Bengal Programme, 91 St. Mary's Road, Abhiramapuram, Madras 600 018. Photo-typeset and printed by Nagaraj & Co., Madras 600 041. Processing by Color Crafix, Madras 600 028. Editor : S R. Madhu. Layout artists : E. Amalore, S. Jayaraj.

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