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SAFETY AT SEA

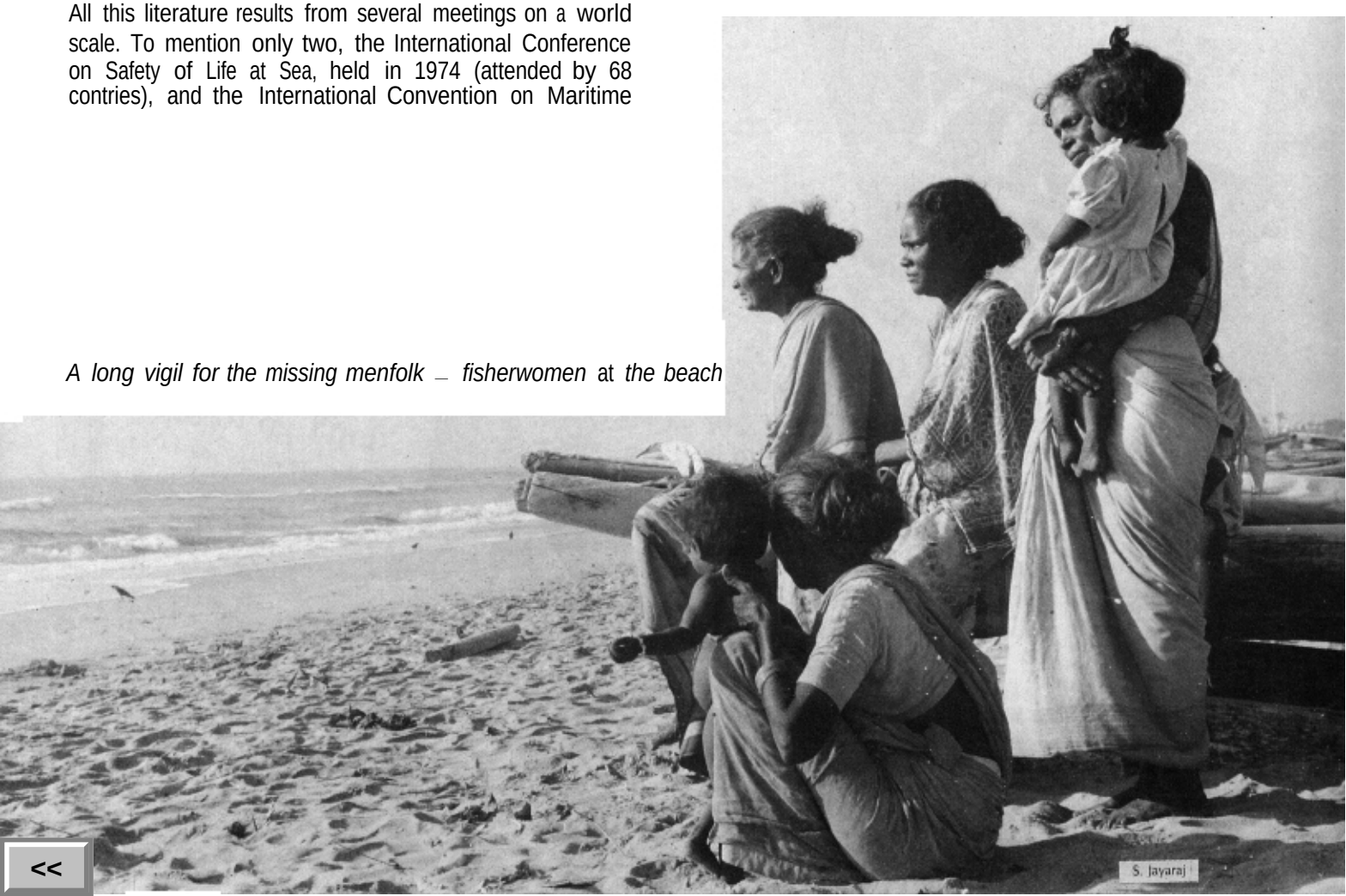
Fishermen from Sri Lanka drift to Indonesia, Maldives, India or Burma. Burmese fishermen land in India — in the Andamans, Andhra Pradesh or Tamil Nadu. Indian fishermen wander off to Bangladesh, and Bangladesh fishermen to India; and Indonesian fishermen go astray as far as Africa. Often, fishermen wage a traumatic battle for life in the sea and survive — only to undergo interrogation on alien land, even jail terms, before they finally return home.

It would appear from reports that the subject needs critical scrutiny. Preventive measures could perhaps reduce the number of incidents and help ensure safety at sea; the fishermen themselves, the designers, builders and owners of boats, and various government authorities, would need to carry out these measures.

Second, a better search and rescue (SAR) organization for fisherfolk in distress at sea is called for in the Bay of Bengal region. What type of organization is recommended by the IMO which is the world standard-setter in the area? There is already a formidable body of literature on the subject — about organizational structures, about SAR-related procedures and practices, about crisis communication, about coordination and cooperation among a spectrum of agencies and between countries.

All this literature results from several meetings on a world scale. To mention only two, the International Conference on Safety of Life at Sea, held in 1974 (attended by 68 contries), and the International Convention on Maritime Search and Rescue, held in 1979. Besides, an International Conference of Safety of Fishing Vessels was held in 1977. Knowledge about these conferences and their findings is insufficient in the Bay of Bengal region.

This issue of *Bay of Bengal News* focusses attention on fishermen's safety at sea. The first article describes the mid-sea ordeal of two Sri Lankan fishing boats: one sailed, another drifted, to Indonesia. A second article sets out the FAO's views and experiences on small boat safety. Safety equipment that small boats ought to carry is listed. A Sn Lankan initiative aimed at averting or cornbattng ordeals at sea is the subject of the next article, in which SAR expert engaged by BOBP suggests what Sri Lanka could do. The COSPAS-SARSAT satellite-aided system for search and rescue is also described here. Fishermen in Sri Lanka and in the entire Bay of Bengal region would feel more secure with an eye in the sky keeping watch over them!



A long vigil for the missing menfolk — fisherwomen at the beach

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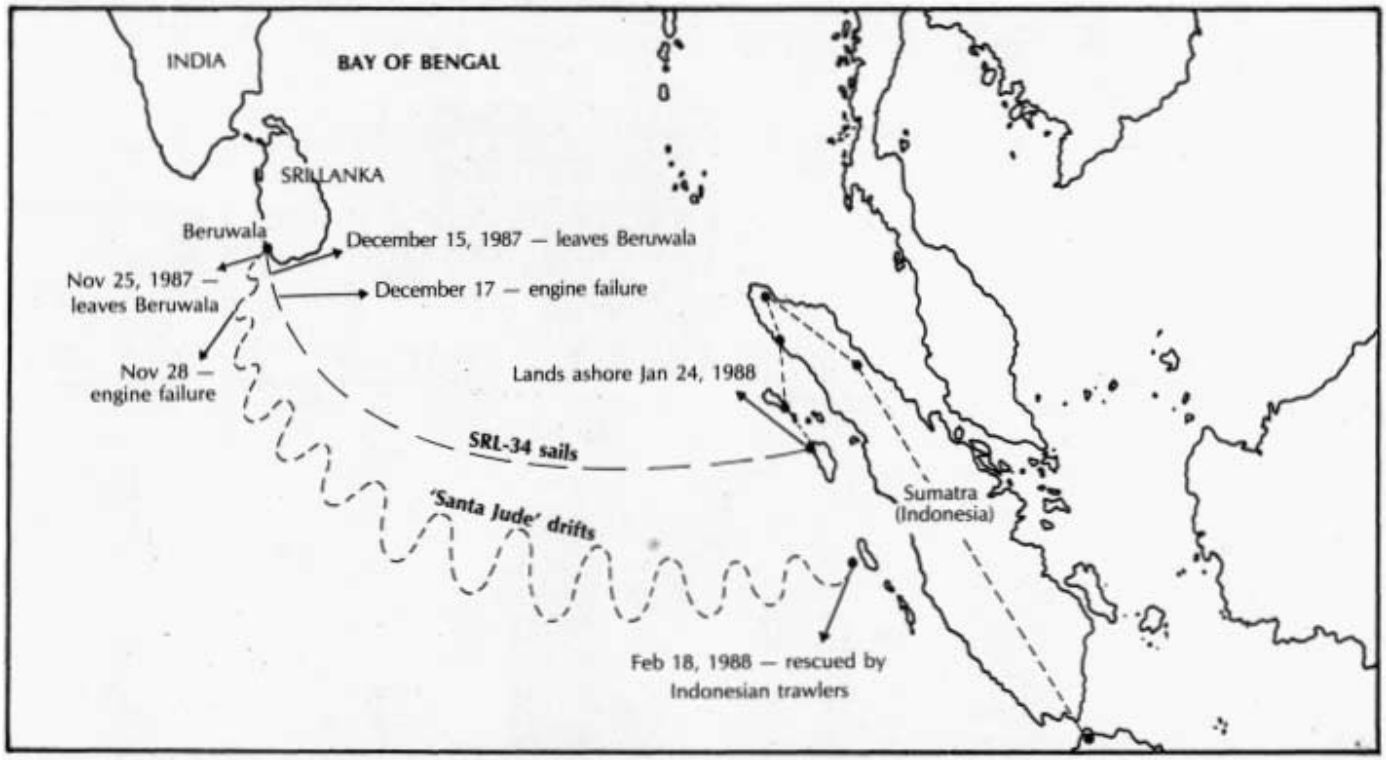
Mid Sea Odyssey: Fishermen Tell Their Story

S.R. Madhu

Land seems aeons away; all around you, and stretching into the endless beyond, is the ocean. You are bobbing along on a craft with a broken-down engine, at the mercy of waves, wind and sea. That's the scenario many a fisherman dreads. Some have been through the nightmare — and disappeared into the ocean's depths. Others have lived to tell the tale. Among these happy survivors are the crew of two boats — SRL-34 and *Santha Jude* — who sailed or drifted all the way from Beruwala in Sri Lanka to Sumatra in Indonesia. Above: The two crews trade jokes and jibes at the Beruwala beach. Below: How SRL-34 sailed, whither *Santha Jude* drifted — an artist speculates.



SRL-34: "The Sails Kept Us Alive"

The crew of the BOBP-designed SRL-34 were sea-weary and homesick, but physically in pretty good shape after 41 days at sea following a sudden engine breakdown.

December 15, 1987 was a day that dawned like any other. The BOBP-designed fishing boat SRL-34 left Beruwala harbour and set out to sea.

At the end of the second day, skipper Joseph Fernando, 41, and his three-member crew were buoyant. The craft's fish-hold filled up fast — about 1,500 kg of fish had been caught.

3.30 a.m., December 17. The boat's engine, a 26 h.p. Yanmar, stuttered, snorted and stopped. Whatever the crew knew about righting engine glitches was tried out, but it didn't work. SRL-34 was then about 45 miles from land; without favourable wind, the crew could not hoist sails and return to base. Further, a strong current kept pushing the boat offshore — Joseph and the crew felt distinctly uneasy.

The wind played truant for seven days, by which time the boat had drifted far away from Sri Lanka. "We thought our best bet was some other shore", says crewman Moses Silva, "so we tried to follow ships going east".

Meanwhile, tension wracked the crew's families on shore, as searches yielded no news of the boat. The shore manager responsible for the boat, Mr Guy Fernando, sounded the M. P. from Tangalle, and a Naval launch scoured the sea up to 180 miles from the shore. The crew's distraught family met Mr Fernando every day, and he doggedly cheered them up — saying how seasoned and skilled their menfolk were at sea.

Christmas in mud-ocean saw the SRL-34 crew in a sombre mood. Food was running out, they drank their last cup of tea on December 23. But they could always catch fish — they threw in four pieces of gill net every evening. On an average they caught 10 pieces of skipjack everyday. "Our best catch was 2 sharks and 20 large skipjack, two weeks after the engine conked out".

An ominous portent was the shrinking water supply. On December 28, the supply dwindled to 3 gallons. A strict regimen for conserving the supply was decided on. Fortunately it rained, and water supplies built up, but a storm

Back home — SRL-34 crew with families in Beruwala.

now battered the crew and raged for 20 hours.

Says Joseph: "I was told later that we should have reefed the sail – reduced the sail area – to reduce danger of capsize. We didn't do it. But we did something else sensible. We locked up the wheelhouse and stayed inside. Waves swarmed over it but no water leaked in".

Around 4 January, the crew sighted a ship. "One of us got atop the engine wheelhouse with a blue flag improvised from the bunk mattress, tied the flag to a bamboo pole and waved vigorously – no response. May be people on the ship thought we were being friendly!" In all, SRL-34 encountered 17 ships: two came pretty close, then maddeningly passed them by.

Land was finally sighted 21 January. Three days later the crew drew ashore; as they tried to anchor, an Indonesian boat threw them a line. Soon after, a policeman came aboard, inspected the boat and opened the fish-hold. At a police station the crew bathed, drank coffee, smoked and enjoyed the luxury of a rice meal.

To be back on land was ecstasy, but Joseph and crew spent nearly two months in the Indonesian archipelago. They had landed at a small island, were escorted to another island, then to Sinabaug, Meulaboh and Bandah Aceh before being flown to Jakarta and thence to a heroes' welcome in Colombo – and joyous festivities in Beruwala.

Looking back on the experience, Joseph says: 'We managed to return alive because of the SRL-34 sails; sails normally used by 28-footers would have got ripped up pretty soon. We were well-stocked. We had a whole gunny bag of dried fish at journey's end. We never had to eat fish raw. There was plenty of water too."

SRL-34 shore manager Guy Fernando with skipper Joseph Fernando.

"On the whole, we were in pretty good shape when we landed in Indonesia, though we badly needed a shave and shower".

Santha Jude – "A Miracle Brought Us Back"

The crew of Santha Jude *braved hunger, thirst and despair for nearly three months as the boat drifted some 3,000 km east before rescue by an Indonesian boat.*

Anthony Waas greets us courteously as we visit his home in Beruwala, and introduces us to his wife and parents. Sanguine and sociable, Waas has always been popular in Beruwala, but his recent 82-day odyssey to Indonesia on the *Santha Jude* has made him a celebrity.

A slim and wiry 31, Waas shows no trace today of the harrowing experience he underwent. But his voice cracks up just a bit on a couple of occasions as he recalls his most famous fishing trip.

Santha Jude, one of Beruwala's hundred-odd 28-footers (3½tonners), set out to sea on November 26, 1987. The crew included besides Waas, Anthony Fonseka (34), and Anthony Fernando, Anil Soysa and Roy Fernando, all 24 years old. The catch during the first two days being rather poor, the crew decided to go further out. On the morning of the fifth day, the engine broke down.

'What followed gave us an idea of the immensity of the ocean," says Waas.

Santha Jude crew — now hale, hearty and in high humour.

'We drifted on and on, our supplies shrank, our strength ebbed, we began to see hallucinations, but land seemed nowhere in sight".

A crude sail the crew fashioned was soon in tatters. Matches ran out – they were used up to light a compass on a dark stormy night. The crew ate fish raw, scooped up seawater to quench their thirst, and prayed to St. Jude, the boat's patron saint.

An occasional shower gave the hapless men a precious store of drinking water. On Christmas-eve they caught a turtle and ate it up quite completely. But what demoralized them was the seeming callousness or indifference of passing ships. 'We kicked up a racket, yelling, waving and gesturing, but the ships did not respond and went their way".

Fortunately, none of the crew fell ill during the entire 82-day adventure despite their physical and mental torment. "There were bouts of purging because of the seawater we drank, we had swelling in the legs, we suffered headaches – but no major ailment".

"At long last, we saw two big boats one day, about 2 km away, and signalled to them. They were 60-footers, with some well-dressed foreign fishermen on board. They took us in and treated us to cigarettes and coffee. Only from the cigarette markings did we come to know that we were in Indonesia".

"Our faith and our will-power sustained us," says Waas. "Yet our coming back alive was nothing short of a miracle".

Bay of Bengal News brought the crews of SRL-34 and *Santha Jude* together at the Beruwala landing centre recently to encourage them to exchange notes on their experiences.

Waas says all boats going out to sea now carry more rations than they used to. He agrees that the *Santha Jude* crew suffered more hardship than their SRL-34 counterparts. "SRL-34 is perhaps a better-equipped boat. But may be their crew faced easier sea conditions, I do not know".

The SRL-34 shore manager, Mr Guy Fernando, is emphatic about the boat's superior capabilities. "SRL-34 was not rescued, it landed ashore by itself. It did not drift, it sailed, except when there was no wind. My men did not face starvation: the boat was well-stocked".

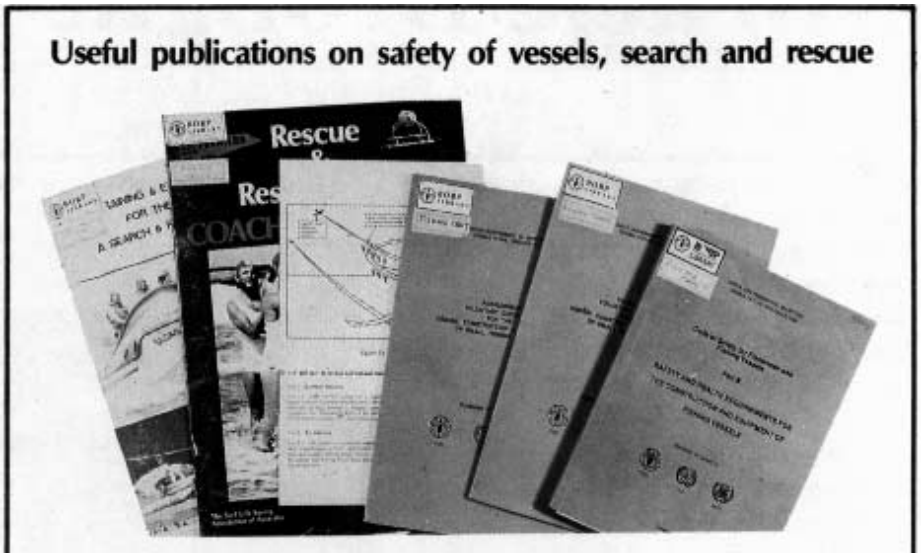
Mr Fernando suggests that boats carry simple communication equipment that will enable them to tell each other where they are headed. 'When a search is launched we may go north because fishermen may have set out in that direction initially. But they may have changed direction later because of poor catches".

Santha Jude owner Anthony Waas and wife.

Waas is upset about the red tape that has snarled his insurance claim for *Santha Jude.* "The government must urge insurance companies to be more fair to fishermen who have suffered like we have done".

– **S.R.M.**

Useful publications on safety of vessels, search and rescue



- International Conference on Safety of Fishing Vessels, 1977
- Code of Safety for Fishermen and fishing Vessels:

  Part A: Safety and Health Practices for Skippers and Crews, 1975.

  Part B: Safety and Health Requirements for the Construction and Equipment of Fishing Vessels, 1975.
- FAO/ILO/IMO Voluntary guidelines for the design, construction and equipment of small fishing vessels.
- FAO/ILO/IMO Document for guidance on fishermen's training and certification, 1MO, London, 1988.
- International Conference on Maritime Search and Rescue, 1979.
- Merchant Ship Search and Rescue Manual (MERSAR Manual) (1986).
- IMO Search and Rescue Manual (IMOSAR Manual) (1987).

These publications are available with IMO (International Maritime Organization), 4, Albert Embankment, London SE1, 75R, *U.K.*

FISHERMEN'S SAFETY: THE GLOBAL PICTURE

by David B. Thomson

The global picture on safety at sea, the roles and responsibilities of three U.N. organizations, the safety equipment recommended for small-scale marine fishermen — these subjects are discussed here by a fishery industry officer from the FAO headquarters in Rome.

The fishing industry capture sector has probably the worst industrial safety record of any major industry. In the United Kingdom, loss of life at sea fishing far exceeds that in coal mining which is considered to be one of the most dangerous of professions. An average of 15 men and 50 boats are lost each year in the U. K. This works out at about 0.1 percent of the fishermen work force and around 1.5 percent of the fishing fleet.

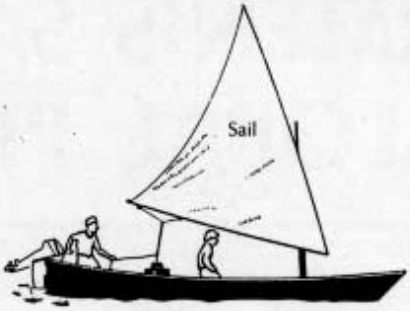
If these figures reflect the global situation, then from the world's commercial fleets the loss of life would average 500 men a year and vessels lost would be over 1 500. No comprehensive surveys have been conducted to date but that is probably a fair estimate for the industrial or well-developed fisheries.

But what of the world's small-scale or artisanal fishing fleets? There are now estimated to be some 12 million full-time fishermen with about 3 million boats in the small-scale fishing fleets of Asia, Africa, Latin America, Southeast Asia and OGeania. Loss of life on these vessels may well compare with the rate for commercial fleets, or even exceed it as the boats are often poorly equipped. If that is so then we may be losing some 12 000 men and 45 000 boats each year in accidents at sea, from the artisanal fleets. No detailed figures are available and these

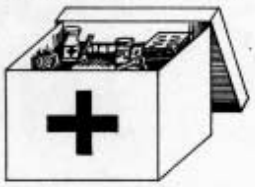
International safety standards and regulations are difficult to enforce in small fishing vessels.

Safety at sea what fishermen should know, and what they should carry

COMPASS



Every boat should have a first aid kit



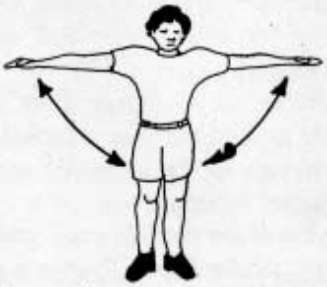
'SOS' SIGNAL

Made with sound . . .

3 short . . . 3 long . . . 3 short

ARM SIGNALS

The correct arm signal for distress



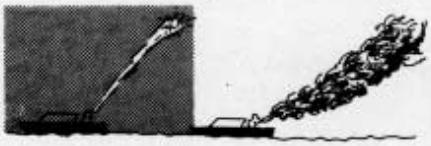
is not well known.

'V' SIGNAL

. . . or painted on the boat . . .
. . . is a distress signal to aeroplane

FLARES

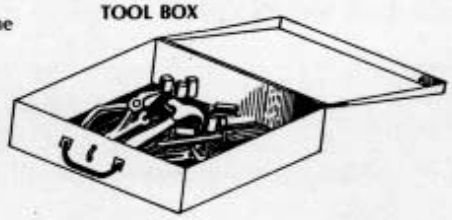
Use starburst flares at night



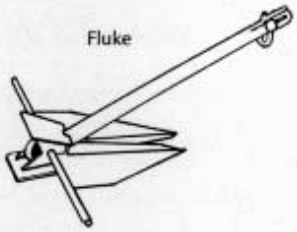
Smoke flares in daytime

Fire flares off when you are sure someone will see it

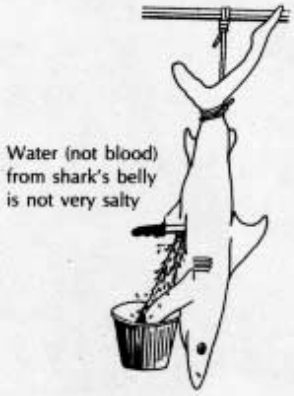
TOOL BOX



Fluke

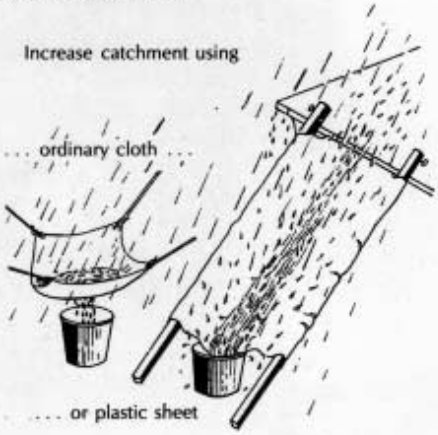


WATER COLLECTION

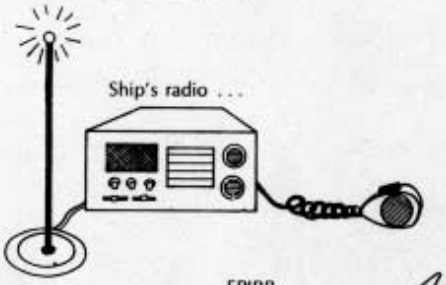


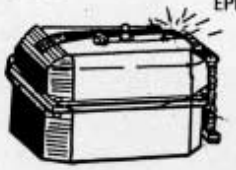
Water (not blood) from shark's belly is not very salty

Increase catchment using



RADIO SIGNALS





can be used to signal shore, planes or ships.

TELL SOMEONE YOUR PLANS . . .

. . . then they know where to look if you don't come home

Sketches Courtesy : South Pacific Commission, Hand Book No. 28.

accidents are only reported when associated with major news items such as typhoons in the Philippines and tidal waves in Bangladesh.

Obviously, any measures that can be taken to reduce the loss of life or improve survival chances are well worthwhile and should be aggressively promoted by fishermen and governments alike.

Three United Nations Agencies take a special interest in safety at sea and related problems of fishermen. These are the International Maritime Organization, the International Labour Organization and the Food and Agriculture Organization. Their respective concerns overlap somewhat but can be broadly defined as:

IMO-Safety at sea
ILO-Conditions of work for crewmen
FAO-Fishing activities and technologies

The bulk of the work of IMO and ILO concerns merchant shipping but in consultation with FAO and various government representatives they produce guidelines and conventions directed at fishing fleets also. Thus fishing boats must conform with international rules for the carrying of lights and signals and for procedures to follow for safe navigation and prevention of collisions.

When a government ratifies a convention or accepts a set of guidelines, it then instructs its marine department (or coastguard or fisheries) to incorporate the elements into national regulations and to see that these are enforced.

This works fairly well for large ships but becomes progressively difficult as one moves down in scale. This is because of the great variety of types of small boats, the fact that few of them can afford expensive innovations and the need to take local situations into account.

Because of that, most conventions related to fishing boat safety and certification do not have provisions for vessels under 25 gross registered tons. However, some governments have gone ahead and drafted guidelines which may eventually become compulsory on small fishing boats in their jurisdiction.

FAO is working closely with IMO and ILO to ensure that any recommendations on small fishing boats made to governments are sensible, feasible and acceptable to the majority of these fishermen.

Some practical training programmes of safety at sea have been developed and carried out with good results. Some of the useful safety tips and innovations for small boat fishermen are summarized in an FAO/South Pacific Commission Manual (No. 28, 1987) from which the illustrations are drawn.

A great part of safety at sea relates to the condition of the vessel and its equipment. A well-maintained, well-equipped boat is less likely to be lost when dangers or bad weather are encountered. Many pieces of safety equipment may be used only once a year, but they should be carried on every trip and should be carefully checked on a regular basis. These include:

A first aid kit
Emergency rations (biscuits, glucose, drinking water, packed in airtight tins or cans)
Tools and spare parts for the engine
A signalling torch and batteries
An oil lamp and oil
A fire extinguisher (for larger or powered boats)
One or more anchors and anchor lines
A sea anchor
A life line and life buoy or float
An emergency sail (especially for powered craft)
A magnetic compass
A set of oars or paddles
A whistle, bell or hooter
A bucket for baling and/or catching water
A pair of signalling flags

Relatively simple and inexpensive equipment can make the difference between survival and loss of life, or between safe return to port and drifting at sea for months on end. Many fishing boats have drifted across the ocean because of failure to carry an emergency sail, tools, oars or spare parts. Crews have suffered terribly through lack of elementary means to collect or store fresh water, or of basic food or medical supplies.

Some years ago, a Sumatran fishing vessel which had neither compass nor sail suffered an engine breakdown west of the Mentawai islands. The boat then drifted over 3000 miles to Mozambique in S. E. Africa. Fortunately, the crew survived, but with a little emergency gear and some training, their voyage could have been much shorter.

The magnetic compass is a simple and relatively inexpensive piece of equipment which could be of considerable help to small boat fishermen. Very few of the three million artisanal fishing boats carry a compass. As a result of growing competition in coastal waters, many small fishing boats are having to fish offshore and out of sight of land. The compass could reduce their steaming time, improve their efficiency and economy, and reduce the danger of accidents or getting lost at sea.

Training in safety, seamanship and navigation can equip skippers and crews to meet with emergencies. Crews should be drilled in the actions tO take when a man falls overboard, when someone is injured or when heavy seas threaten the boat. Basic instruction in first aid can enable fishermen to treat serious wounds at sea and to keep the injured person alive until he can receive proper medical attention ashore. How to rig and set a sea anchor, how to take a disabled boat in tow,'and how to plug a leak are other vital subjects for training.

Survival training can prepare fishermen to cope with the ngours of an extended period at sea by enabling them to collect and conserve drinking water, to avoid heat exhaustion, dehydration or hypothermia. All fishermen should know how to revive the apparently drowned by artificial respiration and mouth-to-mouth resuscitation.

The FAO is encouraging governments and assisting fishermen's extension services to develop and provide training and advice on safety for fishermen and to make fisherman conscious of the need to invest time and effort in safety precautions and thus reduce the dangers they face in their calling.

A joint FAO/ILO/IMO international maritime training guide is available to fishermen's organizations and authorities to guide them on training and certification for fishermen. It contains sections on small fishing vessels and guidelines for safety-at-sea training for fishermen. "Document for guidance on fishermen's training and certification" IMO, London, 1988.

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SEARCH A
AT SEA: "
NEEDS
ON MANY

How can the seas be made safer for Sri Lank suggests a package of measures : a permane and rescue; use of basic safety equipmen on search-and-rescue mechanisms; legislatior cations. These measures are discussed in

"I have spent several sleepless nights", says Sri Lanka's Minister for Fisheries, Mr Festus Perera, as he talks with passion about fishermen who battle for life at sea, sometimes in vain. 'We should do something to help them".

In response to a request from the Ministry of Fisheries, Sri Lanka, BOBP initiated this year in-depth studies on "Safety at sea". Eventual goal: Recommendations to ensure the safety and survival of fisherfolk. A national consultant summarized information about the present fishing fleet in Sri Lanka, safety problems encountered, and existing mechanisms in the country for search and rescue of fisherfolk. An international consultant associated with the IMO (International Maritime Organization) recommended action for the future in conformity with international practice.

The studies were carried out during June-August, 1988. The two consultants presented their findings at a meeting chaired by the Minister of Fisheries in August.

The international consultant, Mr Urban Hallberg, is the head of the SAR (search and rescue) branch in the National Swedish Adminstration of Shipping and Navigation. He has handled SAR problems for 15 years as educator, administrator and trouble-shooter, has taken active part in SAR missions for fishing boats in small coastal fishing villages of Sweden.

Mr. Hallberg discussed SAR in general and his Sri Lankan mission in particular with *Bay of Bengal News.*

Q: *Sri Lanka is deeply exercised about fisherfolk who set out to sea and do not return, or survive after a close brush with death. Is this problem global?*

Hallberg: Distress at sea is certainly a global problem. In Sweden, 2,500 cases of people missing at sea are reported on an average every year, though very few of them are fisherfolk.

Sweden has agreements with seven other countries concerning search-and-rescue (SAR), and the area of coverage has been demarcated among them. Cooperation among the seven countries is excellent. Example: Sweden has nine SAR helicopter bases. But if a Swedish vessel in distress has drifted to the area covered by the Soviet Union, a Soviet helicopter will take off. SAR knows no national or economic boundaries.

Different areas pose different problems for SAR operations depending on the climate, the topography and physical characteristics. Such factors influence the type of services, facilities, equipment and personnel that SAR operations require.

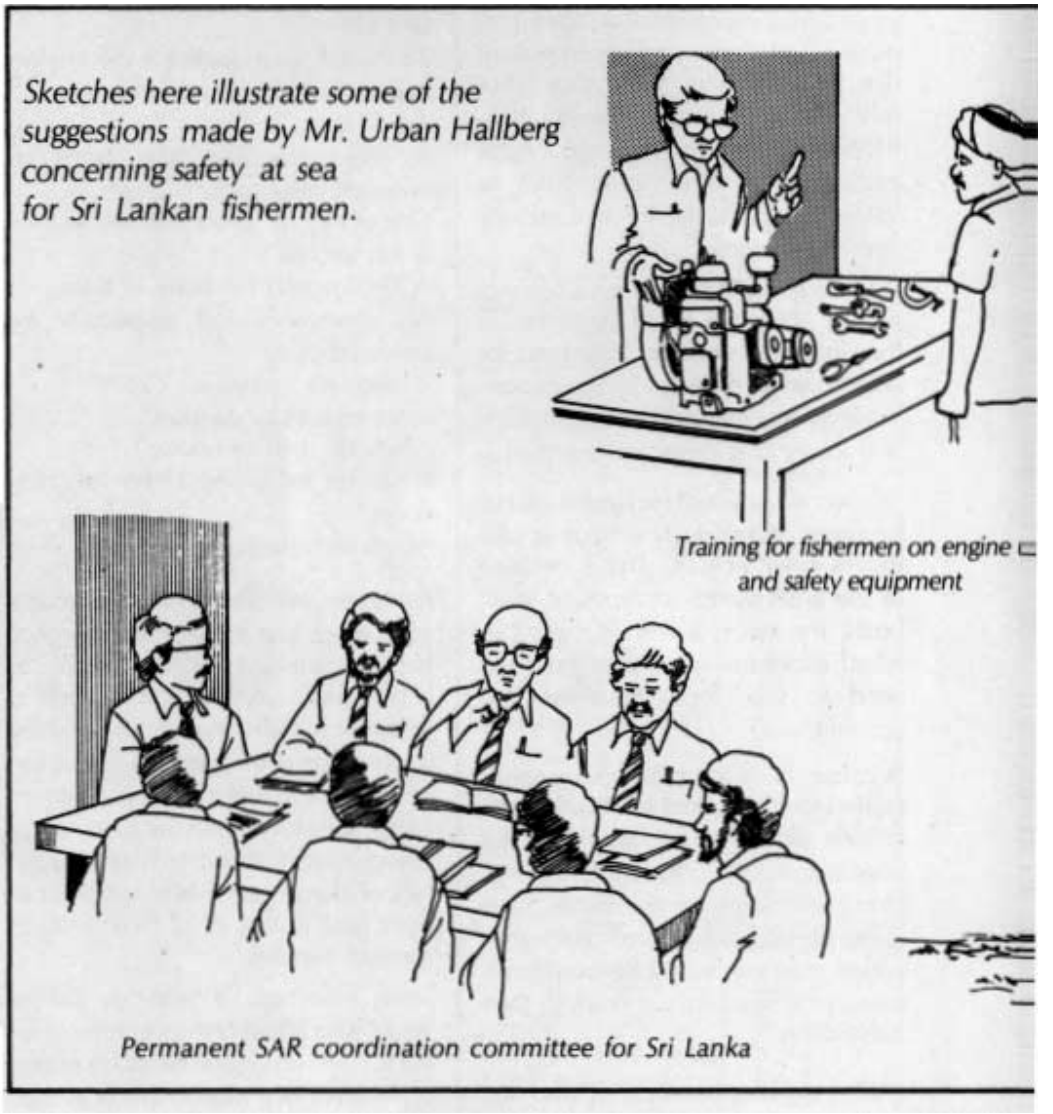
Q: *Can you describe a typical search-and-rescue scenario in Sweden for a vessel in distress?*

Hallberg: No two SAR operations are identical. In general terms, when a vessel is determined to be in distress, an elaborate communications and transport network is activated. The Coast Guard, merchant ships, fishing vessels, pleasure boats, the Army, the Navy, the Air Force, the Police — all are alerted. Messages go round by radio, cable, telex, telephone. Aircraft keep a radio and visual watch, orbiting satellites monitor any distress signals.

When the vessel is located, the most convenient mode of rescue is adopted. IMO guidelines on rescue precautions, practices and procedures are observed.

Q : *What action has been taken to improve MR worldwide?*

Sketches here illustrate some of the suggestions made by Mr. Urban Hallberg concerning safety at sea for Sri Lankan fishermen.



Training for fishermen on engine and safety equipment

Permanent SAR coordination committee for Sri Lanka

ND RESCUE
SRI LANKA
ACTION
FRONTS"

an fishermen? An expert on search and rescue nt national co-ordination committee for search by fishermen; overseas training for officials and modernizing and streamlining communie article below.

Hallberg: Several important international conventions have been held to standardize procedures on search and rescue. An exhaustive search-and-rescue manual has been published by the IMO. A satellite-aided search system (COPAS- SARSAT) owned and operated jointly by the US, USSR, France and Canada, became operational in 1985. This is capable of covering the whole world, and the IMO encourages all countries to join this system. A World Maritime University has been set up at Malmoe in Sweden.

Q: *To focus now on Sri Lanka. You have met and discussed with fisheries, trade and shipping, radio and telecommunications officials: and with the Minister of Fisheries. What is the immediate action needed?*

Hallberg: First, let me compliment the Ministry of Fisheries on its initiative. It has focussed attention and action on an important topic.

Action is needed on many fronts. Bur I think the immediate needs are preventive. It's better to prevent crises, and to take the right precautions, than to have to combat full-blown crises. A number of simple steps are essential. These relate to the condition of the boat, safety equipment it should carry, and training for fishermen. *(These are briefly discussed in another article, "Fishermen's safety: the global picture" by David Thomson. — Editor)*

Q : *What are the prospects of an exclusive SAR service devoted to fisheries?*

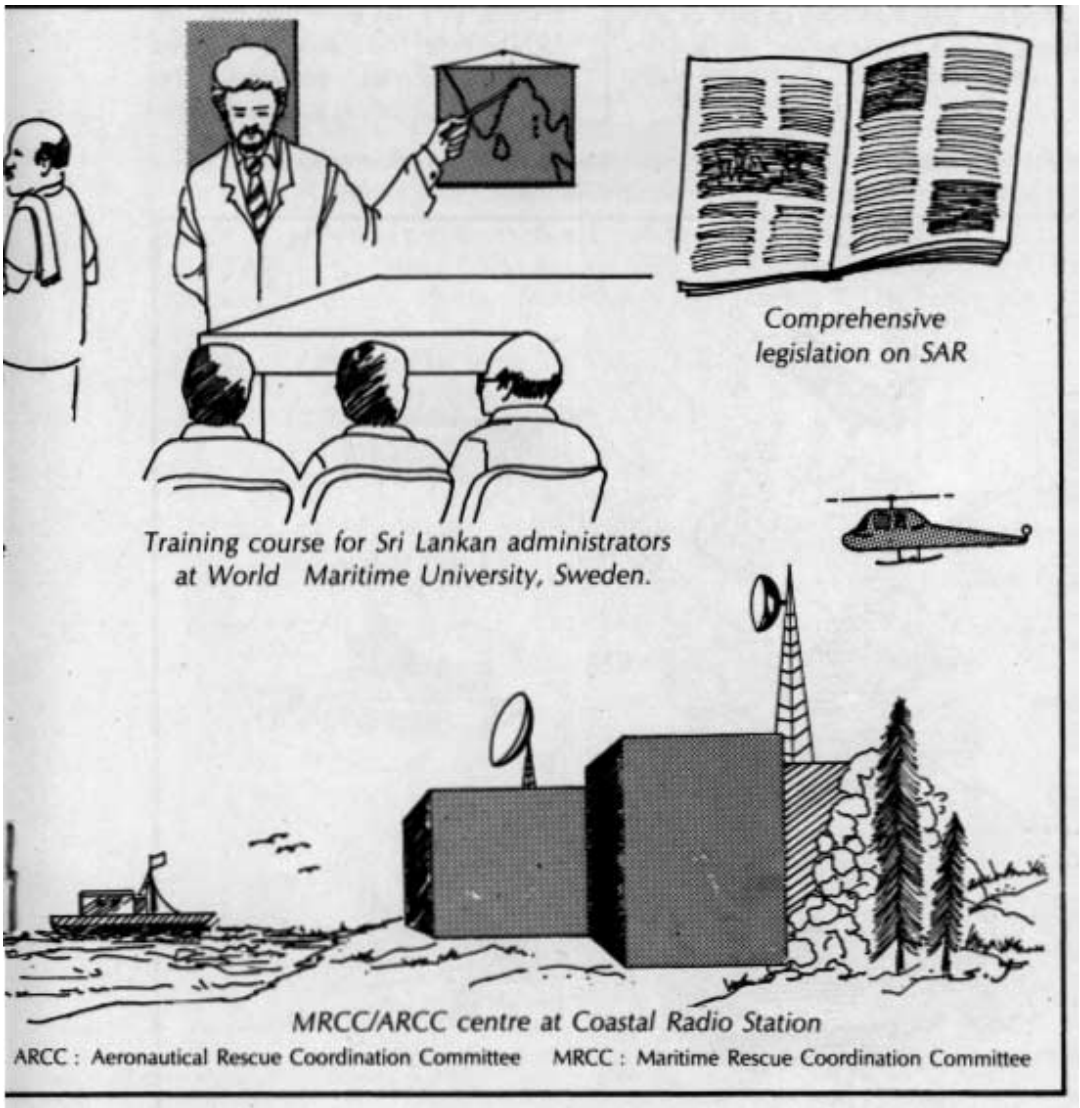
Hallberg: Search and rescue at sea is too complex, multi-dimensional and expensive for an exclusive service catering to a single interest. In my opinion it is impractical. What many countries do have, and what the IMO recommends, is a service that can cater to all maritime interests including those of fishermen. I would suggest that a permanent inter-departmental SAR committee be set up in Sri Lanka, with all interests represented in it. It should have at least two full-time staff. Such a committee would be convened by the Ministry of Trade and Shipping, which was registered as the SAR authority for Sri Lanka at the 1979 International Convention on Maritime Search and Rescue.

Q: *What are your views on the communication needs of SAR?*

Hallberg: Communications is a vital element of SAR, and this needs strengthening and modernization in Sri Lanka. Fortunately, the Coastal Radio Station (CRS) in Colombo is presently being updated on international lines with Australian assistance. It should be quite possible for the modernized and revitalized CR5 to respond to the SAR needs of fisherfolk.

I also feel that the aeronautical and maritime rescue coordination committees in Sri Lanka should work as a joint body (MRCC/ARCC) to facilitate SAR operations. The centre should be located at the CR5 in Colombo. This will ensure that during a SAR mission, when time is short and tensions run high, one can obtain easy access at once to experts from the Navy, the Air Force, the Ministry of Fisheries and radio experts.

I would strongly recommend that Sri Lanka join the COSPAS-SARSAT satellite network. (See box. — Ed.). To make this possible, fishing boats should carry special-purpose transmitters known as EPIRB5* that emit signals on the 406 MHz.. COSPAS-SARSAT will enable



quick detection of a Sri Lankan vessel in distress, if its EIPRB is activated.

Local and relatively inexpensive production of EPIRBs can be envisaged, perhaps with external collaboration.

Q: *How about education....*

Knowledge and know-how about SAR needs to be upgraded at various levels in Sri Lanka. It would help if administrators and SAR officials were trained at the World Maritime University in Sweden. The IMO has developed three model SAR courses — a one-week course for SAR administrators; a 2-week course for SAR Mission Coordinators; a one-week course for Surface Research Coordinators. Extended training is also necessary at SAR schools in Sweden, USA, Canada or Denmark.

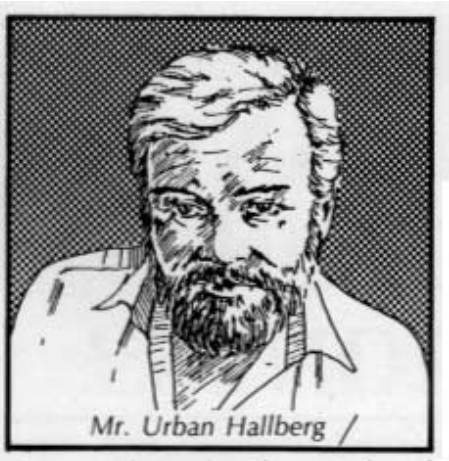
Q: ... *and legislation?*

Sound legislation is crucial for effective SAR. It should be comprehensive in nature; IMO/ICAO documents could be used as background material. Under the legislation, a responsible authority should be named for every SAR service — maritime, aeronautical, pollution. Areas of responsibility of each service should be defined. The rules for cooperation among the different services should be spelled out.

The resources of all government bodies — their personnel and equipment — should be made available for SAR, and this should be spelled out in legislation. These government bodies would include the military services; the police; the telephone, telegraph, transport, fire, forestry, health and meterology departments; the coast guard; lifeboat authorities; broadcasting services; air traffic services, hydro-electric and public works. Apart from general legislation, there should be detailed government directives for each SAR service.

Q: *You mentioned an IMO safety manual earlier. Can you elaborate on what it says?*

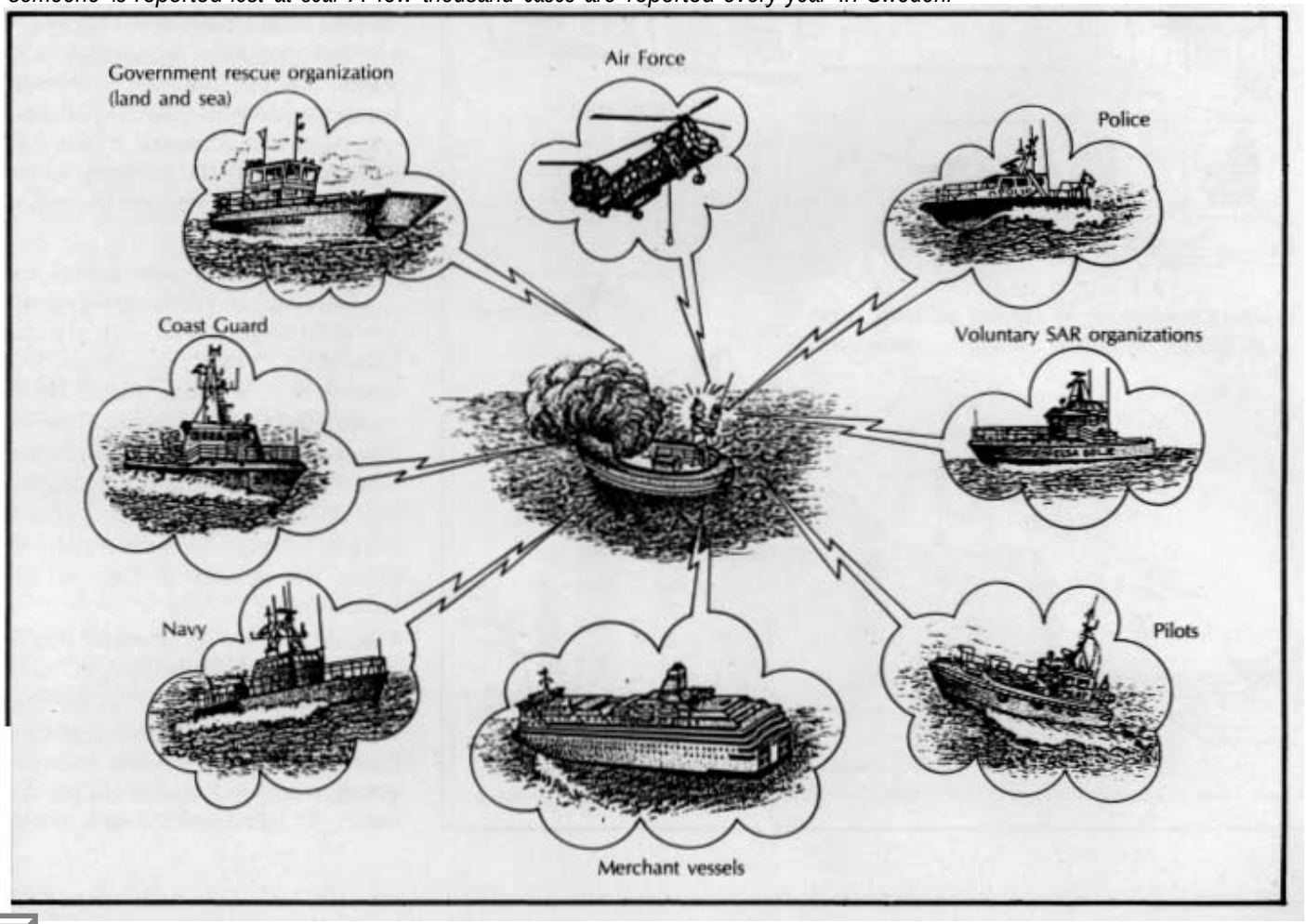
Hallberg: The IMO safety manual consists of two parts. The first part sets out the basic structure of a SAR organization, the planning of a search and rescue service, the components and the responsibilities of various SAR units, the equipments and the facilities at each unit, detailed operational plans, etc.


Mr. Urban Hallberg

The second part describes search and rescue procedures. It explains the types of emergencies that can occur, the sequence of events, the standard reporting formats, how to determine search areas, what are the various search techniques, procedures for sighting'and rescue by aircraft, emergency assistance other than search and rescue, SAR training.

The 170-page manual shows how much thought and collective effort internationally has gone into effective SAR. The better this manual is mastered by SAR personnel everywhere, the better their capabilities are going to be.

This sketch from Sweden gives an idea of the agencies on land, sea and sky that swing into search-and-rescue action when someone is reported lost at sea. A few thousand cases are reported every year in Sweden.



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SATELLITES FOR RESCUE — THE COSPAS-SARSAT NETWORK

Since the mid-i 970s, several countries have been interested in using satellites to detect and locate aircraft and ships in distress. This led to the establishment of a joint international satellite-aided search and rescue system (COSPAS-SARSAT) developed and operated by Canada, France, the USA and the USSR.

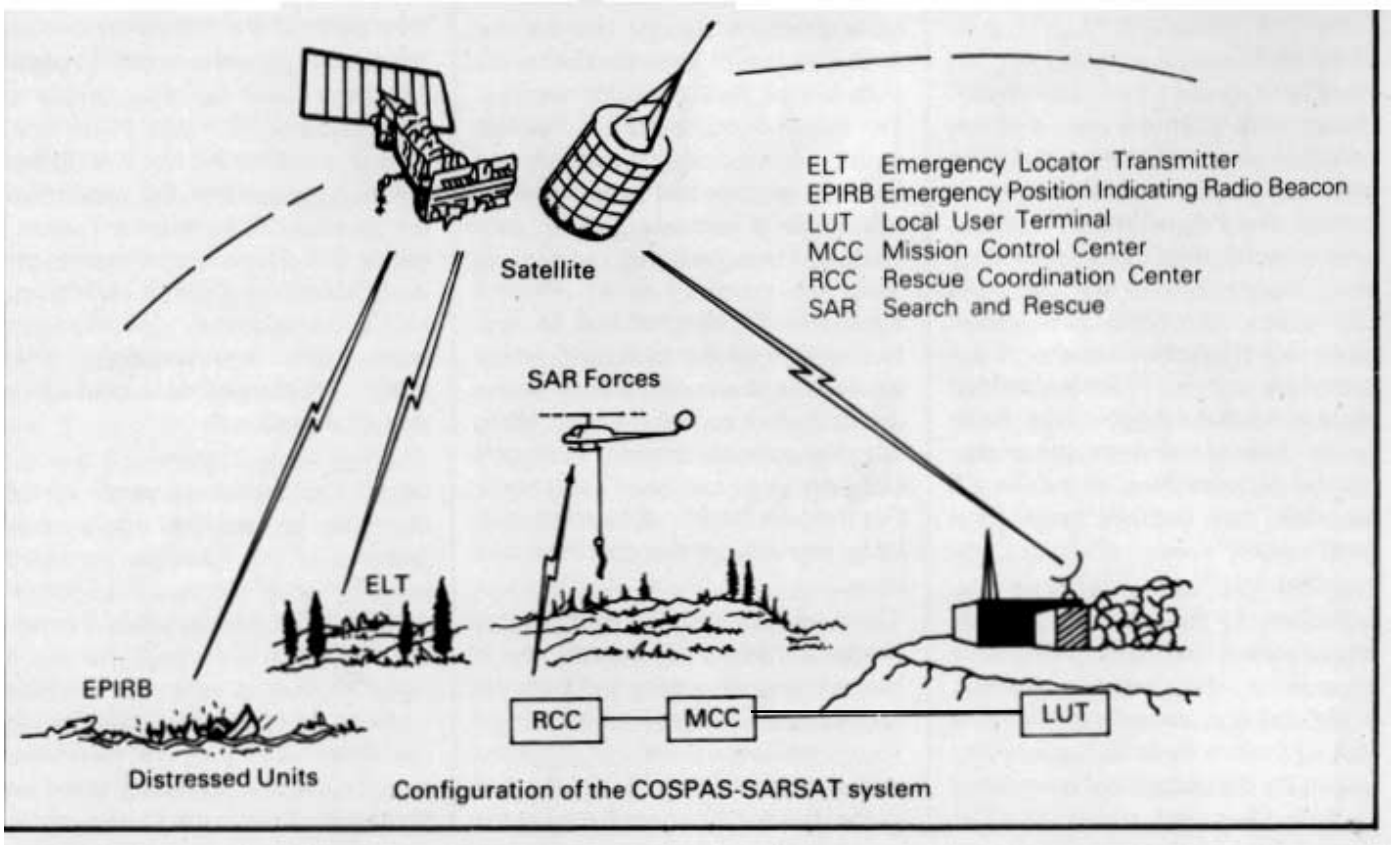
How does the system work?

Vessels at sea should carry EPIRBs (Emergency Position Indicating Radio Beacons). These are special-purpose transmitters. They transmit signals on the emergency distress frequency of 406 Mhz. These signals are received by multiple satellites in low near-polar orbit, and relayed to a network of dedicated COSPAS-SARSAT ground stations. These stations process. the signals to determine beacon location, and relay the data to a Mission Control Centre (MCC). This alerts the appropriate Rescue Coordination Centre (RCC), which in turn initiates search and rescue of the vessel in distress in accord with prescribed practice.

System experiments and testing began with the launch of COSPAS-I by the Soviet Union in June 1982. COSPAS-ll followed soon after. The first SARSAT-equipped satellite NOAA-8 was launched in March 1983, COSPAS-IlI in June 1984 and SARSAT-ll (NOAA-9) in December 1984. Technical performance tests for the COSPAS-SARSAT system were completed late 1984.

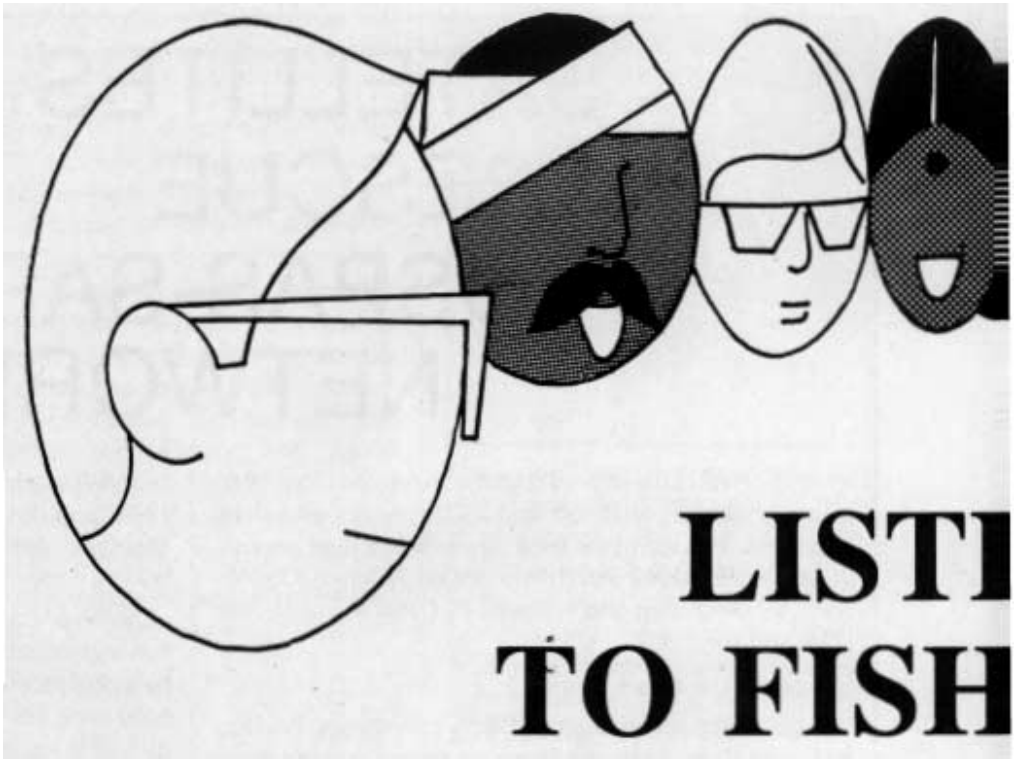
COSPAS-SARSAT has clearly demonstrated that the detection and location of distress signals can be greatly improved by global monitoring frem low- altitude spacecraft in near-polar orbit. The operational experience of COSPAS-SARSAT by SAR agencies started in September 1982, when a light aircraft crashed in Canada. Three people were rescued. In 1985 the COSPAS-SARSAT system entered its operational phase and emerged as a truly global, international system capable of serving all countries. By November 1986, the system had helped save 650 lives worldwide.

How will COSPAS-SARSAT apply to Sn Lanka? Signals from the EPIRB of a Sri Lankan vessel will be picked up by a satellite and beamed back to a coastal earth station in India (now being set up at Arvi near Pune) or in the Soviet Union. From here, the location of the vessel in distress can be determined. The SAR authority of Sri Lanka can be notified by telex and SAR action initiated.



Configuration of the COSPAS-SARSAT system

Rathindra Nath Roy describes the beginning of an important dialogue in Tamil Nadu, India.



That departments of fisheries ought to listen to fisherfolk and learn their views, concerns and problems is so obvious that it has never been done – that is, until the Tamil Nadu Department of Fisheries brought together fishermen and women from all the coastal districts for a 3-day workshop (April 26-28, 1988)! We at BOBP can take some little credit for the happening. The seed, as it were, was sown at a regional consultation on people's participation, held in Bangalore in May 1987. Mr. V. Manivannan, the Director of Fisheries, Tamil Nadu, has since then nurtured the idea of a follow-up. So, when the department approached BOBP to co-sponsor and participate in the activity it.seemed a fitting fruition of an idea we consider important.

Held in a spacious marriage hall in Madras, the workshop brought together 44 fishermen and women from the nine coastal districts. The primary idea was to listen to and learn from the fisherfolk. But the organizers also ensured several opportunities for the fisherfolk to discuss their concerns and probems with departmental officers, fisheries experts, representatives from banks and other organizations concerned with fisheries and with BOBP staff.

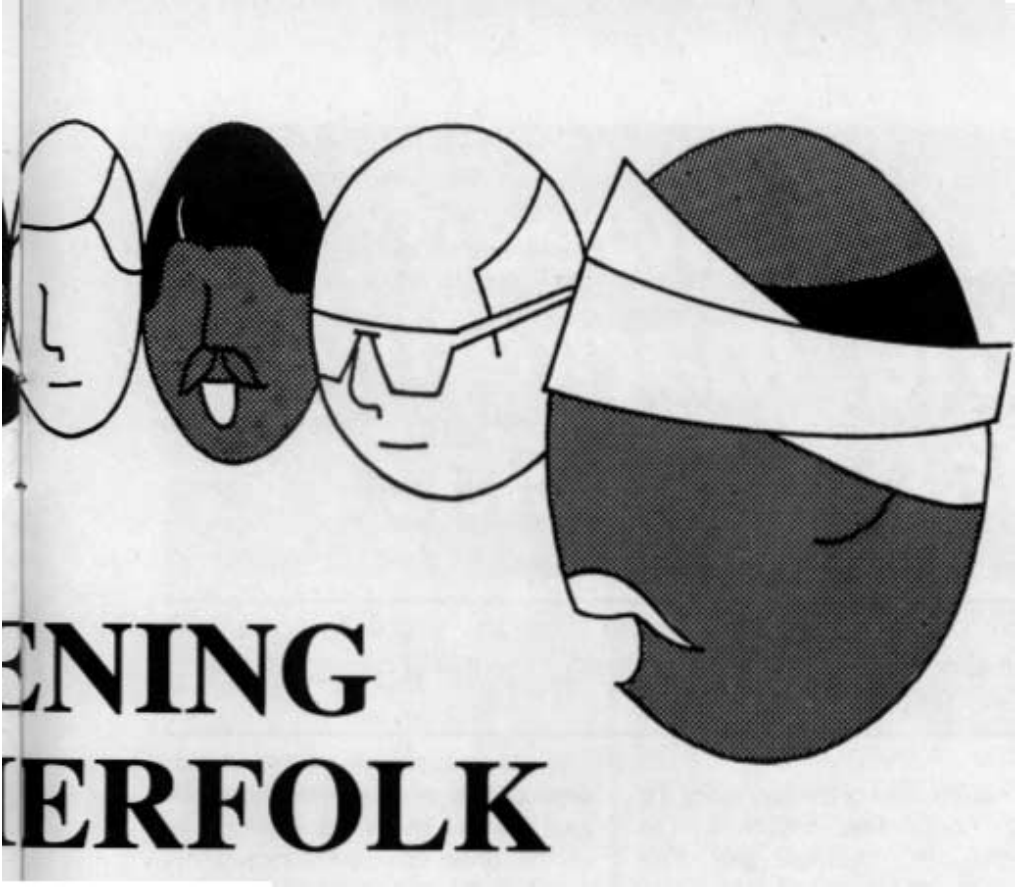
Assistant Directors in each coastal district were given the task of identifying fishermen and women who were active in small-scale fisheries, concerned about its development, and who were articulate though not necessarily literate. Specifically they had been instructed not to suggest 'leader' types; but it is office bearers of co-operatives, community leaders and the more influential fisherfolk who made up the majority. While this group may not be representative of small-scale fisherfolk they certainly provided a good cross-section.

The first day of the meeting was exclusively for the fisherfolk; the only others present and participating were a handful of fisheries department staff, BOBP staff and some fisherfolk NGO staff who were there to mediate and help in the discussions, but not to bring in their ideas and viewpoints. The fisherfolk formed districtwise groups and the discussion began. No agenda was set, anything of concern and importance could be talked about and was recorded by the mediators and some of the fisherfolk themselves. The discussions were, to say the least, animated, and often heated. Some of the fisherfolk like those from the far south had obviously met before and had clearly thought through the issues; even written statements were brought along. Some others took a while to settle down. A difficult task for the mediators was to keep the discussion from turning into grievance sessions. The fisherfolk expressed their interest in the meeting and said that this was the first time they had been asked for their feelings and ideas, their only complaint being that they did not feel there was enough time to talk and think through all they had to say. Further, they felt that such get-togethers would be more fruitful if done at the district level or even at the block level, since conditions differed so much along the long coastline of Tamil Nadu that it would be difficult to coherently bring together all the concerns and issues.

The mediators, with the help of some fisherfolk, had the difficult task later in the evening of putting together the issues raised – and as it turned out, 88 recommendations, issues, problems and questions were tabled at the end of the day. For the convenience of the experts and officers, with whom the fisherfolk would discuss these points the next day, the 88 points were classified broadly into six areas: fisheries resources & management, fishing craft & gear; fish marketing and handling; credit; community concerns and fisherwomen; and cooperatives.

The formal part of the workshop began with the second day. The Advisor to the Governor of Tamil Nadu concerned with fisheries, Mr. G.V. Ramakrishna, inaugurated the workshop; the Secretary of Fisheries & Forestry, Mr. M.A.K. Tayab, presided over the inauguration; the Director of Fisheries, Mr. V. Manivannan, welcomed the participants; representatives from BOBP, MPEDA and the Indian Overseas Bank spoke.

After the inauguration came the dialogue. The *modus operandi* of the discussion sessions was that a representative of the fisherfolk presented point by point the issues, concerns, problems and queries raised the previous day. After every point, the expert panel responded to it and this was followed by open discussion. For the convenience of the experts, there were six such discussion sessions based on the classification that had been done.



Space does not permit us to list the 88 issues or the discussion that ensued, but it would be illustrative to mention some of the issues that arose. The Department of Fisheries intends to publish the proceedings and recommendations of the workshop for distribution not only to those fisherfolk who attended the workshop but to the fisherfolk population at large, and possibly use the document to continue and expand on the dialogue.

We, the organisers, had expected that credit and subsidies would be uppermost in the minds of fisherfolk, and we were right. They wanted more credit on better terms but had a host of suggestions on procedures and options. But disturbingly enough, credit was more often than not seen as a subsidy, an outright welfare grant, rather than as financing which had to be repaid. Subsidies were seen not as incentives to encourage the adoption of new technologies but rather as grants to make such technologies "viable". This kind of a perception has serious implications to any fisherfolk development programming, particularly in resource-scarce situations.

We thought resources and their management are complex subjects which would be close to credit in priority. What surprised us even more, pleasantly at that, was the amazing depth of understanding the discussions showed. Fisherfolk across the state were concerned about depleting resources, and they had various understandings of the factors that caused such resource depletion. The reasons ranged from overfishing by mechanized boats to use of destructive gear. But importantly, the fisherfolk suggested that even without these there was cause to worry since there were too many traditional fisherfolk fishing! They wanted scientific resource studies undertaken and resource management options to be implemented – they even suggested some of the methods already being traditionally used, such as zoning, closed seasons for gears, fishing holidays, mesh size regulation and the outright banning of certain types of destructive fisheries. The discussion on resources was particularly underlined by the fact that each district's fisherfolk were able to specifically name species which were common in their catches and now were rare! A total of 15 such species were identified.

Across the board, when problems were discussed, rarely did the fisherfolk talk about or suggest what they themselves could do. More often than not they felt that it was the government's role and responsibility to not only find means and solutions but also to finance and implement these!

To be fair, the fisherfolk seemed to do a far better job of the discussions than the experts. The fisherfolk were clear and articulate and extremely patient. The experts seemed hesitant and cautious, and perhaps because of their knowledge and their understanding of the complexity of issues often responded in a manner that seemed abstruse to the fisherfolk.

The overall impression, both amongst the organizers and the fisherfolk, was very positive. The fisherfolk wanted more such opportunities to not only learn but to impart learning so that a clearer understanding of the options and constraints could be brought home to the fisherfolk. It was also felt that this kind of a dialogue may provoke fisherfolk into participation not only in problem definition and planning but also in implementation.

It would be useful, in conclusion, to dwell a while on whether we did it right and how we would do it in future. The suggestion of the fisherfolk that the discussion be restricted to smaller geographic areas, preferably with similar ecological and socio-economic characteristics, is a sound one and should be followed. It was obvious that listening alone would not be enough. There was a need for more open discussion – a real dialogue between partners with the same objective. A larger time-span for discussion would be needed not because there are a number of subjects but because there is a need to enable fisherfolk to think through the issues and concerns in order to critically understand the situations, separate symptoms from problems, to seek causative factors for problems and to generate options. Perhaps more emphasis needs to be placed not only on what government could do for the fisherfolk but what fisherfolk could do for themselves. On the other side of the table, experts need to think through and clarify their understanding of situations, learn to appreciate the fisherfolk point of view and learn to discuss and work with fisherfolk rather than order, speak down or profess to them.

A very good beginning has been made and we at BOBP hope that this is only a beginning of the dialogue that will lead to more fruitful participatory development of fisherfolk and fisheries in Tamil Nadu.

Cultured seaweed: What's the marketing potential in India?

The BOBP recently studied the structure of the seaweed industry in India and problems concerning harvesting, processing and marketing. The aim was to find out the marketing potential of cultured seaweed. This article by Prithi Nambiar sets out the findings of the study.

The fact that an active industrial chain has originated from and continues to devolve around seaweed is little known to many. This is perhaps the reason why the world seaweed industry as a whole is largely clouded in obscurity. International attempts are being made to remedy the wide gaps in information by undertaking a variety of studies through technical marketing and research-oriented surveys. In India, these studies are hampered by the fragmented and undocumented nature of the seaweed market and consequent difficulties in compiling statistical data.

A study was initiated recently by the ODA Post-Harvest Fisheries Project of the BOBP to unearth the basic structure of the Indian seaweed market and to outline the underlying constraints and problems that are restricting its development. The objective of the study was to advise on a marketing strategy for cultured seaweed, an activity being promoted in India and Sri Lanka by BOBP, and to determine the potential for value-added processing within the fishing community.

To understand the implications of market interference in this sector through development projects, the nature of the market must first be clarified in terms of the supply and demand dynamics.

The most striking feature of the Indian seaweed industry which presently comprises over 30 factories is that although it is spread across much of southern India and extends as far as Gujarat in the north west, it depends very much for its supply of raw material on a narrow strip of territory along the coast of south-eastern India which can be called the 'seaweed belt'. This seaweed belt snakes along the eastern coastline of Tamil Nadu and includes the primary seaweed harvesting centres of Rameswaram, Pamban, Vedalai, Seeniapa Darga, Pudumadam, Periapatnam, Kalimarkadu, Kilakarai, Ervadi, Vilinokkam, Mundel and Kanyakumari.

Regular commercial exploitation of the wild stocks of the major types of seaweed in demand in the Indian domestic industry – agarophytes and alginophytes – began in 1966. The total anhual harvest is estimated to be of the order of 40,000 tonnes net weight. Details of the quantities available after drying for the two major species of agarophytes and the two major genera of alginophytes are presented in Table 1.

The seaweed processing industry in Kerala, Andhra Pradesh, Tamil Nadu and Gujarat depends for supplies almost exclusively on the seaweed belt: but the seaweed collectors are unaware of their own economic role.

At Vedalai village in Ramnad district, fisherwomen transport dried seaweed

They seem to regard seaweed collection as a secondary source of income, after fishing. Result : what ought to be a seller's market is in actual fact a buyer's market. It is the middleman or the agent who takes the biggest chunk of the profit cake.

Seaweed agents secure business loyalties from the poor harvesters in the production zone by offering them cash loans for their pressing personal needs. Indeed, the seaweed harvesting business shares similarities in the nature and mode of transactions with its sister industry, the fisheries sector. Many agents deal in both seaweed and fish simultaneously or alternate activities depending on the seasonal nature of the supply of either product.

Seaweed agents purchase wet seaweed from the harvesters or collectors who are normally the women and children in the area, as well as some fishermen who take up collecting as a part-time ocupation. The agents dry the wet seaweed on the beach and then store it in makeshift warehouses. The post-harvest techniques used in the drying and storage of seaweed are crude and careless, leading to an undesirably high level of moisture and sand in the raw material supplied to the processors. A problem that agents overlook in favour of their own interests since the greater

Table i

Total seaweed harvests **after** drying

(ronnes)

	1980	1981	1982	1983	1984	1985
Agarophytes						
Gelidelia acerosa	247	131	102	293	210	189
Gracilaria edulis	213	117	225	291	320	269
Alginophytes						
Sargassum spp.	3090	2522	3176	2070	780	2096
Turbinaria spp.	438	222	704	375	235	385

Source: Central Marine Fisheries Research Institute, Cochin, India. Bulletin 41, 1987.

the moisture and sand content of the seaweed, the heavier its weight and the greater their profit. Processors agree on the size of their requirements with the agent of their choice and the agent then transports the material packed in gunny bags to the factory site at the expense of the processor.

Supplies of the red agarophyte seaweeds which include *Gelidiella acerosa, Gracilaria edulis, Gracilaria verrucosa, Gracilaria crassa, Gracilaria corticata, Gracilaria foliifera,* and *Hypnea musciformis,* are routed to producers of agar, whilst supplies of the brown alginophyte seaweeds which include *Sargassum* and *Turbinaria* are sent to producers of sodium alginate. Some typical costs are presented in Table 2.

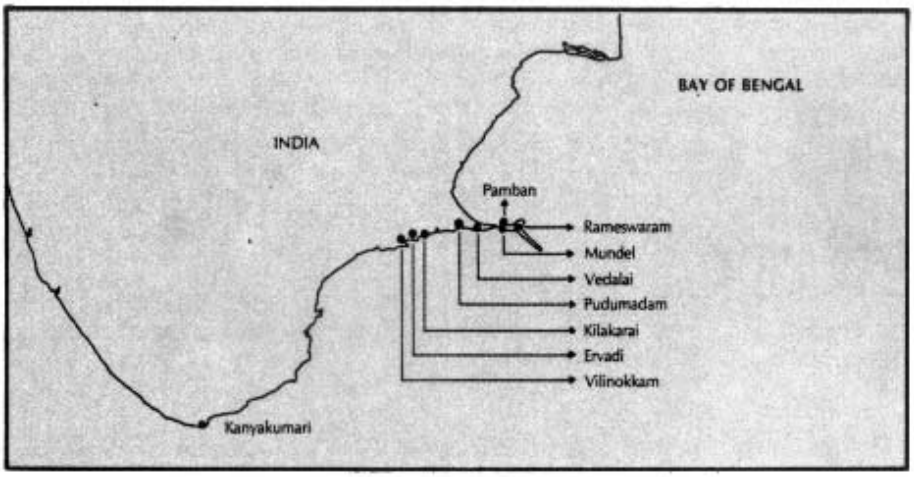
Agar is manufactured for use as a gelling agent by the food industry to produce jellies, marshmallows, candies, marmalades, yogurts, and many processed meats. The pharmaceutical industry has many users for agar of which the best known is its application as a laxative. Agar is also available direct to the public due to its various culinary uses. Agar is a truly versatile commodity.

In the food market, agar supplies "move" in response to consumer demand, generally seasonal in nature. In the industrial market, where agar is an intermediate product, its demand is a function of the capacity of the processing industry. Other factors come directly into play to determine the quantity of agar that is demanded. These factors include the quality specifications of the industry and its access to alternate sources of supply of agar. Government policy, it was found, had an active role to play in determining the nature of the market for industrial grade agar. The access granted to domestic user industries to international grade agar under the Open General Licence scheme of import has ensured that a choice of superior grade agar is possible. Indian made agar has not been able to meet international quality requirements due to low gel strength. This impact may be due to the absence of technical innovations that might make possible a better quality product.

Table 2
Typical cost **to** industry per tonne of dry weed

	(Indian Rupees)
Gelidiella acerosa	5000 to 6000
Gracilaria spp.	2000 to 3000
Sargassum spp.	600 to 700
Turbinaria spp.	600 to 700

Alginophyte seaweed is supplied primarily to processors who manufacture sodium alginate used for printing and sizing in the cotton textile industry. Food grade sodium alginate is also produced as a gelling and thickening agent which has widespread use in the food and ice cream industries. The final market for sodium alginate is shaped by government policy which permits the import of sodium alginate by all domestic industrial users against the procurement of a licence, thus resulting in open access to internationally produced sodium alginate which is cheaper and, as with agar, of a better quality than that produced in India. Alginate produced by large-scale manufacturers is more expensive, due to the imposition of a hefty excise duty of 40% plus 5% surcharge on its sale. The



The seaweed belt along the Tamil Nadu coastline.

availability of cheap local substitutes like guar gum and of cheaper and inferior sodium algiiiate produced by small-scale processors within the country makes the market situation somewhat dismal for the larger processors. Further, the changing nature of the Indian textile industry, which is reorienting itself to the production of synthetic fabric in response to consumer demand, has resulted in a shrinking market for textile grade sodium alginate.

The seaweed industry faces constraints on all fronts: harvesting, processing and marketing. These constraints, although the same at the harvesting stage, differ according to the nature of the industry in the processing and marketing stages depending on whether it is agar or alginate which is involved.

In the harvesting stage the problems relate to:

- The low returns received by seaweed collectors. Seaweed agents collude to keep the prices of wet seaweed low claiming that the market for seaweed is shrinking and that the seaweed prices outside the seaweed zone are very low. Prices at the point of first sale have thus remained steadily low over the years due mainly to the poverty and ignorance of the seaweed collectors.
- Post-harvest techniques which have stayed crude and basic. Seaweed agents compromise on the quality of the material supplied to processors by taking advantage of their unique supply position. Raw seaweed is sold only partialy dry and adulterated with seashells and sand.
- Danger of over-exploiting the most accessible beds of seaweed.

In the processing stage the small-scale agar units face the following problems:

- Lack of reliable technical information on a suitable small-scale production process.
- Chronic problems of cash flow due to highly irregular production schedules.
- Inadequate supplies of fresh water.

The larger agar units find problems with:

- Raw material quality and quantity.
- Erratic power supply.
- Contamination of water.

At the marketing stage, no unit, large or small, reported any difficulty with the sale of their products, pointing to a buoyant market for agar seaweed. This bodes well for cultured seaweed.

Alginate processing units in the small-scale category reported locational problems similar to those experienced by their agar manufacturing counterparts. However, they pointed out that since their scale of operation was small, they enjoyed an assured market.

The most dismal picture emerged in the large-scale sodium alginate industry which faced constraints such as:

- Heavy excise duty of 40% plus 5% surcharge, which reduces their competitiveness against both international quality sodium alginate and small-scale domestic production.
- Lack of protection by the government, which has allowed relatively easy access to externally produced sodium alginate and substitutes that enjoy advantages with respect to both cost and quality. This has been a particularly trying move in view of the fact that earlier policy was to encourage an increase in the installed capacity of domestic capacity.
- The shrinking local market for sodium alginate with the switch-over from cotton to synthetic fabric production in the textile industry.

These major marketing problems have forced a low utilization of installed capacity in the sodium alginaté industry.

The trouble spots vary considerably in the case of each seaweed product. The market situation faced by the seaweed industry is complex. This may account for the limited growth of this sector. The analysis however, revealed that intervention may be possible on two fronts.

- The primary requirement is to upgrade the quality of the raw materials available to the processing industry. This may be done through technical intervention as is being attempted by BOBP in its culture project at Mandapam. The culturing of seaweed will be a major development in the seaweed industry if it is accomplished successfully and is proven to be commercially viable. It has the potential for changing the face of the Indian seaweed industry. But the ultimate test lies in proving its technical and commercial viability to an industry which is at present very cynical about the prospect of culturing seaweed successfully.
- Secondly, improved post-harvest techniques for the drying and storage of seaweed need to be demonstrated to the harvestors in order to ensure maximum storage life for seaweed stocks. As part of the demonstration, it is critical to point the way to an alternative marketing chain that will allow collectors to use improved quality standards as a method to bypass the agent and enter the commercial world of seaweed.

While both these steps may be undertaken through technical intervention in the form of development projects, the reach of these measures will depend on the take-up rate of project lessons by the communities of the 'seaweed belt'. This is the cutting edge by which the success of the project is to be judged.

TRADITIONAL KNOWLEDGE AND NEW IDEAS

Text and sketch bySignar Bengtson

The crab claw sail is an old idea from the shores of Asia.

For a long time experts have regarded the sail as "primitive". But current wisdom is that the sails of the outrigger canoes and the kattumarams – which are crab claw sails – are very effective, and work according to principles previously not known in the west.

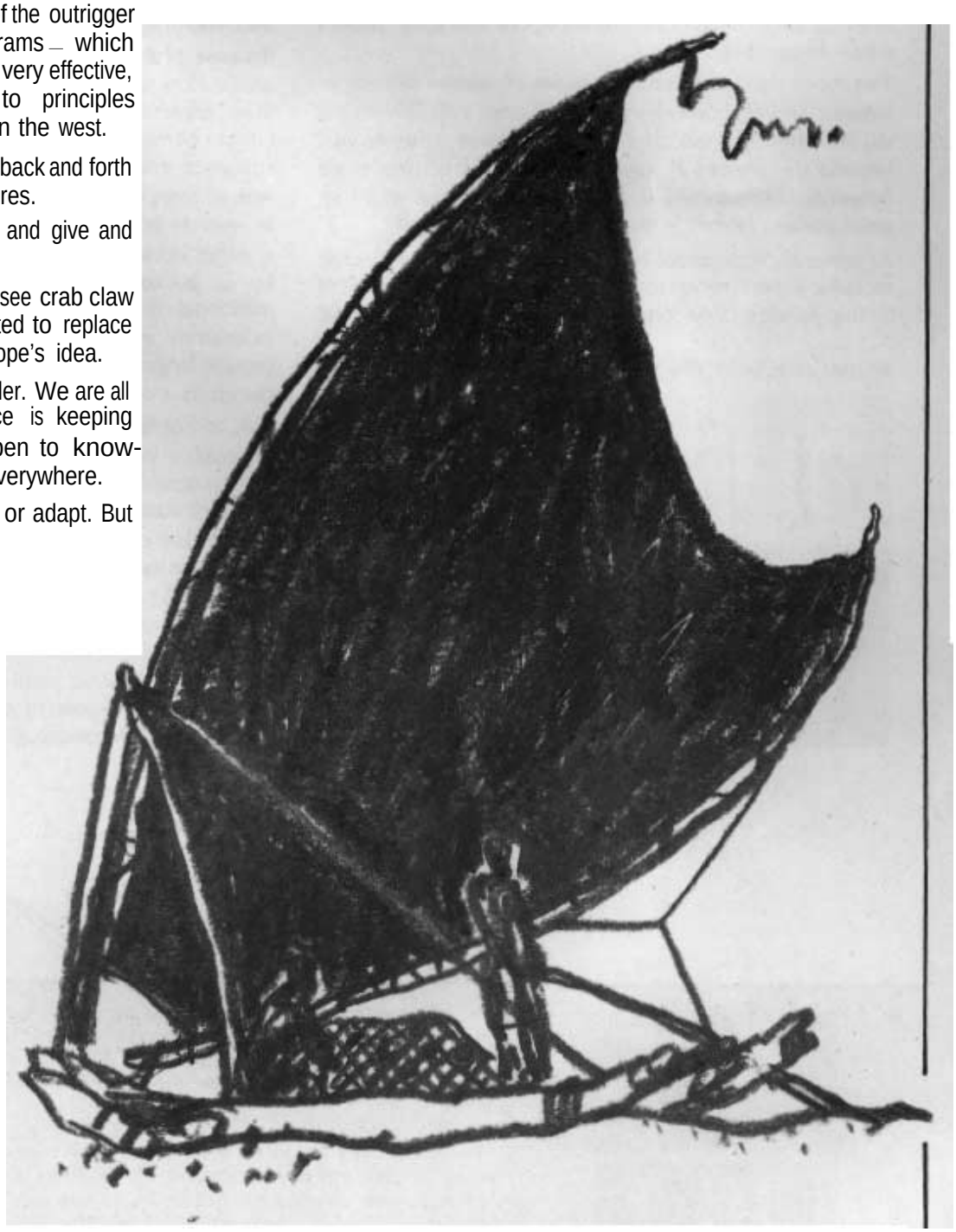
Ideas and knowledge go back and forth in waves between cultures.

We stand on our shores and give and take. Or ought to do it.

On the seas where you see crab claw sails, engines have started to replace sails. The engine is Europe's idea.

The world is getting smaller. We are all neighbours. Co-existence is keeping doors and windows open to knowledge and ideas from everywhere.

Not necessarily to adopt or adapt. But to understand.



LETTER FROM THE PUBLISHER

BRACKISHWATER CULTURE

Coastal aquaculture has over the years become a major component of BOBP's work, at the request of participating countries. In 1979, when the BOBP came into being, the aquaculture. workload was nothing more than a consultancy of six man-months, spread over 5 years. But by 1983-1984 the position had changed dramatically. Coastal aquaculture topped the budget among various BOBP subject disciplines. While aquaculture has now conceded that position to extension, it has remained a major component of the BOBP's "Small-Scale Fisherfolk Communities" project which began 1987.

The much publicized success of salmon farming in Norway and of shrimp farming in Ecuador and Taiwan tell us of highly sophisticated capital-intensive systems well beyond the present absorption possibilities of small-scale fisherfolk communities. Is there then any scope at all for small-scale operators in the Bay of Bengal region?

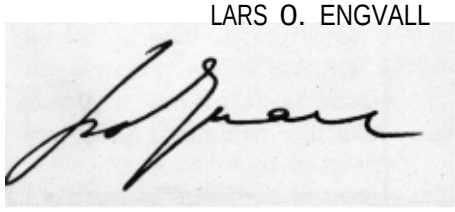
At present, decision-makers throughout the region eye the lucrative export market for shrimps. But the management of shrimp ponds is fairly complex, particularly if the production system is intensive. Prodt.!ction risks are further inflated in certain areas with constraints on feed and seed availability. For a small-scale operator with little or no previous aquaculture experience, the required leap in technical and managerial skills would be substantial. For less complicated practices, i.e. extensive culture, larger land areas are required; that is not in the hands of potential small-scale operators. So, small-scale shrimp farming is unlikely to spread widely unless it gets very strong extension support right from the purchase of inputs through the marketing of the final product.

Because of the reasons cited above, part-time low-capital aquaculture technologies are considered more appropriate than "full-time" technologies. Examples of the former: cage culture of marine finfishes with high market value, and the culture of molluscs and seaweeds. BOBP has been involved with all three types of technologies. But the potential of each is severely limited at least on a wide regional basis. This is either because suitable environments are hard to come by or because consumer demand is not enough. An additional complication is that most of these systems interact extensively with the natural environment and therefore require lengthy trials to establish their viability when introduced to a new area.

This is not to say that small-scale coastal aquaculture is impossible in the region. Notable success stories include shrimp farming in confined ponds in Orissa, cage culture on the west coast of Thailand, and oyster and mussel farming on the Gulf coast of Thailand. However, success is neither easy nor assured. It will require strong and long-term commitment by all parties concerned; the project's integration into realistic national programmes; and an adequate legal and institutional framework — particularly for shrimp farming, where the interests of small coastal communities might easily be ignored in favour of quicker development by entrepreneurs and corporate groups.

Mussel culture in Thailand — an early BOBP attempt.

LARS O. ENGVALL



BAY OF BENGAL NEWS

Bay of Bengal News is a quarterly publication of the Bay of Bengal Programme (BOBP), a regional fisheries programme which covers seven countries bordering the Bay of Bengal — Bangladesh, India. Indonesia, Malaysia, Maldiyes, Sri Lanka, Thailand. The BOBP's matn project is "Small-scale fisherfolk communities in the Bay of Bengal" *(GCPIRASI1* 18/MUL),- Executed liy the FAO (Food and Agriculture Organization of the United Nations) and funded by Denmark and Sweden, the project develops techniques, technologies and methodologies through pilot activities to improve the conditions of small-scale fisherfolk in the seven member-countries. The project began in 1987 for a duration of five years. It succeeds an earlier BOBP project, "Development of small-scale fisheries in the Bay of Bengal", which terminated 1986. A five-year post-harvest fisheries project, executed and funded by ODA (U.K.), is also part of the BOBP.

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