ISSN 0971-3077

BAY OF BENGAL NEWS

The Journal of
BOBP For Fisheries Management
BAY OF BENGAL PROGRAMME
Sponsored by the Governments of Denmark and Japan

Vol.III No. 4 DECEMBER 2001

BOBP after 2001

"Fisheries is too valuable to be left to its own devices in the Bay of Bengal Region. A strong and collective response to the plight of the small-scale fishermen from all fisheries stakeholders - most importantly, from the governments of the BOBP member-countries - is urgent and vital".

A Word from the Editor

Forging unity to manage fisheries

Requests keep pouring into the BOBP office from individuals as well as member-governments. Basudev Bhowmick and Md Riaz, fishing company officials from Bangladesh need sound information on the pelagic stocks of Bangladesh's EEZ; Mustafa Ahmed from Maldives needs better on-board preservation technology for his fishing dhoni; Suharyanto, running an NGO in Indonesia, wants to implement community- based fisheries management in villages where his organisation operates; Daniel Pereira, a multi-day boat owner from Negombo, Sri Lanka, is always apprehensive of a break-down of his fishing boat and its drifting to neighbouring countries where the crew can be detained for long periods. He wants the BOBP countries to evolve regulations which can facilitate early repatriation of such fishermen and their boats... and the list goes on. The reply is common - the BOBP is trying to evolve as an inter-governmental organisation (BOBP-IGO) and interventions can only be possible once the BOBP-IGO is set up.

Fishing and safety need to go hand in hand

The BOBP

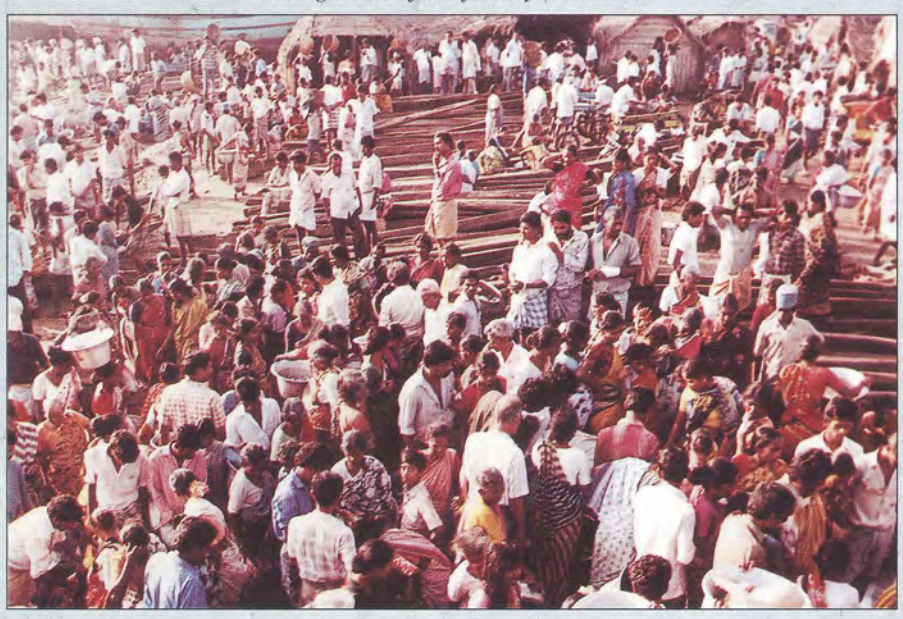
The Bay of Bengal Programme for Fisheries Management has completed 22 years. The BOBP started in 1979 to help improve the condition of small-scale fisherfolk in the seven member-countries. It's First Phase (1979-1986) was devoted to technology transfer and development in small-scale fisheries. The Second Phase (1986-1994) focused on people-centered activities to alleviate poverty and raise the living standards of small-scale fishing communities. The Third Phase (1994-continuing) is aimed at sustainable development and management of small-scale fisheries through stakeholder approaches to management. During all the three phases, the Programme's approach has been catalytic and consultative and its activities have been people-oriented, and have helped in solving the problems of fisherfolk.

The fisheries resources of the Bay of Bengal (BOB) are almost unique. In terms of area, it encompasses 2.83 million sq km., which includes 277 000 sq km between the continental shelf and 50 metres depth and 522 000 sq km between the shelf and 200 metres depth. The total length of the coastline of the countries straddling the Bay and its adjacent seas is about 105 000 km (excluding Myanmar's coastline). The BOB is a relatively productive fishing zone of the Eastern Indian Ocean and more than 300 fish species are estimated to be of commercial value.

BOBP, it can be said, has left a foot-print in the region – in bringing technologies, raising awareness and to some degree in changing behaviour in regard to coastal fishery resource management.

The fisheries contribution to the national gross domestic product in the BOB countries ranges from a little over 1 per cent (India, Thailand) to as much as 11 per cent (Malaysia) and the gross national product (US $) varies from 370 (Bangladesh) to 2 300 (Malaysia). Fish is a source of much needed animal protein for coastal populations - as also a major foreign exchange earner for most of the countries around the Bay. The rich fishery resources provide livelihood support to millions of

Depleting resources and increasing demand call for immediate management of the fishery resources



fisherfolk and fishing is the only source of livelihood in many coastal rural areas in the region.

However, fishing is becoming more and more uneconomical because of dwindling resources and degradation of the fisheries habitat and coastal environment. Most coastal marine fish stocks in the BOB are being optimally harvested. Coastal demersal species and shrimp stocks have been heavily exploited, whereas offshore resources have been less intensively fished. Tuna stocks vary but in many areas are fully exploited.

As the coastal stocks are getting fewer and fewer, the fishermen are moving deeper. While fishing technology has improved, enabling small-scale fishing vessels to fish in deeper waters, their safety at sea is weak – resulting in loss of life at sea or drifting of boats to neighbouring countries where fishermen languish in prisons or detention centres for lengthy periods.

The Need for Management

The fisheries in the BOB countries is dominated by the artisanal and small-scale fishermen. The generally positive economic performance of the marine capture fisheries in the BOB is being achieved in an environment where the growing fishing pressure has accelerated conflict between different categories of resource users, where the fisheries resources are being optimally exploited, and in some cases even over-exploited and where access to fishing has no limits. How long can the BOB sustain this rate of exploitation? Management has to step in if the fisheries is to be made sustainable. In the prevailing situation, there are no quick-fix approaches to the complex social and environmental problems of the Bay. Resource management will need long- term commitment and investment. And management paradigms will need a shift if the Bay's fisheries are to be sustained and the quality of life of the poor fisheries is to be improved.

The challenge for fisheries management in the Bay of Bengal is clear - better management of coastal artisanal and small-scale fisheries.

While the BOB countries can manage the fisheries within their national jurisdiction to a certain extent, a cooperative effort by the countries is essential to manage the fisheries outside the EEZs. To ensure long-term sustainability of the stocks, both coastal and trans-boundry, the member-countries have to come together, forge unity and manage the fisheries. Management in isolation will be a short-sighted approach. Common decision making platforms need to be evolved to carry new forms and approaches to management. This vindicates the need for a permanent inter-governmental orgnisation (IGO) in the region to cater to the management needs of the Bay's fishery resources.

The BOBP-IGO

The BOBP/FAO Mission which documented the Learnings of the Third Phase of the BOBP (1994- 1999), noted that the "member- countries voiced a strong desire to see the work begun by BOBP Third Phase to continue. It also noted that the catalytic and information- sharing functions provided by BOBP would enable national activities to move forward much more quickly and completely than they would in the absence of regional- level support".

Post- harvest continues to be the weakest link

To overcome continuing poverty and resource depletion, there is a definite need to manage the Bay's fisheries. Cooperation among the Bay of Bengal countries would pave the way for confidence- building in the larger management of the Bay's resources.

Presently, there is no inter-governmental organisation that can facilitate and enable sustainable development and management of

Fisheries management will need reduction in fleet size

small-scale fisheries in the BOB region. This need is particularly acute given that a very large proportion of fisheries in the region is small-scale in nature, and it provides livelihood to millions of fishers and their dependents as well as valuable and affordable animal protein to the poor people of the region. It is felt that the needs of the member- countries can be effectively met through regional cooperation. The BOBP-IGO will also be an ideal mechanism for FAO and other international development agencies to address their constituencies in the BOB region for sustainable development and management of the fisheries resources.

The BOBP-IGO will become a means of closing gaps in management areas and a vehicle for promoting sound fishery governance in the region. It is also seen as an ideal mechanism to create a framework for regional cooperation and facilitate the setting up of an effective fisheries management system, especially for optimum utilisation of the shared, trans-boundary and straddling stocks; develop reliable fishery information and statistical databases on marine fin and shell fish stocks; harmonise rules, regulations and procedures in the member-countries in conformity with global initiatives; develop methodologies and national capacities to address issues concerning post-harvest losses and wastage, quality assurance of fish and fishing products; etc. Within the Bay, there are well-documented maritime boundaries duly acknowledged by the Bay's coastal states and this would further facilitate the regional mechanism for managing the Bay's fisheries resources and ecosystem.

The BOBP has always been a valuable forum in the region for cooperation in raising common issues and challenges and meeting them head-on. An IGO will ensure the logical progress of the BOBP – an institution which means much to Md Riaz, Suharyanto, Daniel Pereira and Mustafa Ahmed; officials and scientists of the region; to governments and NGOs; and also for the success of sustainable fisheries development and management of the Bay of Bengal region.

Y S Yadava

At Phuket, Thailand, in October 1999, when the representatives of the BOBP member- countries had gathered to participate in the 24th Meeting of the Advisory Committee, a consensus was reached among the member- countries and they strongly endorsed the need to continue the BOBP or to evolve a new regional mechanism, which would have the ability, as the BOBP did, to address critical and important issues and concerns relating to fisheries development and management, both at the policy and implementation levels. The Chennai Declaration on Sea Safety for Artisanal and Small-scale Fishermen also recommended that the issue of sea safety could be addressed on an urgent basis only through a regional mechanism like the IGO.

The process to evolve the BOBP-IGO is underway and the member- countries are meeting in Colombo in early 2002 to decide on the future of BOBP. A decision at this meeting of the plenipotentiaries would have a vital bearing on the long-term sustainability of the Bay of Bengal's fishery resources and on the livelihood support it provides to the millions of fisherfolk and their families — ***Editor***

A new dawn — new hopes, new aspirations

Fishermen's Day: celebrations in Thailand

Fishermen's Day or a Fishermen's Week is becoming an annual feature in most of the BOBP member-countries and is eagerly awaited by the fisherfolk every year. "It gives our community an opportunity to come together, discuss problems and issues that confront our livelihood and strengthen our unity," voiced most of the fisherfolk participating in the Fishermen's Day organised by the Department of Fisheries (DOF), Government of Thailand and supported by the BOBP.

This year's event in Thailand was organised in Ban Bo Ma Muang village in Krabi Province on 17 November 2001. The highlight of the event was the participation of Mr Ichiro Nomura, Assistant Director General, FAO Fisheries Department, Rome, Dr Maitree Duangsawasdi, Deputy Director General, DOF, Thailand and other Senior Officers of the DOF from Bangkok as well as from Phuket. Senior officials of the Krabi Province, fisherfolk, teachers and volunteers attended the function. School children also actively participated in the programme and presented a cultural show.

In his speech, Mr Nomura expressed happiness on being a part of the

Mr Ichiro Nomura, Assistant Director General (Fisheries), FAO

celebration and commended DOF – BOBP for organising the Fishermen's Day in Krabi Province. "Efforts should aim at making small-scale fisheries more sustainable and socially acceptable, and to this extent, FAO would like to continue to work with you and assist you in making your efforts successful," said Mr Nomura. Speaking on the occasion, Dr Duangsawasdi said that the event was gradually becoming a good interface mechanism between the DOF and the fisher community and the Department wished to make it a popular event throughout the country.

During 2001, the BOBP also supported the organisation of Fishermen's Week/ Day in Sri Lanka, the Maldives and the Indian states of Andhra Pradesh.

Fisherwomen behind the success of the Programme

An exhibition was put up by the fisherfolk community, which mirrored their efforts in successful adoption of sustainable fishing practices and conservation of the marine resources. Home-made value added fish products were on display and sale. The active involvement of fisherwomen in the organisation of the exhibition was another feature of the celebrations. An elderly lady manning a stall said, " Every such event makes me more concerned about the sustainability of our fisheries resources and their availability for the future generations."

The event also marked the symbolic burning of push nets to demonstrate the community's will in the eradication of destructive fishing practices.

Cultural show by school children and symbolic burning of push nets on Fishermen's Day in Thailand

Fisheries profile of the Bay of Bengal: A fact sheet on Indonesia

The sea is a part of the people's lives in Indonesia. Fisheries in the country play a crucial role in the socio-economic fabric. Indonesia's fisheries policy focuses more on the rational utilisation of natural resources for employment, income generation and nutrition.

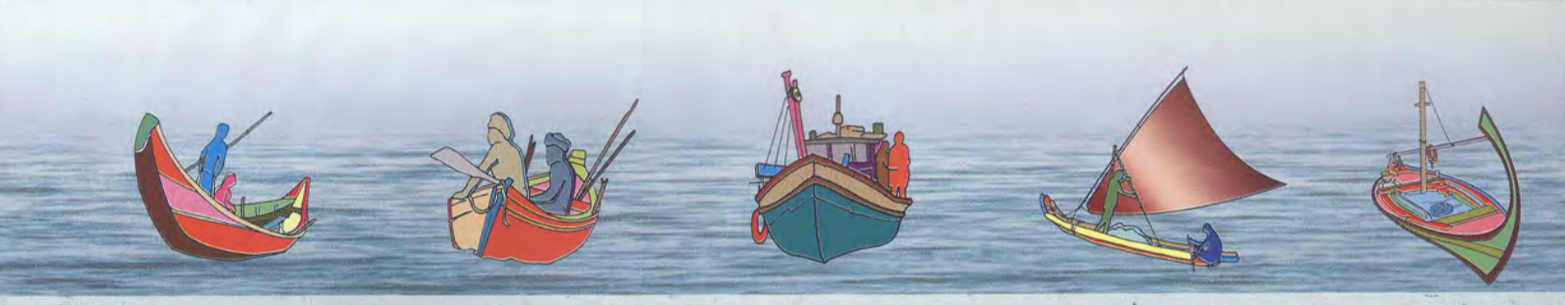
The Republic of Indonesia, formerly the Dutch East Indies, is an archipelago of over 17 500 islands surrounded by a vast expanse of ocean, extending some 5 150 km along the Equator in the Indian and Pacific Oceans. It is the world's 16th largest and fifth most populous nation. Basically agrarian, Indonesia is the world's third largest rice grower. Bahasa Indonesia is the official language but there are over 200 regional dialects and languages. During 1971-96, the contribution of fisheries to the GDP remained at less than 2 per cent (the manufacturing sector contributed 26 per cent and agriculture 20 per cent).

In Indonesia, the area of the sea under the nation's jurisdiction, 5.8 million sq. km, is three times larger than that of land. The sea is a part of the people's lives in the country, and some coastal people are known as traditional seafarers who had sailed across the sea and ocean, even to the east coast of Africa, since pre-historic days.

As the world's largest archipelagic nation with an Exclusive Economic Zone (EEZ) of 2.7 million sq. km, fisheries in Indonesia play a central role in the socio-economic fabric of the nation. This is reflected in the objectives for the sector outlined in the second long- term development plan (PJPT II, 1993-2018). The fisheries policy focuses more on the development of human resources and rational utilisation of natural resources for employment, income and nutrition.

Fishery Resources

The marine fishery areas of Indonesia are made up of its territorial waters and the EEZ. Indonesia's territorial waters can be divided into three main ecosystems, namely the Sunda Shelf, the Sahul Shelf and the Indian Ocean. Indonesian waters have a potential yield of marine fisheries resources aggregating about 6.2 million tonnes a year. Until 1998, the exploitation rate had touched 60 per cent of the potential yield. Several kinds of fishing gear and various sizes of vessels have been used to exploit the marine resources as much as possible. Most fishing vessels are small wooden ones, of less than 30



gross tonnage (GT), using simple gear and navigation equipment. Indeed, more than 85 per cent of the total marine fish production is accounted for by the small-scale fisheries.

The number of marine fishing boats, which was 335 088 in 1989, increased to 412 702 in 1998, a growth rate of 2.57 per cent annually. Of these, 54 per cent were non-powered; 25 per cent outboard motor powered; and 20 per cent inboard motor powered vessels of less than 30 GT. The remaining, about 1 per cent or 3 962 vessels of more than 30 GT, were used mainly in commercial fisheries.

The number of non-powered boats, too, increased from 218 553 units in 1989 to 223 490 units in 1998, an average of 0.25 per cent a year. However, outboard powered boats registered a better growth rate (4.84 per cent), increasing from 71 122 units in 1989 to 102 125 units in 1998. Inboard powered boats recorded the highest growth rate – 10.20 per cent, up from 45 413 boats in 1989 to 87 087 boats in 1998. Most fishing vessels operated in East Java, North Sumatra and Malaku.

Non-powered boats comprised dug-out boats and plank-built boats – small, medium and large. Powered boats comprised outboard powered boats and inboard-powered motor boats. Among inboard-powered boats, the size ranged from less than 5 GT to over 200 GT. While motorisation has enabled the fishers to fish in wider ranges with greater mobility and manoeuvrability, thus contributing to the increased supply of fish, it has also brought in additional pressure on the resources.

Indonesian fishermen use a variety of fishing gear ranging from seine nets, purse seine nets and gill nets to lift nets, hook and lines and traps. The more popular are pole and line, drift gill net, troll line, set gill net, and portable and other traps. Cast nets and harpoons are also used in some cases. Accounting for the highest marine fish catch (1998) were purse seine (661 354 tonnes), drift gill net (419 163 tonnes), *payang* (318 597 tonnes), pole and line (299 922 tonnes), and raft net (218 432 tonnes).

Country crafts dominate the fishing fleet in Indonesia

During 1989-98, the number of fishermen also increased dramatically – from 1 463 875 fishers in 1989 to 2 274 629 in 1998. Out of this, full-time fishermen numbered 1 153 495, part-time fishermen who spent a major part of the time fishing numbered 785 496, and other part-time fishermen who spent only a small part of the time fishing, numbered 335 638. 1998 statistics indicate that out of the people engaged in the primary production sector of the fisheries industry, approximately 90 per cent of them constituted the small-scale fisheries.

Fish Production

Total fisheries production, which was 3 035 268 tonnes in 1989, rose to 4 642 209 tonnes in 1998, an increase of 5.88 per cent annually. Marine fisheries catch was 3 723 746 tonnes in 1998, up from 2 272 179 tonnes in 1989. While marine fish capture increased by 7.09 per cent, fish capture in inland open waters increased by 2.25 per cent, and fish culture improved by 7.86 per cent. In 1998, marine fisheries production reached 80.21 per cent of

Fisheries production, by sub-sector of fishery: 1989 - 1998

Unit : MT

Sub-sector	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
TOTAL	**3 035 268**	**3 162 469**	**3 349 601**	**3 543 332**	**3 795 322**	**4 013 831**	**4 263 587**	**4 452 258**	**4 579 766**	**4 642 209**
- Marine Fishery	**2 272 179**	**2 370 107**	**2 537 612**	**2 692 068**	**2 886 289**	**3 080 168**	**3 292 930**	**3 383 457**	**3 612 961**	**3 723 746**
- Inland Fishery	**763 089**	**792 362**	**811 989**	**851 264**	**909 033**	**933 663**	**970 657**	**1 068 801**	**966 805**	**918 463**
Inland open water	**296 385**	**292 537**	**294 477**	**300 896**	**308 649**	**336 141**	**329 710**	**335 706**	**304 258**	**288 666**
Culture	**466 704**	**499 825**	**517 512**	**550 368**	**600 384**	**597 522**	**640 947**	**733 095**	**662 547**	**629 797**
- Brackishwater	258 491	287 073	323 156	337 431	355 284	346 214	361 239	404 335	370 259	353 750
- Freshwater	113 673	120 598	106 862	116 707	141 890	140 098	162 198	182 918	171 768	168 478
-Cage	4 924	4 481	6 648	8 815	26 045	33 011	39 855	44 630	26 186	17 639
- Paddy field	89 616	87 673	80 846	87 415	77 165	78 199	77 655	101 212	94 334	89 930

the total fisheries production, while inland open water fisheries production accounted for 6.21 per cent, and fish culture 13.56 per cent.

In marine fisheries, fin fish catch accounted for 89.23 per cent, out of which tuna contributed for the major portion. Shrimps accounted for more than 90 per cent of the crustacean production (6.54 per cent of the marine fisheries production). By species, marine fisheries production consisted of a wide range of fish. Those which accounted for the major shares included scad (277 593 tonnes), eastern little tuna (236 673 tonnes), skipjack tuna (227 068 tonnes), Indian mackerel (204 763 tonnes), fringescale sardinella (174 691 tonnes), and Indian oil sardinella (153 965 tonnes).

The major fish production regions in Indonesia were Central Java, which contributed 8.22 per cent of the total marine fisheries production, North Sumatra (8.87 per cent), Malaku (9.69 per cent), East Java (7.48 per cent), and South Sulawesi (7.1 per cent). Between them, they accounted for 1 532 717 tonnes (41.36 per cent) of the total marine fisheries production.

In 1999, the estimated per capita food fish supply in Indonesia was 29.3 kg per annum. In Indonesia, fish consumption is higher in the eastern part than in the western region; average fish consumption in Java is only about 10 kg but reaches more than 40 kg in Malaku, Irian Jaya. Indonesian fish exports have registered remarkable growth over the years. Foreign exchange earnings increased from US $ 88 million in 1975 to US$ 1 786 million in 1996.

Fisheries Management

Coastal management zones of three, five and seven miles have been established in Indonesia, with each zone being reserved for different sizes of fishing boat and gear. Restrictions on certain gear types and mesh sizes have also been imposed. Trawling has been banned in Sumatra and in the Java Sea.

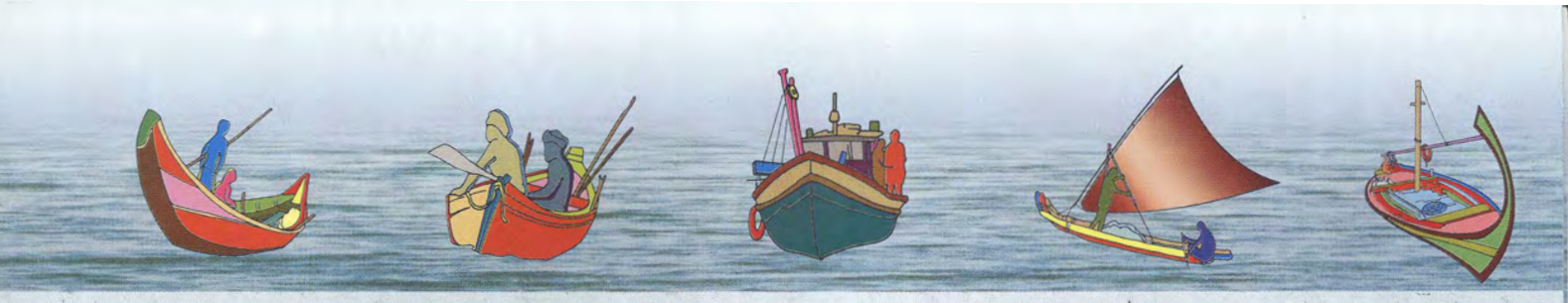
Over-exploitation of near-shore resources is leading to a decline in the overall level of fishing economy. This has worsened conflicts between different groups of fisherfolk. The recent development of mariculture has also generated problems, such as the destructive use of fishing practices during wild seed collection, the unmanaged development of fishery to generate feed for the aquaculture sector and pollution.

The resource management framework for the marine fisheries was established by the central government based on resource estimates made by the research body. Prior to 1999, three agencies had responsibility for marine fisheries resource management in Indonesia, namely, the Directorate General of Fisheries, the Provincial Fisheries Service and the Central Research Institute for Fisheries. Under the Autonomy Law No. 22/99, authority for the management of coastal resources has now been devolved to provinces and districts, and to the management of local fishers in the offshore areas. While the capacity to assume these new roles has yet to be built, the government is strongly committed to this new resource management direction.

Marine fishing boats, by size of boats: 1989 - 1998

Unit : Number

Category / Size of Boats	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Non- powered Boat										
Dug out boat	106 741	112 246	117 361	115 839	123 760	126 800	127 936	135 736	122 365	118 267
Plank Buil Boat - Small	66 573	70 295	70 047	70 554	73 452	72 694	73 392	71 890	65 379	64 074
- Medium	38 801	35 895	35 396	35 143	41 822	36 189	37 139	37 505	31 962	33 609
- Large	6 438	6 923	8 855	7 841	8 711	9 803	6 695	7 430	9 213	7 540
Sub Total	**218 553**	**225 359**	**231 659**	**229 377**	**247 745**	**245 486**	**245 162**	**252 561**	**228 919**	**223 490**
Powered boat										
Outboard Motor	**71 122**	**73 144**	**75 416**	**77 779**	**82 217**	**87 749**	**94 024**	**96 995**	**95 022**	**102 125**
- Inboard Motor	**45 413**	**46 542**	**47 709**	**51 750**	**59 536**	**62 950**	**65 467**	**69 891**	**78 163**	**87 087**
< 5 GT	34 663	35 435	35 179	37 913	43 396	45 331	48 855	51 327	55 814	58 448
5 - 10 GT	6 658	6 897	7 391	7 936	9 791	9 604	9 562	10 312	13 440	15 898
10 - 20 GT	2 348	2 336	2 726	3 156	2 812	3 376	2 789	3 074	3 587	5 575
20 - 30 GT	1 006	831	909	984	1 558	1 688	1 519	1 500	1 941	3 204
30 - 50 GT	334	631	738	1 049	1 170	1 869	1 682	1 626	1 818	2 166
50 - 100 GT	187	119	185	208	351	567	687	1 535	1 110	1 112
100 - 200 GT	156	173	272	184	213	340	253	354	393	519
> 200 GT	61	120	309	320	245	175	120	163	60	165
Sub Total	**116 535**	**119 686**	**123 125**	**129 529**	**141 753**	**150 699**	**159 491**	**166 886**	**173 185**	**189 212**
Total	**335 088**	**345 045**	**354 784**	**358 906**	**389 498**	**396 185**	**404 653**	**419 447**	**402 104**	**412 702**



Fisheries profile of the Bay of Bengal: A fact sheet on Sri Lanka

Fishing is an important part of the Sri Lankan economy. Marine fisheries is the mainstay of the fish production in Sri Lanka. It contributes 88 per cent of the total national fish production, out of which 80 per cent comes from the coastal fisheries.

Sri Lanka, a teardrop-shaped island in the Indian Ocean, 25 miles off the Indian landmass, was known to generations of travellers for its beauty and to traders for its production of high-quality tea. At one stage in its long history, the Arabs called the island Serendib, from which derived the word serendipity. The economy is predominantly agricultural, the chief activities being the processing and export of tea, rubber and coconuts.

Fishing and fish production is an important part of the Sri Lankan economy in terms of employment, food and nutrition security and foreign exchange earnings. Its contribution to the Gross Domestic Product (GDP) was about 2 per cent in 2000, directly employing about 150 000 persons and another 50 000 persons in related occupations. Over 700 000 people depend on fisheries for their livelihood. The per capita consumption of fish is around 16 kg.

Fishery Resources

Sri Lanka has sovereignty over an Exclusive Economic Zone (EEZ) covering an area of 517 000 sq. km which is approximately eight times the land area (62 700 sq. km). The continental shelf area around Sri Lanka is estimated at 31 250 sq. km but its width varies. The shelf is generally narrow and rarely exceeds 40 km. The average width is about 22 km. Most of the fish resources are found within the continental shelf.

The coastline, 1 800 km in length, comprises a vast area of marine habitat - sandy beaches, extensive lagoons, mangroves and coastal marshes. Over 50 per cent of the population resides in the coastal areas of the country. The country's fisheries and aquaculture resources also include over 280 000 ha of perennial and seasonal tanks and reservoirs and 158 000 ha of brackish water. Almost all the fisheries in Sri Lanka (except the foreign fishing vessels which operate from Sri Lankan bases to fish in international waters, and shrimp farming undertaken by private companies) are regarded as artisanal and small-scale fisheries.

Since 1950, the fishery sector has changed from an entirely artisanal to a semi- industrial sector due to motorisation of traditional craft and the introduction of new crafts permitting more effective fishing methods. Presently, the fishing fleet in the island consists of around 28 000 craft, out of which 46 per cent are motorised. The majority of the craft (58 per cent) are traditional dug-out canoes (*oru* and *vallam*) and log craft (*theppam* and *kattumaran*). The main fishing method is drift gill netting, which accounts for about 60 per cent of the total catch. Long-lining, trawling, line fishing, trolling and beach seining are the other important types of fishing.

Fishing operations of all the traditional craft (non-motorised and motorised) and 17'-23' fibreglass reinforced plastic (FRP) boats in Sri Lanka are mainly confined to the coastal areas. Fishing boats fitted with inboard engines are of two types. The boats of length 28'-32' fitted with inboard engines of 26-35 hp operate in the coastal areas and are considered as day boats. The multi-day boats (34'-50' in length) operating in the offshore and deep-sea areas are powered with inboard diesel engines of 35-160 hp and made of fibreglass with an insulated fish hold to carry ice and water.

There are about 1 500 multi-day boats operating in the offshore/ oceanic area. Presently, over 75 per cent of the multi-day boats are equipped with SSB radio, and satellite navigators have been provided under various government development schemes. However, the multi-day fishermen are still facing new challenges and majority do not have the experience to prevent break down and losses at sea. The result is a relatively high accident rate. On an average about 20 boats are subject to accidents at sea every year.

Sri Lanka has made substantial progress in the development of its indigenous capability to design, construct and repair fishing boats. There are nine major and 20 small boat builders registered with the Ministry of Fisheries and Aquatic Resources Development. All boat-building enterprises are privately owned and operated, except the one owned and operated by the state-owned Cey-nor Development Foundation.

Distribution of fishing craft, by district - 1999 (1)

DFEO Division	Total	In board		Out Board		Non-motorized
		Multi day	One day	FRP	Traditional	Traditional
Puttalam	4 255	34	101	2 042	106	1 972
Chilaw	3 231	7	28	1 531	-	1 665
Negombo	2 892	181	123	1 063	28	1 497
Colombo	406	12	57	135	-	202
Kalutara	1 259	262	53	192	-	752
Galle	1 396	203	83	345	248	517
Matara	1 751	405	212	242	158	734
Tangalle	2 127	214	105	531	339	938
Kalmunai	1 323	1	270	63	128	861
Batticaloa	2 044	41	259	247	80	1 417
Trincomalee	2 614	59	160	1 202	2	1 191
Mullaithivu	411	-	-	117	101	193
Kilinochchi	-	-	-	-	-	-
Jaffna	2 353	-	-	-	-	2 353
Mannar	1 673	-	24	913	84	652
Total	27 735	1 419	1 475	8 623	1 274	14 944

Source : Statistical Unit of the Ministry of Fisheries and Aquatic Resources Development; (1): Provisional.*

Fish Production

The total national fish production from marine and inland capture fisheries and shrimp aquaculture was estimated at 304 380 mt in 2000. The fish production increased steadily between 1970 and 1983. In 1984, production declined owing to the eruption of civil disturbances in the northern and eastern provinces. Since then, it has picked up gradually.

Fisheries in Sri Lanka can be broadly divided into four categories - coastal or inshore fisheries, offshore or deep-sea fisheries, inland fisheries and coastal aquaculture. The coastal fisheries is predominantly concentrated along the continental shelf area. Outside the continental shelf, up to about 160 km, is the offshore fishing zone; beyond that, up to a 320 km limit is the deep-sea fishing zone. Fisheries on the shelf are supported by a wide range of coastal pelagic and demersal species, typical of tropical multi-species fisheries.

The maximum sustainable yield (MSY) of the coastal marine resources in Sri Lanka has been estimated (by a survey in 1979-1980) at about 250 000 metric-tonnes (mt), of which up to 170 000 mt were pelagic fish (small- and medium-sized sardine, scad, mackerel, anchovy, seer fish and tuna) and up to 80 000 mt were demersal or semi-demersal (bream, snappers, groupers, etc). Fisheries in the offshore or deep-sea waters are supported by medium-sized and large pelagics, mainly tuna, and an exotic range of deep-water dermersal species. The MSY for these species has been estimated at 90 000 mt.

There has been a marked increase in fish production from offshore or deep-sea owing to the introduction of better-equipped multi-day boats. The production from the offshore and deep-sea sector increased from 800 mt in 1972 to 84 400 mt in 2000. The total

* *Recently reorganised as the Ministry of Fisheries and Ocean Resources*

Fish Production, by fishing sub - sector (1999 - 2000)

Year	Total fish production	Marine fish production **			Inland (Fin fish)	Aquaculture (Shell fish)
		Coastal		Offshore (2)		
		Fin fish	Shell fish	Fin fish		
1990	183 990	129 660	4 410	11 670	37 690	5 000
1991	198 060	153 974	5 176	15 080	27 730	1 100
1992	206 170	156 700	6 470	22 000	19 370	1 630
1993	220 900	163 163	6 737	33 000	16 090	1 910
1994	224 000	170 600	3 900	37 500	8 900	3 100
1995	237 500	154 850	4 400	60 000	14 650	3 600
1996	228 550	145 190	4 240	57 000	18 090	4 160
1997	242 000	148 640	4 110	62 000	23 610	3 640
1998	269 850	161 220	5 480	73 250	23 380	6 520
1999	279 900	166 790	5 160	76 500	27 630	3 820
2000(1)	304 380	176 800	6 480	84 400	29 730	6 970

** *Excludes fish purchases from foreign vessels permitted to land in Sri Lanka*

(1) Provisional estimates

(2) Fish production from multi-day fishing vessels

Source - Statistical Unit of the Ministry of Fisheries & Aquatic Resources Development

production from marine fisheries at present is around 267 680 mt. The fish production from inland waters was estimated at 29 730 mt and 90 per cent of the production came from perennial reservoirs and tanks. The coastal aquaculture in Sri Lanka is presently confined to shrimp farming in the north-western province and production from this sector was estimated at 6 970 mt. A National Aquaculture Development Authority has been set up in the country to regulate shrimp aquaculture.

Ornamental fish trade in Sri Lanka has developed into a valuable foreign exchange earner. Sixty fresh water species and over 200 marine species are recorded as being collected and exported to over 25 countries. Total value of ornamental fish exports from Sri Lanka is in the region of Rupees 500 million (1997). In both marine and fresh water species, there seem to be a trend towards reduced supplies from the wild. There are also clear signs of over-collection of certain species. All these could affect the sustainability of the aquarium industry unless appropriate management measures are taken without delay.

Sri Lanka - traditional fishing crafts are gradually giving way to multi- day offshore fishing boats

Export

Export of fish and fish products is emerging as an important source of foreign exchange for Sri Lanka. The present exports in terms of volume comprise around 3 per cent of the national fish production. The value of fish exports in 2000 was Rs. 10 328 million, mainly from shrimp, lobster, crab and fin fish (tuna and sword fish), and amounted to a total of 19 566 mt. Sri Lanka, however, is a net importer of fish. With high per capita consumption, demand exceeds supply and the gap is filled by importing fish products. Fish imports, valued at Rs. 4 951 million, amounted to 77 338 mt and consisted mainly of dried and canned fish.

Fisheries Management

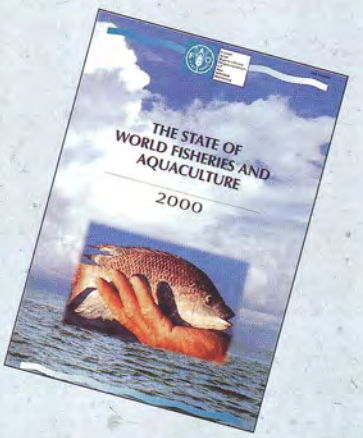
The fisheries management regime in Sri Lanka was initially an open access regime managed under the Fisheries Ordinance of 1940. Subsequently, regulations relating to specific regions or fisheries such as the beach seine fishery or purse seining were introduced to reduce gear conflicts. Following clear evidence that coastal fishing was occurring beyond sustainable limits, a new Fisheries and Aquatic Resources Act was promulgated by Sri Lanka in 1996. This Act lays greater emphasis on management and sustainable development of fisheries through ten sections which address (i) Licencing of all major fishing operations, (ii) Declaration of areas for fisheries management and (iii) Conservation of fisheries and aquatic resources. The fishery in Sri Lanka is now officially a rights- based fishery but many of the mechanisms to manage a rights- based fishery have yet to be put in place.

The State of World Fisheries and Aquaculture – 2000

This unique FAO publication provides a comprehensive, objective and global view of capture fisheries and aquaculture, including associated policy issues. The book addresses the concerns of both consumers and fishers which are central to the State of World Fisheries and Aquaculture

As most of the world's capture fisheries have apparently reached their maximum potential and the majority of stocks are now fully exploited, the future is not likely to bring substantial increase in the total catch of these fisheries, states **The State of World Fisheries and Aquaculture 2000 Report,** while adding that the growth in aquaculture is continuing. Reporting in detail on the status of resources and ecosystems and on current production, utilisation, trade and consumption patterns, the Report, the third issue in the series, confirms a number of recent global supply and demand trends. Consumers' concerns are addressed in relation to fish quality and safety, and the use of genetically modified organisms in fisheries. The welfare of fishers – who engage in perhaps the most dangerous profession in the world – is considered in separate studies on fishers' safety and fishing community cultures.

The Report also discusses several issues associated with possible improvements in understanding the concept of property rights in relation to fisheries resources, identifying practicable sustainable development indicators and resources and applying the precautionary approach in marine fisheries. In his thoughtful foreword, Mr. Ichiro Nomura, Assistant Director General of the FAO Fisheries Department, points out that the book addresses the concerns of both consumers and fishers which are central to the state of world fisheries and aquaculture. Mr. Nomura expresses the hope that the Report will generate awareness of the increasing

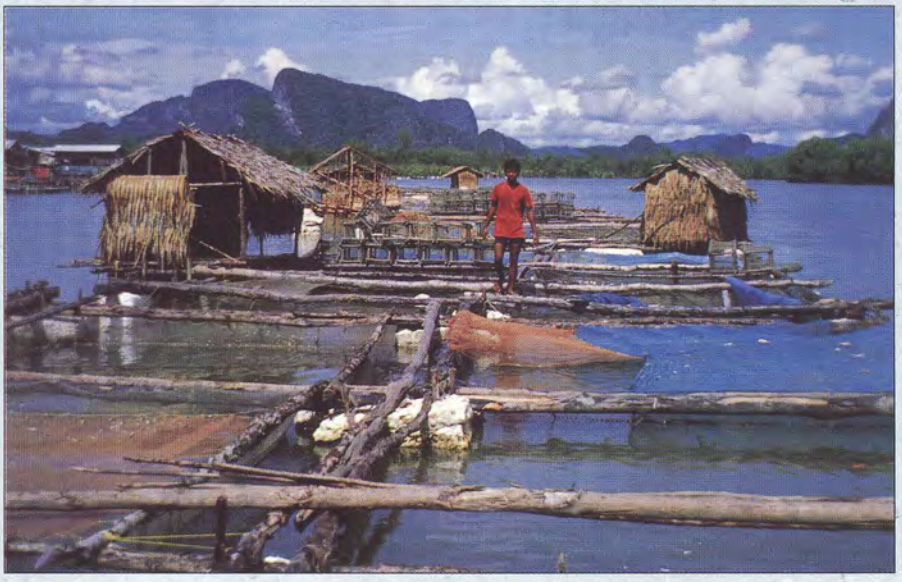


global interaction and stimulate global, regional and national efforts to improve responsible practices and promote sustainability in fisheries and aquaculture.

The superbly brought-out book provides policy-makers, civil society and those who derive their livlihood from the sector a comprehensive, objective and global view of capture fisheries and aquaculture, including associated policy issues. The Report is divided into five parts – World View of Fisheries and Aquaculture, Selected Issues facing Fishers and Aquaculturists, Highlights of Special FAO Studies, Outlook, and Fisheries Activities of Country Groupings. The Report's main text is supplemented by 19 well-compiled text boxes, 16 tables and 44 figures. Here are excerpts from The State of World Fisheries and Aquaculture, the first part of the Report:

Reported global capture fisheries and aquaculture production contracted from a figure of 122 million tonnes in 1997 to 117 million tonnes in 1998. However, production recovered in 1999, for which the preliminary estimate is about 125 million tonnes. The production increase of 20 million tonnes over the last decade was mainly due to aquaculture, as capture fisheries production remained relatively stable.

Cage culture in Phang-Nga bay, Thailand



Overview

For the two decades following 1950, world marine and inland capture fisheries production increased on an average by as much as 6 per cent a year, trebling from 18 million tonnes in 1950 to 56 million tonnes in 1969. During the 1970s and 1980s, the average rate of increase declined to 2 per cent a year, falling to almost zero in the 1990s. The global patterns of fish production owe much to China which reports production in weight that accounts for 32 per cent of the world total. Other major producer countries are Japan, India , the United States of America, the Russian Federation and Indonesia. Outside China, the world's population has been increasing more quickly than total fish production and the per capita fish supply has declined since the mid-1980s. In contrast, China has reported increase in fish production and shows little signs of slowing growth.

Employment in the primary capture fisheries and aquaculture production sectors in 1998 is estimated to have been about 36 million people, comprising about 15 million full-time, 13 million part-time and 8 million occasional workers. For the first time, there is an indication that the growth in employment in the primary sectors of fisheries and aquaculture has ceased.

Capture Fisheries Production and Trend

Total capture fisheries production in 1998 amounted to 86 million tonnes, a noticeable decline from the maximum of about 93 million tonnes recorded in 1996 and 1997, although there was a considerable recovery to an estimated 92 million tonnes in 1999. Although in decline, marine capture fisheries continue to account for more than 90 per cent of the world capture fisheries production. The remainder comes from inland fisheries, which have increased their output by almost 0.5 million tonnes a year since 1994. The Northwest Pacific had the largest reported landings in 1998, followed by the Northeast Atlantic and Western central Pacific. Alaska Pollock from the North Pacific had the highest landings in 1998. Total catches from the Northwest and the Southeast Atlantic are levelling off after reaching their maximum levels a decade or two ago. In the Eastern Central Atlantic and the Northwest Pacific, total catches are increasing again, after a short decline following their maximum production levels of a decade ago.

World fisheries production and utilisation

(million tonnes)

	1994	1995	1996	1997	1998	1999[1]
PRODUCTION						
INLAND						
Capture	6.7	7.2	7.4	7.5	8.0	8.2
Aquaculture	12.1	14.1	16.0	17.6	18.7	19.8
Total inland	**18.8**	**21.4**	**23.4**	**25.1**	**26.7**	28.0
MARINE						
Capture	84.7	84.3	86.0	86.1	78.3	84.1
Aquaculture	8.7	10.5	10.9	11.2	12.1	13.1
Total marine	**93.4**	**94.8**	**96.9**	**97.3**	**90.4**	97.2
Total capture	91.4	91.6	93.5	93.6	86.3	92.3
Total aqaculture	20.8	24.6	26.8	28.8	30.9	32.9
Total world fisheries	**112.3**	**116.1**	**120.3**	**122.4**	**117.2**	**125.2**
UTILISATION						
Human consumption	79.8	86.5	90.7	93.9	93.3	92.6
Reduction to fishmeal and oil	32.5	29.6	29.6	28.5	23.9	30.4
Population *(billons)*	5.6	5.7	5.7	5.8	5.9	6.0
Per capita food fish supply *(kg)*	14.3	15.3	15.8	16.1	15.8	15.4

[1] *Preliminary estimate*

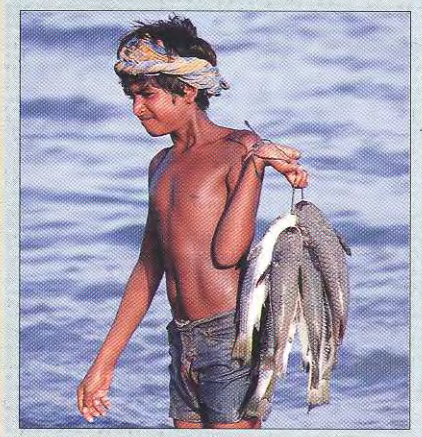
In 1998, production from inland capture fisheries was 8 million tonnes, which represents a 6 per cent increase over 1997 levels. Some 46 per cent of the catch comprises freshwater fish that are not identified by species, while unidentified crustaceans and mollusks contribute 7.6 and 7 per cent respectively to production.

The number of under-exploited and moderately exploited fisheries

Post-harvest handling of fish needs more attention in the Bay of Bengal countries

JANUARY

SUN	MON	TUE	WED	THU	FRI	SAT
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

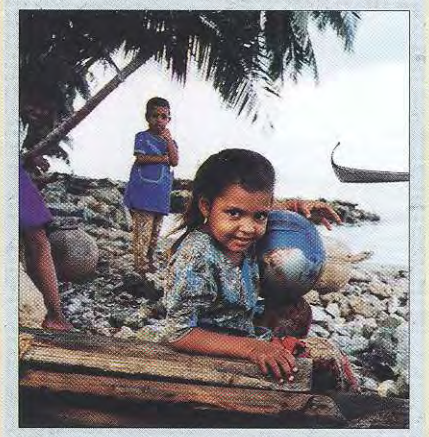


FEBRUARY

SUN	MON	TUE	WED	THU	FRI	SAT
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28		

MAY

SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

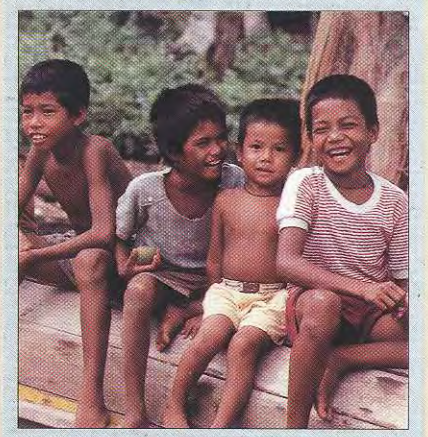


JUNE

SUN	MON	TUE	WED	THU	FRI	SAT
30						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

SEPTEMBER

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					



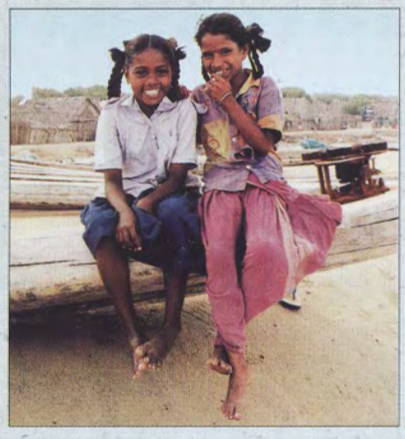
OCTOBER

SUN	MON	TUE	WED	THU	FRI	SAT
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

BOBP Wishes You

MARCH

SUN	MON	TUE	WED	THU	FRI	SAT
31					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30



APRIL

SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

JULY

SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

AUGUST

SUN	MON	TUE	WED	THU	FRI	SAT
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

NOVEMBER

SUN	MON	TUE	WED	THU	FRI	SAT
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

DECEMBER

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

A Happy New Year

resources continues to decline slightly and, as fishing pressure increases, the number of fully exploited stocks remains relatively stable.

Inland aquatic resources continue to be under pressure from loss or degradation of habitat and over-fishing. Freshwater species are reported to be the most threatened group of vertebrates harvested by humans. Rivers, lakes and wetlands account for less than one per cent of the global surface area, but yield at least 8 per cent of the global fisheries production. However, these productive ecosystems are under pressure from the needs of a growing population.

Since the last issue of **The State of the World's Fisheries and Aquaculture** (1998), 1 124 fishing vessels have been added to Lloyd's database of vessels of over 100 tonnes, 548 of which were built during the period 1997-99. Despite the number of vessels built during the two-year period, the USA, Japan and Spain achieved reductions in their national fleets by scrapping and flagging out. The decrease in building since the early 1990s is significant, not only in terms of numbers, but also in terms of average and aggregate tonnage. In the period 1991-93, 2 126 vessels were built, with an aggregate tonnage of 990 000 tonnes. During 1997-99, 1 127 fishing vessels were built with an aggregate tonnage of 418 000 tonnes.

Fishing Technology Development

The impact of fishing on the environment is a global issue of growing concern. Various gear and fishing methods have attracted attention for their potential impact on the environment. Concerns are mostly related to gear selectivity and habitat damage. The major issue being : trawls are non-selective and can take considerable by-catch, which is often discarded. Purse seines can catch mammals and juvenile fish while longlines and gillnets catch sea birds and lost gillnets can continue to catch and kill fish unintentionally.

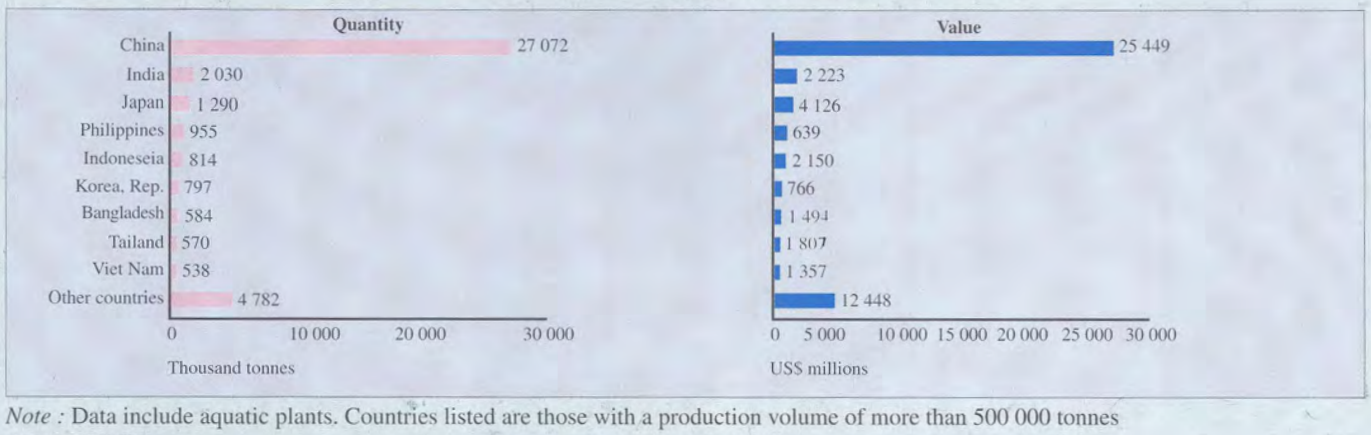
In the last few years, the introduction of satellite communications, which are replacing medium-frequency radios, has had a great impact on skippers' ability to manage all aspects of the fishing operation. The new equipment is controlled by microprocessors including an inbuilt global positioning system (GPS) module.

Fisheries Policy and Management

Most countries have similar management objectives although the emphasis differs between developed and developing nations. Developed countries are usually faced with fully or over-exploited stocks, so their management objective concentrates on stock re-building and capacity reduction, although most countries also have significant aims regarding markets and social conflict. The most urgent objective is to scale fleet sizes so that they become commensurate with sustainable exploitation of the resources. Fisheries management is widely considered to be ineffective because of the poor state of many important fish stocks. The FAO Code of Conduct for Responsible Fisheries is used as a foundation on which to base the fisheries policy and management. Together with the guidelines for its implementation, the Code contains a broad set of principles and methods for developing and managing fisheries and aquaculture. It is widely recognised by government and non-governmental organisations as setting the aims for sustainable fisheries over the next few decades and as a basis for national legislation as well as industry-supported Codes of Conduct.

Improved post-harvest processing is seen as a way of developing the fishing industry without increasing harvests. As well as reducing losses through poor handling, improved processing can raise the value of fish products and establish uses for otherwise discarded catch. Food safety remains important and has become increasingly stringent for exported products. Management of inland fisheries is constrained by the same factors that make accurate data collection difficult; incomplete or inaccurate reporting; and competition for water resources from other sectors

Aquaculture production: major producer countries in 1998



Note : Data include aquatic plants. Countries listed are those with a production volume of more than 500 000 tonnes
Source: FAO

such as agriculture and energy production.

Aquaculture

Most aquaculture has developed in freshwater environments and mainly in Asia. The development of inland aquaculture is seen as an important source of food security in Asia, particularly in land-locked countries. Freshwater aquaculture is dominated by finfish, particularly silver, grass and other carps. Brackish water aquaculture has most frequently been developed for shrimp production, notably the giant tiger prawn, which accounts for the growth in shrimp export markets.

In the Asia region, aquaculture has mainly developed as a rural activity integrated into existing farming systems. All countries in the region have a large unfulfilled potential for growth, although rural aquaculture is far better developed in countries such as India and China. In the Philippines, small-scale holders dominate coastal seaweed and mollusk farming. In Bangladesh, where most fish farmers are relatively poor, there is vast potential for poorest members of society to become new entrant aquaculture farmers. In Nepal, poor fishers are the owner-operators of fish cages, while in the Philippines poor farmers are more likely to be hired to operate such systems and are less likely to be owners. In Indonesia, about 78 per cent of farming households cultivate fish in small ponds of less than 500 sq. m, and aquaculture is the main source of income for 66 per cent of the households that cultivate fish in paddies and ponds. Aquaculture still faces a number of problems. Among these are access to technology and financial resources for the poor, environmental impacts, and diseases.

Fish Utilisation

Since 1994, there has been a tendency to increase the proportion of fisheries production used for direct human consumption rather than for other purposes. Of the products for human consumption, fresh fish showed significant growth during the 1990s, complemented by a decline in the use of canned fish. The total food supply of fish has been growing at a rate of 3.6 per cent per annum since 1961, while the world's population has been expanding at 1.8 per cent per annum. The proteins derived from fish, crustaceans and mollusks account for between 13.8 and 16.5 per cent of the animal protein intake of the human population. Total food supply grew from 27.6 million tonnes in 1961 to more than 93 million tonnes at the end of the twentieth century. Average apparent per capita consumption increased from about 9 kg per annum in the early 1960s to 16 kg in 1997.

Fish marketing–innovative strategies needed

Utilisation of world fisheries production (breakdown by percentage), 1989-1998

Fish Trade

Fish is traded widely – mostly as a frozen food, and increasingly less as a canned or heavily dried food. Its trade has been stimulated by the economic conditions prevailing in most consumer markets and by notions about the health benefits of seafood consumption. Over the last two years, the consumption of fish and fishery products has been strongly influenced by the economic crisis in the Asian countries, in particular Japan. On the other hand, the United States economy has been particularly strong, and consumption of fish continues to increase in that country. The United States and EU markets for fishery products are expected to expand in the coming years. Among the factors that could influence future demand for seafood products are population growth; changes in economic and social conditions (such as lifestyle and family structure); developments in fish production, processing, distribution and marketing strategies; and the prices of fish compared with those of competing foodstuff.

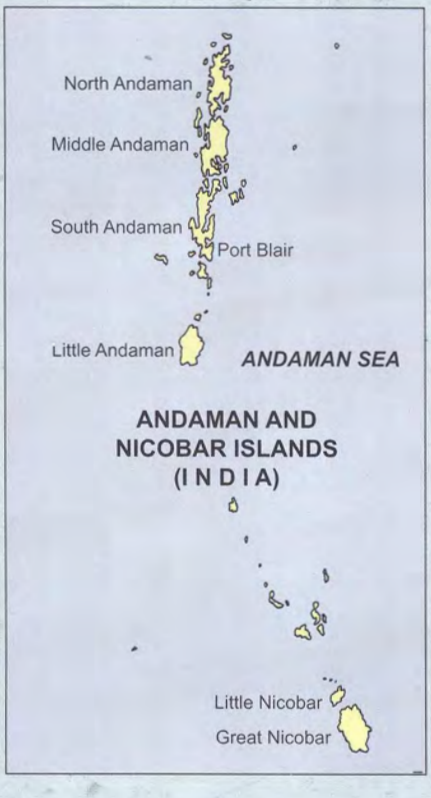
Andaman and Nicobar Islands – untapped fishery resources

by S K Ghosh*

The Island's innumerable creeks, bays and backwaters harbouring nature's most productive mangrove and coral eco-system offer a rich and diverse marine fish stock. Most of the marine catches come from near- shore waters, using traditional fishing craft and gear.

The Andaman and Nicobar group of Islands are located in the Bay of Bengal, between 6^0 45/ and 13^0 41/ North latitude and 92^0 12/ and 93^0 57/ East longitude, stretching to a length of 700 km with a maximum width of 58 km. There are about 572 islands, islets, reefs and exposed rocks forming a part of the broken chain of islands extending from Myanmar in the west to the Indonesian group of islands in the east. The northern-most island in the chain, Landfall Island, is 900 km from the mouth of the Hoogly river; the southern tip is Indira Point or Pigmalion Point, 150 km from Sumatra in Indonesia.

The Island's population density is 34 people per km^2. The total population of the Island is 0.281 million, of which 27 000 are tribal and the rest settlers from the mainland. Of the six tribes in the Islands, the Nicobarese and Shompens are of Mongoloid origin while the Onges, Great Andamanese, Jarawas and Sentinalese are of Negroid origin. The total population of fishermen in the Island is 11 000, accounting for 4 per cent of the total population.



Fishing can be the mainstay of the Island's economy

Fishery Resources

The Andaman and Nicobar Islands account for 24 per cent of the country's coastline, 7 per cent of the continental shelf, 30 per cent of the Exclusive Economic Zone (EEZ) and 6.24 per cent of the marine fish stock of India.

The Islands have barrier reefs and a few atolls as well as lagoons. Innumerable creeks, bays and backwaters harbouring nature's most productive mangrove and coral eco-system offer a rich and diverse marine fish stock. The uneven and rocky nature of the ocean floor and the narrow shelf area, however, imposes restrictions on trawling.

The fresh water fishery resources and inland fisheries in the Island are limited. The swamps, mud flats, low lying areas near the coastline, useful for brackish water aquaculture, measure about 618 hectares. Marine fishing regulations stipulate that the inshore area up to 10 km from the shore be earmarked for the exclusive operation of traditional and artisanal fishermen, that mechanised fishing boats up to 20 metres overall length

* *General Manager, National Agricultural Bank for Rural Development, Kolkata.*

Marine fishery resources of the Andaman and Nicobar Islands

Type of resource	Fish group	Potential (t)	Present yield (t)	Exploitation %
Inshore fishery	Pelagic fishery	1 30 000	13 200	10
Inshore fishery	Demersal	22 500	13 000	57.77
Offshore fishery	Deep sea / Oceanic	92 000	473	0.51
Total		**2 44 500**	**26 673**	**10.9**

Resource profile of the Andamans in relation to the mainland

	A&N Islands	India	Share (%)
Geographical area (km^2)	8 249	3 300 000	0.25
Coastline (km)	1 912	8 041	23.77
Shelf area (km^2)	34 965	500 000	6.99
EEZ (km^2)	600 000	2 020 000	29.70
Marine fishery stock (million tonnes)	0.2435	3.934	6.19

(OAL) be allowed to fish beyond a distance of 10 km from the coast, up to a distance of 23 km, and that only larger mechanised fishing vessels of 20 m OAL and above may operate beyond a distance of 23 km from the coast.

The marine fisheries resources of the Andaman and Nicobar Islands are estimated to be around 0.244 million tonnes, which is 6.2 per cent of the estimated marine fishery potential of India. The marine fish landing is about 27 000 tonnes a year, accounting for 11 per cent of the potential. The composition of tuna and tuna-like fish amount to 0.182 million tonnes, about 74.6 per cent of the total potential. Tuna fishery is the single largest untapped marine fishery resource of the Islands.

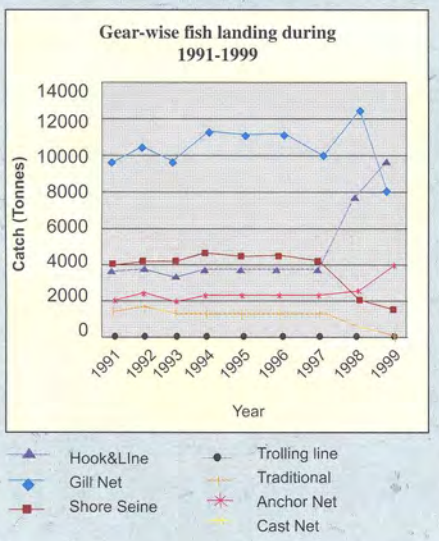
Most of the marine catches come from near-shore waters, using diverse fishing craft and gear. Both pelagic and demersal stock remain under-exploited. In the inshore areas, stocks of anchovies and carangids are largely exploited beyond the optimum stock level and this needs to be reduced to ensure long-term sustainability. The least exploited stock is that of coastal tuna. In demersal stock, against the gross potential of 22 500 tonnes, landings accounted for 6 500 tonnes, just 29 per cent.

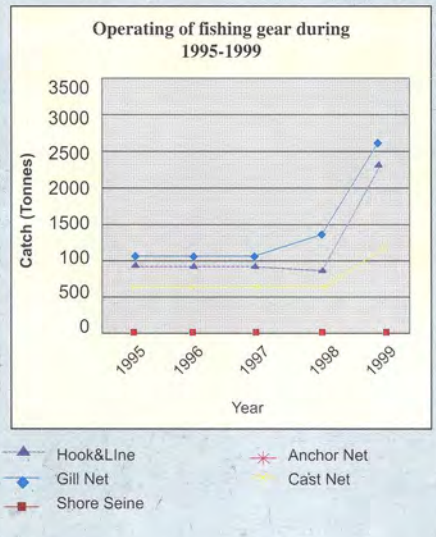
Two types of fishing craft operate in the Islands – the plank-built boat ranging in size from 25 ft to 35 ft, with or without inboard engines, and the dug-out canoe measuring between 10 ft and 22 ft. The fishing season is spread over nine months excluding the monsoon months of June-August. The boats fitted with inboard engines are reported to land about 150 to 200 kg a trip while the catch from dug-out canoes make up for 20-30 kg a day. There are 247 motorised boats and 1 262 country craft which operate in the inshore areas of the Islands.

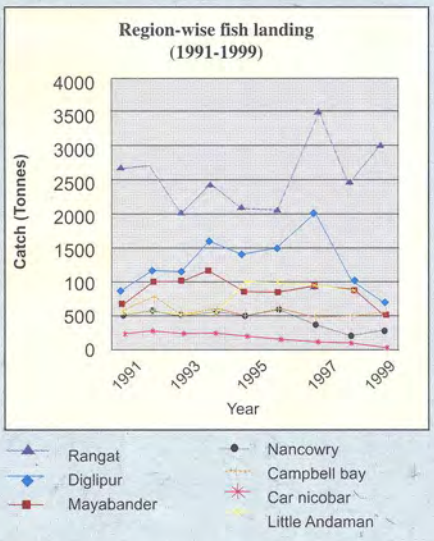
The main fishing gear used are gill net, hook and line, cast net, shore-seine and anchor net. The total number of fishing gear in use during 1998-99 was 2 732, including 1 038 gill nets, 801 hooks and lines, 615 cast nets, six shore seines and two anchor nets.

Offshore and Deep-sea Fishery

The offshore and deep-sea fishery resource is estimated to be between 82 000 and 94 000 tonnes by the Fishery Survey of India. Apart from tuna, other species like oceanic shark, cephalopod (squid), lobster and prawn also offer scope for exploitation. Exploratory surveys have revealed the presence of deep-sea lobster, whip lobster and spear lobster in the Islands' waters.







The traditional craft needs modification to operate in the deeper waters of the continental shelf. The non-mechanised boats need to be slowly phased out and motorised or sail boats of larger size introduced. The mesh size of the gill net needs alteration and hooks and lines should be operational in deep waters. Deep-water hand lining and fish and lobster trap made of natural wood can be introduced for increasing catch in reefy or rocky areas.

The Fishery Survey of India has indicated the abundance of yellow fin tuna in the deep seas around the Islands, with average hooking rates as high as 3.5 per cent. The average catch per 1 000 hooks has been around 300 kg, which is comparable to other regions of India's EEZ. Purse seining has not been in vogue due to non-availability of suitable vessels and facilities like scouting, locating and encircling the shoals.

Deep-sea fishing projects being capital intensive, private sector investment needs to be attracted through the creation of a proper investment climate involving soft loan, foreign equity participation, permission to directly export from the Island and creation of necessary infrastructure in terms of harbour facilities and processing.

Infrastructure Requirement

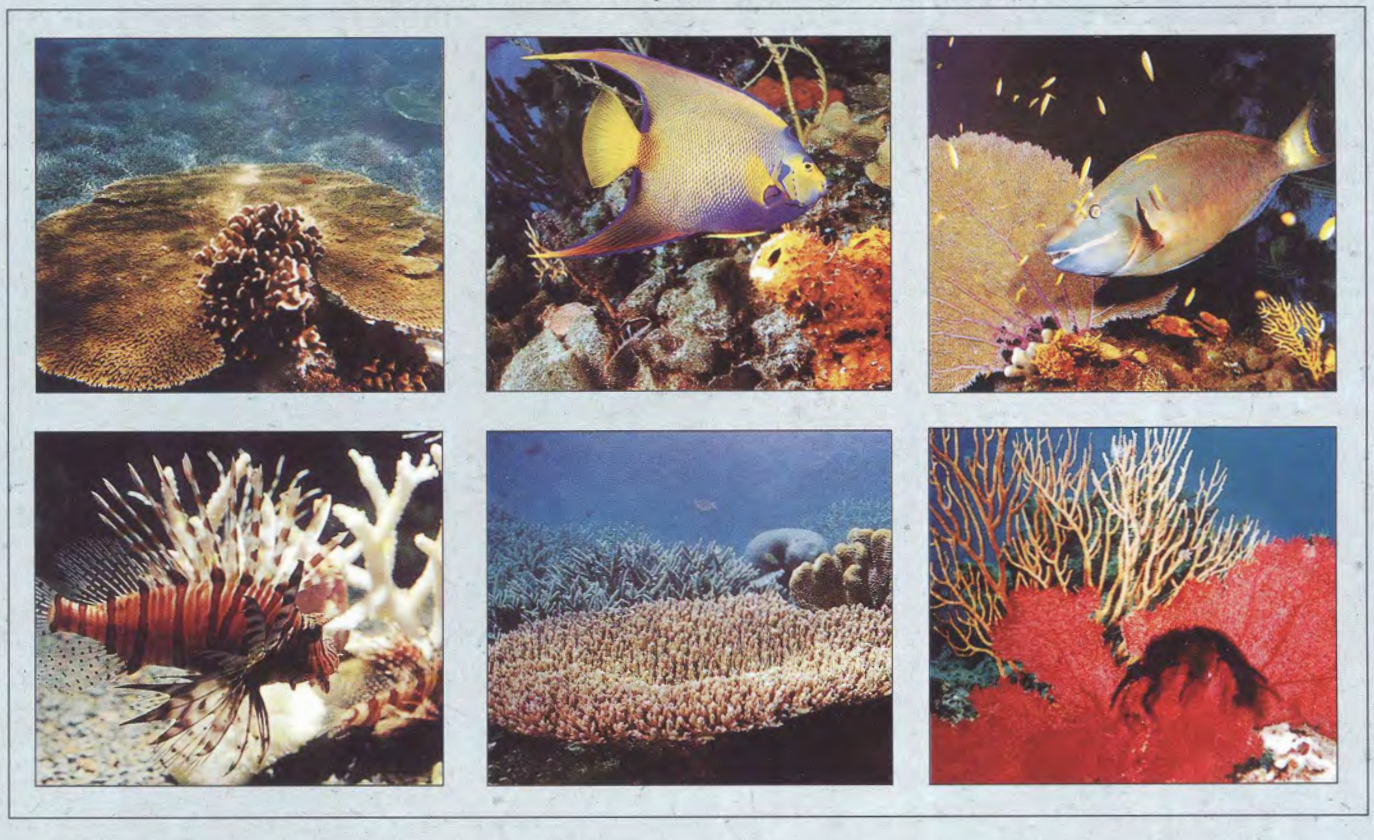
Marine fisheries have failed to develop in the Islands because of the lack of necessary infrastructure, poorly developed shore-based facilities for landing, berthing, bunkering and supplies, inadequate processing and cold storage facilities, and poor marketing.

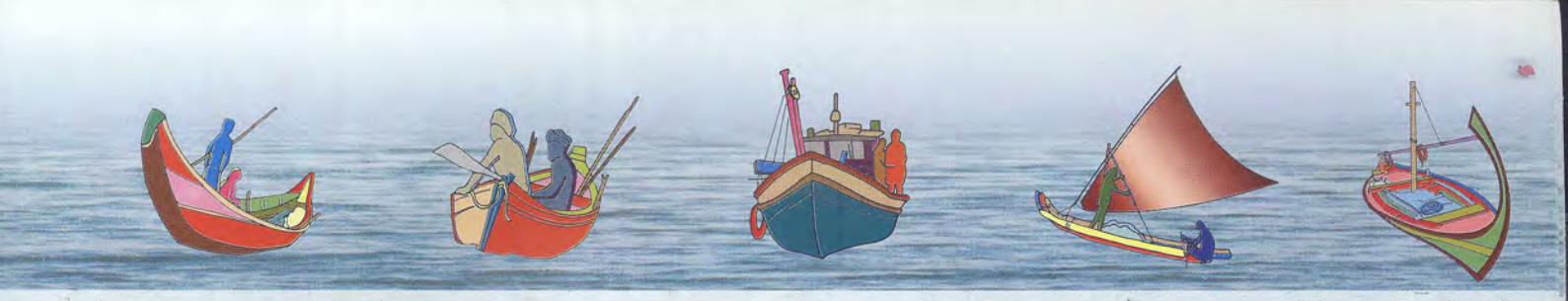
There are 54 fish landing centres in the Andaman and Nicobar islands. Two fishing harbours, one at Campbell Bay and the other at Phoenix Bay, are capable of accommodating 125 medium-to-large vessels and 70 small-to-medium size vessels. The harbour at Phoenix Bay is presently used for inter-island transport with one jetty allocated for fishing vessels. The reason is stated to be lack of fishing vessels operating from this base. An example where infrastructure creation has not gone hand in hand with the solution to marketing problems.

An adequate number of ice plants and cold storage facilities and freezers installed at strategic centres are needed if export is to be successful. Fish drying can be an effective processing mechanism for those remote areas in the Islands lacking necessary infrastructure. In fact, about 30 per cent of the fish caught is converted to dried fish by sun drying on the open beach. The quality of dried fish, however, leaves much to be desired. The problems relate to short shelf life, high sand content, low salt level, use of impure salt, high moisture content and insect infestation during processing and storage.

The Fisheries Department of the Island Administration is considering erection

Andaman and Nicobar Islands - pristine resources and rich biodiversity





of drying platforms at 10 select landing centres, installation of solar dryers and drying tents at 30 landing centres, and a tunnel dryer at Port Blair. Other facilities which need to be developed for the production of quality-dried fish include: making available sufficient quantity of pure salt for curing, proper curing yards with curing tanks, running water, drying platform etc, proper packaging material for bulk packaging of dried fish and rodent proof storage for dried fish. With low cost inputs, large-scale production of quality-dried fish in the traditional sector may be a possibility.

With increase in fish landing, disposal of surplus catch is difficult in the Islands; it is also not possible to transport fish to the mainland as it involves a journey by ship of three or four days. Also, the ships sail only twice or three times a month to the mainland and the frequency is uncertain during the monsoon months. The fishermen, therefore, do not venture into commercial fishing and fish only for their livelihood.

The Islands have a variety of fish which have the potential for export - high-value fish including red snapper, white snapper, grouper, tuna, shrimp, lobster, crab and squid and cuttle fish; and low value fish that can be processed for export mainly in the form of dried fish or fish meal.

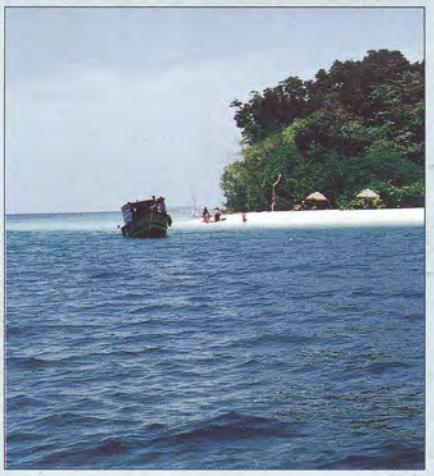
The Andaman and Nicobar coastline is fringed with numerous bays and inlets. They are also surrounded by a vast expanse of oceanic water with varying depth and substrata. Mullet, milkfish, sand whiting, rabbit fish, snapper, grouper and sea bass are present in these waters. While most of the species contribute to the local market, sea bass, grouper, snapper and rabbit fish offer excellent live fish export trade.

About six species of rock lobster and a sand lobster species are available in the Andaman waters. The juveniles of the green lobster are present in inshore waters too. The juveniles can be collected and fattened in an onshore facility.

Ornamental Fishery

The coral reefs of the Andaman and Nicobar Islands harbour plenty of colourful fish, offering excellent potential for export trade in ornamental fishes. The waters offer 200 varieties of marine ornamental fishes, of which 50 varieties enjoy excellent export demand. The anemone fish is the most popular ornamental fish in the world because of its tiny size, hardiness, attractive colour, peaceful nature, adaptability to live in captivity, acceptability of artificial diet, and fascinating display behaviour. The clown fish or anemone fish have a high demand in the aquarium trade.

Sustainable development of Marine Fisheries will need a comprehensive policy



Molluscan Fishery

The Islands are traditionally known for their shell wealth. The earliest recorded commercial exploitation began in 1929. Shells like turbo, trochus and nautilus are used as novelties and support many cottage industries producing a wide range of decorative pieces and ornaments. Shells like the giant clam, green mussel and oyster support the edible shell fishery, while a few like scallop, clam and cockle are burnt in kilns to produce edible lime. The commercial gastropods like trochus and turbo have been over-exploited and sea ranching is therefore necessary, either through hatchery breeding or transplantation of juveniles to depleted areas.

There are three or four species of edible oysters in the Andaman waters. The young ones are collected using spat collectors and they are grown in racks or box cages. Similarly, green mussels are also collected and cultured in suspended ropes. The black-lip pearl oyster is predominant in these islands. The pearl culture technique for this species as well as another species is yet to be developed in India. The sea cucumbers and some sea urchins which are present in the Islands' waters are cultivable. *Beche-de-mer* is the export product prepared from sea cucumbers.

The untapped fishery resources of the Andaman and Nicobar Islands have to be optimally exploited, especially tuna and other deep-sea fisheries. There is considerable potential for setting up shrimp hatcheries because of excellent water quality and availability of brood stock in the region. Similarly, coastal resources can be made available for aquaculture after a detailed study on the production potential and marketing of the product. Standardisation of hatchery technology of marine ornamental species could open up the prospect of yet another export-oriented industry. And considering the importance of coral reefs as a promoter of tourism and the economy of the Islands, it is necessary to explore the status of these ecosystems and their conservation needs.

The sustainable utilisation of the Andaman and Nicobar Island's marine potential will necessitate a comprehensive policy, which *inter alia* will address the optimum size of the resource-specific fishing fleet, creation of proper investment climate, post-harvest infrastructure and marketing opportunities.

Fisheries profile of the Bay of Bengal: A fact sheet on Thailand

The Gulf of Thailand and the Andaman Sea are the main fishing areas in Thailand. Marine fisheries contribute 77 per cent to the total fish production and is also the major source of foreign exchange earnings for the country.

Until 1939, Thailand was known as the Kingdom of Siam. A fertile nation, agriculture has flourished on the central plain and Thailand is one of the largest exporters of rice in the world. Forests cover some 60 per cent of the country, producing teak and rubber in the north, and yang, the most used commercial timber, in the south. Although not traditionally ranked with South Korea, Taiwan and Singapore as one of the economic 'tigers' of Asia, Thailand's industrial performance forged ahead at an increasing pace throughout the 1980s. The economic and social development of the country gained momentum after the establishment of the Government's first National Economic and Social Development Plan in 1961. Economic development has accelerated, especially during the past decade.

Fishery Resources

Thailand is a peninsular country with a total land area of approximately 514 000 sq. km. The country is flanked by mountain ranges in the west and northwest. Four major rivers, *viz.* The *Chao Phraya,* the *Tha Chin,* the *Mea Klong* and the *Bang Pakong* drain a large amount of water into the Gulf of Thailand annually. This has greatly influenced the biodiversity and the richness of the marine resources in the Gulf.

Marine fishery is operated in two main fishing areas: the Gulf of Thailand (FAO Statistical Area 71) and the Andaman Sea off the west coast of peninsular Thailand (FAO Statistical Area 57). On the Gulf of Thailand side, the country has a 1 875 km long coastline stretching from the border between Thailand and Cambodia in the southeast to the border between Thailand and Malaysia in the south. The Gulf of Thailand, a semi-enclosed sea, covers an area of about 378 000 sq. km. Since it is part of the Sunda

continental shelf in the South China Sea, the Gulf is rather shallow, with an average depth of about 50 metres. The Andaman Sea is deeper than the Gulf, with an area of about 126 000 sq. km. It has the general features of oceanic waters. The length of the coastline on the Andaman Sea side of peninsular Thailand is 740 km.

The salinity and turbidity of the Gulf are influenced by the two monsoons. Similarly, the surface current is generally influenced by the monsoons, being clockwise during the southwest monsoon and counter clockwise during the northeast monsoon.

The 1995 Marine Fishery Census revealed that the total number of fishing households in the country was 80 704, comprising 401 812 fishermen, out of whom 62.2 per cent (50 176 households or 249 818 fishermen) was exclusively engaged in marine capture fisheries, 34.2 per cent (27 592 households or 137 376 fishermen) exclusively in coastal aquaculture and 3.6 per cent (2 936 households or 14 618 fishermen) in both activities. The highest percentage of households engaged only in marine capture fisheries was found along the Andaman Coast - about 16 846 households (31.7 per cent), followed by southern part of the Gulf - about 16 802 (31.6 per cent).

Fishing vessels in Thailand are conventionally designed and constructed, based on experiences passed on from generation to generation. Nonetheless, there are also fishing vessels that are designed and built using modern technology. Most of these are deep-sea fishing vessels, while the coastal vessels continue to be traditionally built. The fisheries laws and regulations do not allow all kinds of trawlers and push nets to operate within the prohibited area of a distance of 3 km from the shore line.

The number of fishing boats distributed along the coast of Thailand, both in the Gulf and on the Andaman Coast, total 54 538 (1995 Marine Fishery Census) with approximately 70 per cent fishing in the Gulf. While the small-medium-sized fishing boats of less than 50 GT have decreased in numbers, the fleet of larger vessels of more than 50 GT has expended during the last decade.

The profile of the artisanal and small-scale fishing fleet in Thailand includes the following:

- 2 826 unpowered boats principally using lift nets and crab traps;
- 36 430 outboard powered boats using various gear types including shrimp, finfish, and crab gill nets, traps, and longlines;
- 6 925 inboard powered boats of less than 10 GT using otter trawls, push nets, gill nets and traps;
- 6 550 inboard powered boats of 1 049 GT using otter trawls or pair trawls; and
- 1 807 inboard powered boats of 50 GT and over using both trawls and Thai purse seines.

Coastal areas offer high prospects for cage farming

As in the other countries of South and South-east Asia, marine fishery in Thailand is a multi-gear, multi-species industry conducted by a large number of small-scale fisherfolk. Fishing methods used in the Thai waters are diverse and vary from trawl nets, gill nets and traps to set bag nets and push nets. They comprise 7 226 trawl nets, 1 288 surrounding nets, 25 946 gill nets, 6 375 traps, 2 202 lift nets, 2 624 falling nets 3 591 push nets, and 5 286 other small-scale and artisanal fishing gear, including beach seine, clam dredge, bamboo stake trap, set bag net, hook and line and others.

Fish Production

During the last three decades, the demand for marine products has rapidly increased due to economic and population growth. Prior to 1960, fishing in Thailand consisted virtually of small-scale fisheries, but after a great expansion in marine fisheries in 1960 and with the use of the otter board trawl, the number of fishing boats increased substantially. The size and catch capacity also increased and the result has been over-exploitation of the marine resources.

The artisanal and small-scale fisheries in Thailand operate under an open access management regime. The

Fish production in Thailand during 1990, 1998 and 1999 *

Source	1990	1998	1999	Average annual growth rate 1990- 1999 (%)
Marine capture	2 362 777	2 708 992	2 778 390	1.8
Inland waters	135 457	199 328	226 510	5.9
Freshwater aquaculture	97 659	240 001	256 417	11.3
Brackishwater aqauculture	120 960	261 544	238 140	7.8
Mariculture	73 100	106 128	108 250	4.5
Total	**2 789 953**	**3 507 993**	**3 607 707**	**2.9**

* *Technical Document, ASEAN – SEAFDEC Conference on Sustainable Fisheries for Food Security in the New Millenium, 19- 24 November 2001, Bangkok, Thailand*

marine fisheries of Thailand dominate in the coastal areas (about 378 000 sq. km) in the Gulf of Thailand and the Andaman Coast and the majority (90 per cent) of fishing households comprise of small-scale fishermen.

The total fish production in Thailand during 1999 was estimated at 3.61 million metric tonnes, of which the marine capture contributed 77.01 per cent, inland open waters 6.28 per cent, freshwater aquaculture 7.11 per cent, brackish water aquaculture 6.60 per cent and mariculture 3.0 per cent. Fish production during the period 1990-1999 has grown at a rate of 2.9 per cent. In 1999, the estimated per capita food fish supply in Thailand was 19.2 kg per annum.

Export

Thailand is the top fish exporting nation in the world (in value terms) and accounts for over half of the total value of ASEAN fish exporters. The main trading partners are Japan, the United States, Western Europe and other Asian countries including ASEAN neighbours. Thailand is the second biggest canned tuna producer after the USA. Thailand also imports significant volumes of fish. The imports are mainly of tuna, both for local consumption and for processing and re- export.

Fisheries Management

The fisheries policy in Thailand has evolved over the past three decades to reflect changing circumstances of resource abundance. Under the first three National Economic and Social Development Plans, the fisheries policy focused on increasing production particularly through the exploitation of demersal resources in the Gulf of Thailand. The Fourth Plan for the period from 1977 to 1981 maintained production and foreign exchange earning objectives, but for the first time introduced the concept of " conservation of marine resources and habitat." By 1990, over-fishing became evident with rapidly declining catch rates in the Gulf of Thailand. Policy objectives now focus on strategies to reinforce fisheries management and conservation and for the 8th National Economic and Social Development Plan (1997-2001), the National Fisheries Policy Committee has established the following objectives:

- ***In the Thai internal waters and EEZ:*** To endeavour to attain fisheries sustainability by maintaining at least 1.58 million mt of marine fishery production per year during the current Plan, with the rehabilitation of the fishery resources and environment; and reduction of by-catch and low value catch by about 100 000 mt per year.
- ***Outside the Thai waters:*** To implement regulations governing the conduct of Thai fleets in compliance with fishing or joint venture agreements with other coastal States. The target is to make available approximately 3 500 fishing vessels of more than 18 metres in length for fishing operations and to harvest at least 1.8 million mt annually outside the Thai waters.
- ***Aquaculture development:*** To accelerate coastal aquaculture development with diversification of cultivable species; and prevention and control of environmental degradation due to aquaculture development.
- ***Post-harvest Management:*** To improve the quality assurance and control of the Thai fish and fishery products to enable them to compete in foreign markets; and resolution of fish marketing and export problems. The target is to produce for export at least one million mt per year.

The baseline law governing Fisheries in Thailand is the Fisheries Act of 1947 which provides for the establishment of resource management instruments governing marine capture fisheries. In 2000, a Working Group on the Draft Fisheries Law was convened and the work is now complete and the revised law is to be forwarded for enactment by the government.

Fishing community organisations have been set up in every province along Thailand's coastline. Most of these community organisations facilitate exchange of information, solving of problems and coordination with the government. Another objective is to enhance the livelihood of fishermen and their families. The Small- scale Fishermen Federation, comprising mostly of small-scale fishermen in the southern coastal areas of Thailand, was established with the aim of protecting the coastal resources and is doing remarkable work.

Thailand - increasing pressure from the small- scale fishing fleet

Fisheries profile of the Bay of Bengal: A fact sheet on India

In India, the Bay of Bengal accounts for about 32 per cent of the total marine catch and offers considerable scope for harvesting of commercial fin and shellfish species from the offshore waters of the Bay.

India is the second most populous country in the world (after China), seventh largest in land area, and the biggest democracy. Economically, the vast nation has made great improvements, particularly in the 'Green Revolution' of agriculture and the burgeoning new technologies. Bordering Bangladesh, Bhutan, China, Myanmar, Nepal, and Pakistan, India has 29 states, 7 Union Territories and a multi-ethnic population that speaks about 1 600 languages and dialects, though only 15 are major languages.

The fisheries sector occupies a very important place in the socio-economic development of India. The sector has been recognised as a powerful income and employment generator as it stimulates the growth of a number of subsidiary industries and is a source of cheap and nutritious food. More than 6 million fishermen and fish farmers in the country depend on fisheries and aquaculture for their livelihood. The fisheries sector has also been one of the major contributors of foreign exchange earnings through export. The fisheries sector contributed Rs 222 230 million to the Gross Domestic Product (GDP) during 1998-1989, which is 1.4 per cent of the total GDP.

The country has a long coastline of 8 118 km and an equally large area under estuaries, backwaters, lagoons; highly amenable for developing capture as well as culture fisheries. After declaration of the Exclusive Economic Zone (EEZ) in 1977, the area available to India was estimated at 2.02 million sq. km, comprising 0.86 million sq. km on the west coast, 0.56 million sq. km on the east coast and 0.60 million sq. km. around the Andaman and Nicobar Islands.

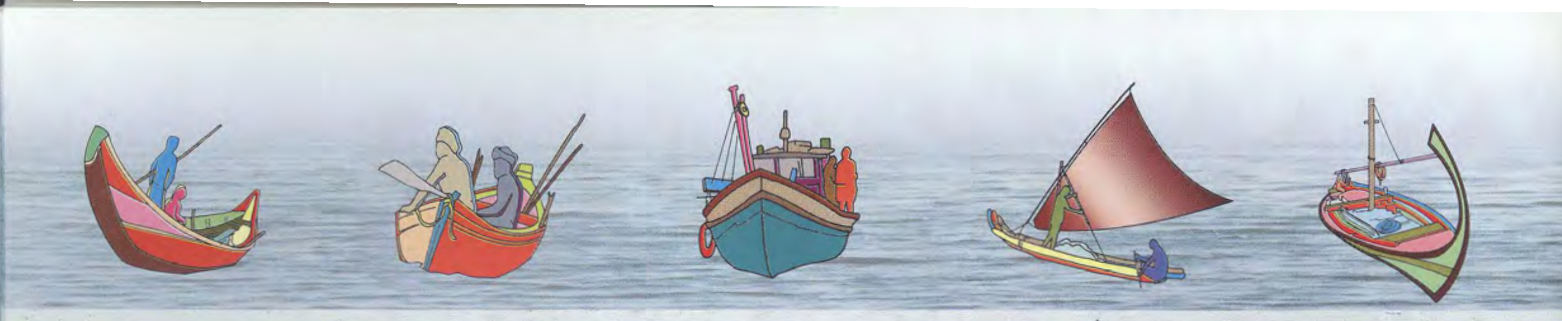
Fishery Resources

The harvestable potential of marine fishery resources in the Indian EEZ has been estimated at about 3.921[1] million tonnes (mt). An estimation of the depth-wise potential shows that about 58 per cent of the resources are available in 0-50 metre depth, 35 per cent in 50-200 metre depth and 7 per cent in depths beyond 200 metres.

The marine fishing fleet[2] comprises about 0.281 million traditional craft (including about 44 578 motorised traditional craft), 53 684 mechanised craft and about 170 large fishing vessels of 21 metre overall length (OAL) and more. Out of 170 large fishing vessels, about 80 are presently active. The main marine fish production comes from the traditional and small-scale fishing vessels operating in the areas up to about 90 - 100 m depth.

Fish Production

In India, while inshore waters have been almost exploited to the sustainable levels, contribution from the deep-sea has been insignificant. The current (1999-2000) annual fish production has been estimated at 5.66 mt — 2.834 mt from the marine sector against a potential of 3.934 mt, and 2.823 mt from the inland sector against a potential of 4.5 mt.



Summary of marine fishery resources potential in the Indian Exclusive Economic Zone

(million tonnes)

Depth Zone/Resources	0-50 m	50-200 m	200-500 m	Oceanic	Total
Demersal	1.280	0.625	0.028	-	1.933
Pelagic	1.000	0.742	-	-	1.742
Oceanic	-	-	-	0.246	0.246
Total	**2.280 (58%)**	**1.367 (35%)**	**0.028 (0.7%)**	**0.246 (6.3%)**	**3.921**

The growth in marine fisheries production over recent years has been rather slow (an average of 2.19 per cent during the period 1991-1992 to 1999-2000) as compared to inland fisheries (average of 6.55 per cent during the corresponding period). Of the total marine production, about 31.5 per cent comes from the east coast (Bay of Bengal) and 68.5 per cent from the west coast. The west coast states of Gujarat and Kerala land the maximum marine catch. Of the east coast states, Tamil Nadu lands the maximum catch followed by West Bengal.

The major pelagic resources identified for exploitation are coastal tuna, carangid, ribbon fish, mackerel and pelagic shark; and yellow fin tuna and skipjack tuna in the EEZ. Among species-wise average annual marine fish landing, sciaenids (croakers) account for the largest – 295 233 tonnes (10.61 per cent), followed by Indian mackerel (218 910 tonnes), other marine fishes (233 554 tonnes), *harpodon nehereus* (175 110 tonnes), and sardinella or Indian oil sardine (157 997 tonnes).

Penaeid shrimps, which dominate the export front, are at their optimum exploitation levels, whereas tuna and cephalopods are the two least exploited

Small- scale sector dominates the Indian marine fisheries

Fish production during 1991- 1992 to 1999- 2000

(million tonnes)

Year	Marine	Inland	Total
1991-92	2.447	1.710	4.157
1992-93	2.576	1.789	4.157
1993-94	2.649	1.995	4.644
1994-95	2.692	2.097	4.789
1995-96	2.707	2.242	4.949
1996-97	2.967	2.381	5.348
1997-98	2.950	2.438	5.388
1998-99	2.700	2.566	5.262
1999-2000	2.834	2.823	5.657

Source: Department of Animal Husbandry & Dairying, Ministry of Agriculture, Government of India

fisheries owing to limited operational range of the majority of the present fishing fleets and also the lack of suitable technology. Several other species in the continental shelf are exploited only up to 90 - 100 m depths.

Presently, about 25 per cent of the marine fish production in the country is by the artisanal sector and 74 per cent from the small mechanised boats. Only about one per cent is from the deep-sea fishing vessels now in operation. Fish production has increased over the years with the motorisation of traditional craft and introduction of mechanised boats, as well as by the diversification of fishing effort by the small-scale sector beyond 50- metres depth.

Export

The export of marine fish and fish products in terms of value registered a level of Rs. 51 167 million[3] in 1999-2000 against Rs. 17 674.3 million during 1992-1993. Though shrimp (including farmed) accounted for about 28 per cent in terms of volume and about 66 per cent in terms of value of export during the period, there has been diversification and the country is now exporting frozen squid, cuttle fish/ fillets, etc. in large quantities. Japan continues to be the single largest market, accounting for about 46 per cent of the total value realisation although the exports now go to more than 70 countries. South-East Asian countries have emerged as the second largest market in recent years realising about 21 per cent of the value. Imports, so far, are negligible.

Fisheries Management

India faces considerable difficulty in the development and management of its marine fishery resources for a

[1] *The potential has been revalidated to 3.934 million tonnes in 2000.*

[2] *Source: Department of Animal Husbandry & Dairying, Ministry of Agriculture, Government of India*

[3] *1 US $ = INR 47.00 approximately*

Fishing craft in India (1999)

States/ Union Territories	Traditional crafts	Motorised traditional crafts	Mechanised crafts	Total
Gujarat	9 222	5 391	11 372	25 985
Maharashtra	10 256	286	8 899	19 441
Karnataka	19 292	3 452	2 866	25 610
Goa	1 094	1 100	1 092	3 286
Kerala	28 456	17 362	4 206	50 024
Tamil Nadu*	33 945	8 592	9 896	52 433
Andhra Pradesh*	53 853	4 164	8 642	66 659
Orissa*	10 993	2 640	1 276	15 854
West Bengal*	4 850	270	3 362	8 482
Lakshadweep	594	306	478	1 378
A & N Islands*	1 180	160	230	1 570
Pondicherry*	7 297	505	560	8 362
Daman & Diu	252	350	805	1 407
Total	**181 284**	**44 578**	**53 684**	**280 491#**

** East coast States/ Union Territories*
 # Total includes 810 FRP catamarans and 135 beach landing crafts

number of reasons. The Indian sub-continent covers a vast region with long coastlines and different ecosystems, both on land and in the sea. The fishery resources are diverse, and the artisanal and small-scale fishermen operate from thousands of landing places dispersed along the coast and live within socially and culturally disparate communities which are an unrivalled mosaic of the cultural and ethnic fabric. Responsibilities and programmes for fisheries management and development are split between the Union Government and State/ Union Territory Governments, which differ in their policies, programmes and approaches.

The open access nature of marine capture fisheries in India is one of the major reasons for depletion, economic waste and conflict among user groups. Without adequate control over access, these consequences will become increasingly severe and further impede the sustainable management of fishery resources. With an open access regime, no catch limits have been set on effort or the catch. The existing regulatory policies restrict the fishing season, fishing areas and the mesh size of gear. However, there is no monitoring and surveillance system available with the concerned implementing organisations.

Motorisation has enabled the traditional fishermen to go deeper into the sea

The development of the deep-sea fishery industry is of concern to the entire marine fishery sector because it will have considerable impact on the management of near-shore fisheries, shore-based infrastructure utilisation and post-harvest activities, both for domestic marketing and export. To avoid over-capitalisation and to ensure a cautious growth of the infrastructure as well as the investments, the country is adopting a rationalised approach in determining the number and size of fishing vessels, their resource-specific gear and operational equipment and availability of technology, either indigenously or through foreign collaborations.

The growth rate in total fish production has been around 4.12 per cent per annum during the 1990s. The inland sector has witnessed a much higher growth rate of 6.55 per cent as against 2.19 per cent in the marine sector during the corresponding period. Keeping in view the slow growth rate achieved in the marine sector and stagnation in the near-shore waters, a growth rate of 2.5 per cent has been proposed during the Tenth Five- Year Plan (2002 – 2007). In view of the immense potential and prospects of inland open water fisheries and aquaculture development, a growth rate of 8 per cent has been proposed for this sector during the Tenth Plan. With the proposed growth rate of 2.5 per cent and 8 per cent in the marine and inland sectors respectively, it is estimated that a total fish production of 8.09 million tonnes (3.26 million tonnes from the marine sector and 4.83 million tonnes from the inland sector) would be achieved at the end of the Tenth Plan.

Concise version of the Code of Conduct for Responsible Fisheries, now in the vernacular

In an effort to make the Code of Conduct for Responsible Fisheries (CCRF) further comprehensible to a large section of the fishing community, the Bay of Bengal Programme (BOBP) recently had the concise version of the Code translated into the vernacular – in Bengali, Hindi, Telugu, Tamil and Marathi. Similar translations into Sinhalese and Thai languages are also in progress. The concise version in English titled, "What is the Code of Conduct for Responsible Fisheries?" was brought out by the FAO, Rome, earlier this year. The English and translated versions explain in simple language what the implication of the Code is for various fishery disciplines and their practitioners.

The Code describes how fisheries should be managed responsibly and how fishing operations should be conducted. It addresses the development of aquaculture, linking of fisheries with other coastal zone activities and the processing and selling of catch. The Code advocates that fisheries should be managed to ensure that fishing and related processing are conducted in ways that minimise negative impacts on the environment, reduce waste and preserve the quality of fish caught. The booklet stresses the point that today's generation has a moral obligation to ensure that it does not reduce fish supply available for future generations by over-exploitation and carelessness. Indeed, if the CCRF is successfully implemented by all those involved in fisheries and aquaculture, fish supply and fish products will certainly be available for future generations, too.

BOBP's initiative in publishing the concise English booklet in several languages spoken in the member- countries is aimed at reaching out to as wide a fishing constituency as possible. After all, it is the fishing community that needs to be educated about various aspects of the CCRF, if implementation of the Code has to be successful. And BOBP's effort, it is hoped, will help fulfill this objective.

Those interested in the language versions of the concise CCRF booklet may contact BOBP for free copies — *Editor*

BAY OF BENGAL NEWS

Bay of Bengal News is a quarterly publication of the Bay of Bengal Programme (BOBP), a regional multi-agency fisheries programme which covers seven countries around the Bay of Bengal - Bangladesh, India, Indonesia, Malayasia, Maldives, Sri Lanka and Thailand. The programme plays a catalytic and consultative role; it develops, demonstrates and promotes new methodologies, techniques, technologies or ideas to help improve the conditions of small-scale fisherflok communities in the member countries. The BOBP is sponsored by the governments of Denmark and Japan, and by member governments in the Bay of Bengal region. The main executing agency is the FAO (Food and Agriculture Organization of the United Nations)

Edited and published by Y S Yadava for the Bay of Bengal Programme, 91 St. Mary's Road, Abhiramapuram, Chennai 600 018, India.
Tel: 91-44-4936294; 91-44-4936188; Fax: 91-44-4936102; E-mail: bobpysy@md2.vsnl.net.in
Website : http://www.fao.org/waicent/faoinfo/fishery/bobp/website/homepage.htm
Printed by Nagaraj & Co.Pvt.Ltd., Chennai - 600 041, India. Ph: 4413133, 4911725