



ZENGYOREN REGIONAL CONFERENCE
ON
INSURANCE AND CREDIT FOR SUSTAINABLE
FISHERIES DEVELOPMENT IN ASIA

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REGIONAL REVIEW OF THE FISHERIES AND AQUACULTURE SITUATION
AND OUTLOOK FOR SOUTH AND SOUTHEAST ASIA

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Abstract

The paper reviews recent trends in the production, utilization, consumption and trade of fish and fishery products in South and Southeast Asia. The economic and social roles of fisheries and aquaculture industries are analyzed. Perspectives of the likely demand for fish in the region toward the year 2010 are also presented, together with an assessment of the region's potential resources of marine and inland water fish and possible contributions by aquaculture. The study concludes that an increase of fish supplies of some 6 million tons will be necessary in the region by 2010 to maintain current per caput consumption levels, and that satisfaction of these needs is unlikely to be met due to resource limitations; the main opportunities of satisfying domestic demand for food fish may be to build on the contributions made by expanded export to provide increased foreign exchange earnings in order to import the required amounts of fish. The study also analyzes regional fisheries cooperation which might further strengthen intra-regional trade. The principal constraints to further development are, apart from population expansion and quality assurance, the serious lack of management implementation and environmental degradation.

I. INTRODUCTION

1. Asian countries have been among the most dynamic among developing economies since the mid-80s, with per caput income growing at significantly higher rates than in any other region. There are large variations around the high average growth rate reflecting disparities in regard to area, population size and density, and the abundance of natural resources. The overall real GDP growth rate ranged between 4.8 percent (Philippines) and 9.5 percent (Viet Nam) in Southeast Asia and between 2.3 percent (Nepal) to 6.2 percent (India) in South Asia in 1995. There are also wide disparities among countries in respect to the structure of their economies, the degree of industrialization achieved, and the development of infrastructure facilities such as transport and communications, power generation, domestic markets and monetary and financial institutions. Despite these differences, the countries of the region are characterized by rising productivity driven by technological improvements.

2. The factors behind the rapid economic development in Asia, particularly in Southeast Asia, include high savings and investment rates and dynamic industrial policies with emphasis on open trade. Economic cooperation among Asian countries has gained considerable momentum in recent years especially in the 1990s, leading to promotion of intra-regional trade. The overall growth of economies in Asia is likely to continue, and could affect significantly the fishery industry since increased disposable incomes may strengthen demand for fish.

3. Southeast and South Asia include some of the most productive marine areas of the world, namely, the Bay of Bengal, the Gulf of Thailand and the South China Sea. The region also has rich freshwater resources provided by three great river systems, the Irrawaddy, the Mekong, the Ganges/Brahmaputra and by numerous lakes, ponds, man-made reservoirs and floodplains. The area supports an huge human population which draws from the sea and inland water bodies a high percentage of its animal protein intake. A common feature of the countries in the region is the high dependence on fish and seafood for its animal protein consumption. Fish is acceptable to all religious and ethnic groups in the region, although preference for freshwater or marine fish species varies according to locality.

4. The fisheries of the region reflect many common factors ranging from the ecosystems, the nature and the role of fisheries and aquaculture in the national economy and the problems encountered in the exploitation and management of fishery resources. Several hundred marine species are caught by a variety of gears operated by industrial and small-scale fisheries, often competing for increasingly scarce resources.

5. National policies for fisheries development vary from one country to another in terms of emphasis and orientation, depending greatly upon the prospects, constraints or the state of resources of individual states. However, most countries place primary importance on developing fisheries and aquaculture as a source of food for their growing populations as well as a means of earning foreign exchange. The role of fisheries in providing employment and income is equally important, particularly when other productive sectors often offer limited alternative employment and income opportunities. However, the further development of marine fisheries in the region is likely to be seriously hampered by limitations imposed by

the natural resources available except for some resources presently lightly exploited.

II. PRODUCTION TRENDS

Marine fisheries

6. The total marine catch of the Southeast and South Asia region has considerably and steadily increased during the last decade from 9.1 million tons in 1984 to over 13.4 million tons in 1994 with an annual compound rate of increase of 3.9% (Table 1). Moreover, the regional contribution to the world marine catch has risen from 19 percent in 1984 to 27 percent in 1994. The major fishing nations are India, Indonesia, Thailand and the Philippines whose aggregate production represents more than 73% of the total output of the region, a share of regional production which has remained virtually unchanged during the last decade. The major part of such production, amounting to 7.9 million tons (64%), was derived from the Western Central Pacific (Area 71) and the other important part (3.7 million tons or 30%) came from the Eastern Indian Ocean (Area 57), while the contribution from the Western Indian Ocean (Area 51) was relatively small (735 000 tons or 6%).

7. Small pelagic species make the greatest contribution to the region's varied output of marine fish, accounting for nearly 30 percent of the total marine catches in 1994, followed by demersal species (16%) and tuna (10%). Whilst its catch is less than 10 percent of the total weight, *penaeid* shrimp is by far the most valuable species exploited in terms of value. Cephalopods presently provide only 3 percent of the total catch, but there has been a marked expansion in its production at a growth rate of 11 percent per annum during the last decade. Thailand is the main producer, followed by Viet Nam, Philippines and Indonesia.

8. It is noticeable that a high proportion of the aggregate regional catch (27% in 1994) consists of miscellaneous species, mostly juvenile fish of commercial species and unsorted fish. Although the overall catch from the countries in the region has risen, some important fishing nations have suffered from a decrease of catches in traditional fishing grounds in the last few years. Such a localized decline of catches tends to be overshadowed by the overall increase of fish production.

9. The growth in the marine harvest reflects not only the steady growth in the number of fishing vessels and the sophistication of their gear but also the increasing demands of a growing regional population. It should also be noted that the expansion of international trade has considerably affected the exploitation of fishery resources. A case in point are shrimp, tuna and cephalopods which are highly demanded in the international market. The production of shrimp jumped from 638 000 tons in 1980 to 1.1 million tons in 1994, an increase of 72 percent. Over-exploitation of wild shrimp resources has prompted the development of shrimp aquaculture in the region and presently about 38 percent of the total shrimp landings, amounting to 692 000 tons, arise from cultured shrimp. Likewise, high demand for tuna has led to development of tuna fisheries, the catch of which rose from 870 000 tons in 1984 to 1.3 million tons in 1994, an increase of over 50 percent. The Philippines and Indonesia are the most important tuna producing countries and their aggregate production represents some

Table 1. South and Southeast Asia, Marine, Inland, Aquaculture Total Harvests by Country - '000 tons (including aquatic plants of 232 tons in 1984, 395 tons in 1989, 492 tons in 1994)

	Marine waters capture			Inland waters capture			Inland/marine aquaculture			Total		
	1984	1989	1994	1984	1989	1994	1984	1989	1994	1984	1989	1994
Bangladesh	157	232	251	482	448	570	117	163	270	756	843	1 091
Bhutan	-	-	-	0	0	0	0	0	0	0	0	0
Brunei	3	2	6	0	0	0	0	0	0	3	2	6
Cambodia	8	25	30	54	51	65	2	6	8	64	82	103
India	1 770	1 797	2 420	585	838	511	510	1 005	1 609	2 865	3 640	4 540
Indonesia	1 704	2 185	2 970	277	321	322	357	529	768	2 338	3 035	4 060
Laos	-	-	-	23	20	22	3	8	13	26	28	35
Malaysia	734	882	1 053	7	2	6	64	53	114	805	937	1 173
Maldives	55	71	104	-	-	-	-	-	-	55	71	104
Myanmar	466	591	599	143	136	151	4	7	74	613	734	824
Nepal	-	-	-	3	6	7	2	7	10	5	13	17
Pakistan	302	341	418	61	95	119	9	10	15	372	446	552
Philippines	1 297	1 512	1 666	301	226	230	481	631	761	2 079	2 369	2 657
Singapore	25	11	12	0	0	0	1	2	2	26	13	14
Sri Lanka	139	165	211	27	34	9	3	6	4	169	205	224
Thailand	1 914	2 323	2 798	111	117	115	112	260	519	2 157	2 700	3 432
VietNam	535	637	817	123	144	134	119	151	204	777	932	1 155
Total	9 109	10 774	13 355	2 197	2 438	2 261	1 784	2 838	4 371	13 090	16 050	19 987

Source: FAO, FISHDAB

63 percent of the total production for the region which are mostly taken in coastal waters. While purse seine fishing aided by fish aggregation devices (FAD) is typical of tuna fishing in the Philippines, both purse seines and longlining are used in Indonesia. Increased demand for bait in longlining and the decline in the use of conventional bait (saury from Japan) have raised the demand for round scad.

10. As for the tuna catches taken by developed nations in the waters of the region, there has been a noticeable decrease during the last decade in the number of Japanese and Korean tuna vessels operating in the Western Central Pacific. Nevertheless, their aggregate catches amounted to some 470 000 tons, accounting for 27 percent of the entire tuna production from the Western Central Pacific. The USA began tuna fishing in 1980 and caught 194 000 tons of tuna in 1994, yielding 11 percent of the total harvest of the Western Central Pacific. The presence of long distance fleets from developed countries thus is still conspicuous in the Western Central Pacific.

11. Tuna fisheries in the Indian Ocean are less developed, although distant-water fishing fleets from Indonesia, Thailand and India harvest substantial amounts. There has been a marked decline in the number of Japanese and Korean fishing fleets operating in the Indian Ocean during the last decade; they caught 32 000 and 25 000 tons respectively in 1994. Their activities have been replaced by Spanish and French fleets which fished some 111 000 and 97 000 tons of tuna respectively in 1994, mainly in the western part of the Indian Ocean. The Maldives harvested 90 000 tons of tuna exceeding substantially the catches of India and Pakistan. It would be useful to examine whether there is significant overcapacity and whether catch rates per ton of capacity have continued to decrease in high seas fishing operations.

Inland fisheries

12. The regional output of inland water fisheries increased only modestly from 2.2 million tons in 1984 to 2.3 million tons in 1994, whereas their contribution to the world output decreased from 22 percent in 1984 to 12 percent in 1994. About 25% of the total catch is attributable to the extensive inland water fisheries of Bangladesh, whose production increased by 18 percent in the course of the last decade to reach 570 000 tons in 1994. There are also notable inland fisheries in India and Indonesia whose aggregate production accounts for 36 percent of the total output. These three countries produce over 60 percent of the total production from inland fisheries in the region.

13. Almost the entire catch of fish by landlocked Laos, Bhutan and Nepal and the greater part of fish supplies available in Cambodia (63%) and Bangladesh (52%) arise from inland water activities. Inland fisheries produce more than 18 percent of the national catch in Myanmar; and of the order of 10 percent in Philippines, India and Viet Nam.

14. In Bangladesh, there has been a noticeable increase in the production of inland fisheries in recent years partly as a result of large scale stocking programmes for inland water bodies. Inland water fisheries production in the Philippines has been stagnant during the last decade largely due to over-fishing, industrial pollution and reduction of areas for fishing because of cage and pen culture development in lakes. In Thailand some 115 000 tons of fish were taken from rivers, canals, lakes and reservoirs in 1994. As in many other countries, this figure does not include the portion of the catch consumed by the fishermen and their families. It is estimated that home consumption may account for up to 25 percent

of the annual catch from inland waters. Fish stocking and regulated fishing are two major management measures used in Thailand to optimize fish yields from inland waters.

Aquaculture

15. Total aquaculture production in the region dynamically increased by almost two and a half times from 1.8 million tons in 1984 to 4.4 million tons, including aquatic plants, in 1994; in terms of value, it increased from US\$ 1 570 million to US\$ 9 240 million during the same period. The regional contribution to the global aquaculture production was 17% in quantity and 23% in value in 1994. Between 1984 and 1994 the aquaculture sector exhibited an overall compound growth rate of 9.6 percent by weight and 19.3 percent by value. Quantity-wise the main producers are India (37% of the regional total in 1994), the Philippines (18%), Indonesia (18%), Thailand (12%), Bangladesh (6%), Viet Nam (5%) and Malaysia (3%), these seven countries contributing over 97 percent of the total aquaculture production in the region.

16. India's production nearly tripled during the last decade to reach 1.6 million tons worth US\$ 2 095 million in 1994. In terms of weight carps are the major species farmed while coastal shrimp aquaculture represents 34 percent (or US\$ 712 million) of the total value. India's total aquaculture production is second in the world only to China. Indonesia's production has increased by 2.5 times since 1984 to reach 780 000 tons worth US\$ 2 075 million in 1994. Whilst Indonesia's share of production in quantity was less than a half of India's, the production in value was almost equal.

17. Driven by the growth of coastal shrimp culture, the expansion of aquaculture production in Thailand was higher than elsewhere in the region. In terms of quantity, Thailand's production (519 000 tons) was far less than those of India and Indonesia, whereas in value terms it accounted for US\$ 1 866 million or 22 percent of the regional total. The rate of expansion in value (i.e. from US\$ 108 million in 1984 to US\$ 1 866 million in 1994) has been much greater than that in quantity (i.e. from 112 000 tons in 1984 to 519 000 tons in 1994) during the last decade.

18. By far the largest major species group cultured in the region in terms of weight are finfish (2.97 million tons or 67% of total production), followed by crustaceans (732 000 tons or 17%), aquatic plants (525 000 tons or 12%) and molluscs (176 000 tons or 4%). Although crustaceans represented only 17 percent of total regional aquaculture production in quantity, their share in value reached more than 50 percent of the total in 1994.

19. Regional farmed shrimp production has grown dramatically over the last decade from 101 000 tons in 1984 to 692 000 tons in 1994 at an annual compound growth rate of a staggering 21 percent. In 1994 the region contributed 75 percent of the world shrimp output, out of which giant tiger prawn *Penaeus monodon* is the most popular species cultivated. The total output of *Penaeus monodon* amounted to 496 000 tons valued at US\$ 3 300 million representing 72 percent of the total volume of regional shrimp production. The major shrimp

producing countries include Thailand (268 000 tons or 39% of the regional shrimp output), Indonesia (167 000 or 24%), Philippines (93 000 tons or 13%), India (92 000 tons or 13%) Viet Nam (36 000 tons or 5%), Bangladesh (29 000 or 4%) and Malaysia (5 900 tons or 1%).

20. Total production of farmed finfish amounted to 2.97 million tons in 1994, of which 88 percent was derived from freshwater, 11 percent from brackish water (diadromous fish species) and 1.0 percent from marine water. The production of freshwater fish in the region grew by 2.7 times from 960 000 tons in 1984 to 2.6 million tons in 1994 with an annual rate of increase of 10.4 percent. The bulk of freshwater fish production arises from polyculture of different herbivorous and omnivorous cyprinid fish species at low stocking densities within traditional semi-intensive pond based farming systems. It contributes a low-priced source of food fish for mass domestic consumption especially in India. The principal cyprinids cultivated in the region include *Roho Labeo rohita* (440 000 tons - India 82%, Myanmar 17%, Thailand 1%), *Catla Catla catla* (361 000 tons - India 99.6%, Laos 0.4%) and Mrigal carp *Cirrhinus mrigala* (354 000 tons - India 99.4%, Laos 0.4%).

21. The other main species are tilapia *Oreochromis spp* cultivated in ponds, pens and cages (224,000 tons - Philippines 42%, Thailand 27%, Indonesia 26%, Malaysia 4%) and the diadromous Milkfish *Chanos chanos* in coastal ponds (334 000 tons - Indonesia 53%, Philippines 47%). In contrast to the production of tilapia which has grown by over 200 percent since 1984 with an average growth rate of 12 percent per annum, milkfish production has grown relatively slowly (only 7.4 percent in quantity) during the last decade.

22. The total harvest of aquatic plants increased steadily to reach 525 000 tons worth US\$ 525 million in 1994 from 203 000 tons in 1984 with a growth rate of 10 percent per annum. The main species cultured include the green seaweed *Eucheuma cottoni* (347 000 tons - Philippines 100%) and red seaweed *Rhodophyceae* (120 000 tons - Indonesia 96%, Viet Nam 4%). These products are harvested mainly as a source of carrageenans and agar for the food industry.

III. EMPLOYMENT AND FLEET STRUCTURE

Employment

23. Annex Table 1 presents the role of fisheries in terms of employment creation. The data, however, must be treated with a certain degree of caution. A noticeable regional feature in fisheries is the occurrence of part-time employment, accounting for some 30 percent of the total labour deployed in the fisheries sector. This is particularly the case in the inland fisheries in Indonesia, Pakistan, Myanmar, India and Bangladesh where there are extensive water bodies available for fishing and aquaculture. It is also noticeable that in Indonesia a great many fishermen are engaged in marine fishing on a part-time basis during the high season.

24. The data available do not permit to make any detailed division of employment between types of fishing (i.e. coastal, offshore, deep sea) and aquaculture (i.e. inland, brackish, marine) or by area fished. Nevertheless, the greater part of the employment is generated by either coastal or inland fisheries and the great majority of domestically caught fish are derived from these sources. Only a few countries (e.g. Thailand, Philippines, Indonesia) have long distance fleets which, however, derive only a small proportion of their