

# Chapter 1

## **Introduction**

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In June 1992, the UN Conference on Environment & Development (Earth Summit) was held in Rio de Janeiro. Although the goals of the summit have not yet been fully achieved, it was a very important milestone for us. This is because the summit showed us the need for environmental conservation if we want to create a sustainable society. In addition to environmental protection, the question of how to secure an adequate food supply is also an urgent issue. The world population has already exceeded 5,800 million. However the distribution of food supply is very uneven. While one billion people are enjoying a kilogram of beef per week, another one billion people are suffering from starvation. If we want to create a sustainable world, we have to examine our current methods for obtaining food resources and make a fair distribution of this food supply.

As food production is limited, we should consume food resources as efficiently as possible. According to J. H. Ryther's estimate (1969), the total fishery resources in the world was about 240 million tons per year. A higher figure of 400 to 500 million tons is mentioned in more recent statistics. However, in 1991 it was reported that the global fishery production had decreased about 102 million tons. If we add the quantity of fish thrown away as garbage to this figure, we find that the world fish catches are approaching the limit of sustainable production. Considering the present situation of fishing in the open sea, the 200-nautical mile fishery zones and the sustainability of marine resources, we can hardly expect that the fishery industry can maintain a reasonable growth in the years ahead. On the other hand, the global situation of food supply and demand demonstrates that demand for marine foods as protein sources will increase not only in fishing nations but also in those countries where people have not traditionally consumed fish.

Japan's total fishery output in 1991 was about 10 million tons, which ranked third in the world after China and Russia. Compared with Japan, the Chinese fishery has made remarkable progress in recent years. Its production nearly doubled to 14 million tons during the six years from 1984 to 1990. Particularly outstanding was the development of inland fisheries which contributed 7.2 million tons to the total production. Since China has a large population and long coastline, its ocean fishing is likely to expand further. Meanwhile, inland fishery will continue to be significant because of China's huge inland population. In the economic declaration of the Tokyo Summit which was held in July 1993, the participants announced that they expected great success from the UN Conference on the fisheries resources both in the coastal

zone and the open sea, together with the migratory fish species. However more and more international restrictions are placed on the marine resources of the open-sea, aquaculture in inland and coastal waters will play a more influential role in future.

Japan is also experiencing a smaller fishery output from deep-sea and offshore fishing owing to the restriction of the Marine Law and other problems. Thus, coastal and inland fisheries should also become more important to Japan in the future. Of the country's total fishing output of ¥2,715.5 billion in 1991, 28.7 percent came from coastal fishing and 23.6 percent from aquaculture, which means that more than half of Japan's fishery production in that year was from coastal fisheries & aquaculture. The Seto Inland Sea plays a her role in coastal fishing & aquaculture. The fish catch in the Seto Inland Sea accounts for a quarter of the total coastal production in Japan. Furthermore, the aquaculture of high-class fishes, such as yellow tail, sea bream and prawn, originated here. Thus, there is much attention being placed in Japan on the efforts at the Seto Inland Sea to implement sustainable fish production and environmental protection. The Seto Inland Sea is an area of closed waters having a total size of about 22,000 square kilometers and an average depth of about 37 meters. Its coastal population is about 35 million and yearly industrial production reaches ¥84,000 billion, so there is potential for serious artificial contamination of the Seto Inland Sea. Since 1970, red tide, the phenomenon caused by the abnormal blooming of harmful phytoplankton, has occurred on a large scale and brought a loss of over ¥20 billion in 20 years, especially to aquaculture.

Generally speaking, red tide occurs as a result of the eutrophication of water. The measures to control chemical oxygen demand (COD) and to prevent nitrogen and phosphorus from flowing into the sea were terribly inadequate around 1970 and water of the Seto Inland Sea was heavily polluted. To cope with this situation, the Law Concerning Special Measures for Conservation of the Environment of the Seto Inland Sea was enacted in 1973, and a number of administrative steps were taken, such as cutting COD loading from the land in half, reductions in phosphorus and nitrogen loads and restrictions on the reclamation of coastal areas (these steps were later made legend as the law concerning special measures to environmental protection). In the meantime, industrial plants and local governments made efforts to improve their water treatment facilities. Residents living in the coastal areas also became more aware of the need for environmental conservation. Due to the efforts of both the government and the private sector, the pollution of the Seto Inland Sea from activities on land has gradually been reduced, and the environment is being improved to some extent. Red tides occurred 299 times in 1976, but this figure decreased to less than 100 in recent years. Aquaculture technology has also been improved. Thus damage to fishery is being greatly curtailed.

Ironically, although red tides began to decrease in the Seto Inland Sea, the poisoning of people and death of fishes which were due to shellfishes poisoned by harmful phytoplankton occurred in many areas throughout the world, and aquaculture in those places. The Intergovernmental Oceanographic Commission (IOC), a UNESCO Organization, and other institutes are studying the problem of red tide, but it is quite difficult to establish any effective preventive measures. To minimize the damage of red tide, we should install monitoring networks in coastal areas around

the world, train more researchers and reinforce our research facilities. These are the issues towards which we must take immediate action. Whether coastal fisheries can be maintained or not depends largely on what we do conserve the water environment.

According to Chapter 17 of Agenda 21 which was prepared at the Earth Summit, by the year 2020 three quarters of the world population will be concentrated in areas within 60 kilometers from the coastline, so the present approach to the management of the ocean and coastal resources may not be able to make sustainable development realized. Coastal resources and environment are deteriorating rapidly in many parts of the world. In addition to environmental conservation, the protection of those species which may be subjected to overfishing is an extremely important problem in coastal areas. In the Seto Inland Sea, the releasing of 16 million larvae and juveniles has been carried out for 16 species of fish as well as six crustaceans, and ten shellfishes, octopuses and squids. While this project is effective in aiding the recovery of some fish resources, it is very important to adopt more direct measures such as appropriate sizes of fishnet meshes so as to prevent indiscriminate fishing of juveniles and reduce the dumping of useless fishes.

At the International Conference on the Environmental Management of Enclosed Coastal Seas held in Kobe in 1990 (EMECS '90), researchers from Japan and the Philippines pointed out that introduction of large mesh of fishing nets should be a high priority measure for the facilitation of the management of marine resources. To attain the sustainable development of coastal fisheries in the future, we will have not only to protect and develop the environment but also to improve fishing technology, propagate marine life through release and proper management of juveniles, and to develop aquaculture technology under the recent progress of biotechnology.

Together with the above mentioned importance to the fishery industry, the beautiful scenery of the Seto Inland Sea should be treasured on the same level as Mt. Fuji, the national symbol of Japan. Conservation of the environment of the Seto Inland Sea and surrounding area is the duty of the present generation to future posterity. The application of the idea of governance, which means the cooperative activities with government, industries and residents for environment conservation, will be needed to accomplished our hearty intention.

#### REFERENCE

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