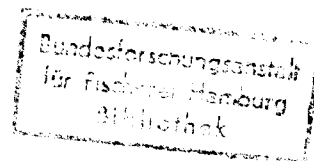


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International Council for the
Exploration of the Sea

C.M. 1979/F:41
Mariculture Committee



TOWARD A PARTNERSHIP AMONG ICES
MEMBER COUNTRIES FOR THE DEVELOPMENT
OF MARICULTURE PROGRAMS

Tapan Banerjee
Aquaculture Coordinator
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Washington, D.C. 20235

1979

x) General Secretary
ICES, Charlottenlund Slot
DK-2920 Charlottenlund,
Denmark

World food production is being increasingly stretched to supply the needs of an expanding world population. Many areas of the world are already burdened by shortages of food. In fact, agricultural products have become the largest source of export income for many North Atlantic countries. Continuation of that trend is not assured. Dramatic future improvements in both technology and innovative investment for food production resources will be needed to meet future needs.

Improvements in land cultivation in agricultural technology continue to provide expanded food supplies, especially in the United States. The present agricultural position of the United States is the result of bountiful natural resources and of investment of many billions of dollars of public and private funds, over the past 100 years, in intensive research, development and innovation. However, limitations to land cultivation of food are already being felt in many areas of the United States and in other parts of the world. Some of these are the result of climatic changes and losses in arable land due to erosion and growth of the deserts. Others are caused by water limitations, encroachments by alternative land users and pollution - induced damaged. Reduced use of some chemical insecticides and fertilizers for environmental and health reasons are also reducing agricultural productivity.

Historically, the oceans have provided a significant alternative source of protein for human nutrition. In fact, fish account for 5% of the protein eaten by mankind. Fish protein is lower in fats and more healthful than protein from meats and is used more efficiently by the human body than protein from milk, beef or soybeans. The natural availability of fish from the oceans is limited, however, and conflicts

are growing among nations on fishing rights. The current negotiations in the United Nations on the Law of the Sea are only one step in an international struggle to resolve marine problems such as overfishing. Since World War II the world harvest of fish has quadrupled, reaching a catch of 73.5 million metric tons in 1977. The upper limit for steady state continuous supply of fish from the oceans is estimated to be about 100 to 125 million metric tons per year.

Mariculture, the human controlled cultivation and harvest of marine aquatic species, represents a new frontier in food production. Mariculture has been employed for many centuries in China, Korea and Japan, and in various forms has been under development for at least a century in many North Atlantic countries. However, in the North Atlantic countries unlike land cultivation, mariculture has not been developed aggressively.

Pino^{1/} during the 66th ICES statutory meeting suggested that scientists and policy makers examine new mechanisms and strategies which will assure growth and sustained productivity of existing and potentially new systems of capture and culture fisheries. One way he felt that it could be tackled is through coordinated inter and multi-disciplinary programs adequately supported at the local, national and international levels. During the same meeting Shell ^{2/} emphasized that mariculturists must begin a systematic research and development effort to identify the most restrictive constraints and to develop practical methods to counter them.

^{1/} Pino, J.A., 1978, Mobilizing Science and Technology for Strengthening Fisheries Development Programs. GM. '78/Gen:9 66th ICES Statutory meeting., Copenhagen, PP. 1-4.

^{2/} Shell, E.W., 1978. Constraints to the Development of Mariculture. C.M. '78/F:26: 66th ICES Statutory meeting, Copenhagen.

To be effective such a program should focus on problems whose solution most depends on international cooperation in mariculture research. Accordingly, we are concerned with conserving and expanding the world's ocean food resources to serve human needs better, especially human nutrition, as a basis for human health. Because many of the interesting aquatic problems lie within the territories of the North Atlantic ocean, international cooperation in the scientific development of these countries is not only desirable in itself but is also essential to attain the scientific objectives of ICES. These objectives will be achieved only if there is a free exchange of scientists for research and training among different ICES member countries, and a broad and rapid flow of scientific information. New methods must be developed and old ones greatly extended. In the past, marine scientists have studied particular limited communities; now, work on a few large scale systems is needed to test and expand our understanding. Greater comparability of methods of pilot testing and adequate arrangements for data handling are needed for a better appraisal of its productivity.

Field research in appropriate environments by scientists of different biological disciplines will be an essential aspect of the program. This will be most effective if different kinds of research can be undertaken in the same areas; thus a few carefully selected and well-described international research sites would prove highly beneficial.

In the United States we have already ventured in such a partnership cooperative program with our neighboring country across the Pacific ocean, Japan. The purpose of this paper is to report the status of the U.S.-Japan cooperative program and to encourage ICES mariculturists to think

of other opportunities.

U.S. - Japan Cooperative Programs in Aquaculture

The United States - Japan cooperative Program in Natural Resources (UJNR) started by a proposal made during the Third Cabinet-Level Meeting of the Joint United States - Japan Committee on Trade and Economic Affairs in January 1964. Some of the other panels included in the program are air pollution, water pollution, energy, forage crops, forestry, wind and seismic effects, and several joint panels and committees in marine resources research, development and utilization.

The United States and Japan are currently involved in a very active and dynamic cooperative program in aquaculture which got its start in 1969. In that year, the aquaculture panel was formed under the United States - Japan Cooperative Program in Natural Resources (UJNR). The panels (U.S. and Japan) included specialists drawn from Federal departments most concerned with aquaculture. Charged with exploring and developing bilateral cooperation, the panels have focused their efforts on exchanging information related to aquaculture which could be of benefit to both countries. U.S. membership includes NOAA personnel (National Marine Fisheries Service and Office of Sea Grant) plus representatives from the Department of the Interior (Fish and Wildlife Service), Department of Health, Education and Welfare (Food and Drug Administration), Department of State (Agency for International Development), and Tennessee Valley Authority. Observers have included researchers from various universities.

National panels began to operate in 1969. Each panel held its own meetings in order to analyze the accumulated information related to aquaculture in its country. This information was exchanged between the two panels.

Beginning in 1971 joint Aquaculture Panel meetings have been held each year, (except 1973), alternating between Japan and the United States. Where possible the meetings have been scheduled to allow members to attend other aquaculture-related conferences or meetings as well as the UJNR Panel meeting. The first joint panel meeting was held in Tokyo in October, 1971. Accounts were given of aquaculture research and the current status of industry in the two countries. Plans for exchanging scientists and literature were discussed. At the second joint panel meeting in October 1972, in Washington, D.C., and Seattle, Washington, it was agreed that the common research should be related to disease and nutrition. The third meeting was held in October, 1974, in Japan. It consisted of a symposium on disease. The fourth meeting, in October, 1975, was a nutrition symposium, held in the U.S. The FAO Conference on Aquaculture provided an excellent reason for holding the fifth meeting in Kyoto, Japan, in June 1976. Santa Barbara, California, was the site of the sixth Panel meeting, in 1977, in conjunction with the International Seaweed Conference. The seventh meeting was held in Tokyo, Japan, in October 1978. This was the second of five meetings at which a specific area of aquaculture was considered, the topic in that year being marine fish culture. Five manuscripts from the 1979 meeting have been submitted to Marine Fisheries Review. The meeting in 1979 will be in Seattle, Washington in October, and will focus on culture of freshwater fishes.

Objective

The general objective of the Panel on Aquaculture of the UJNR was enunciated in the joint statement of Prime Minister Sato and President

Johnson in 1967 when they directed that the Panel be created to develop cooperative studies on the exploitation and utilization of marine natural resources.

This has been pursued in several ways:

1. Cooperative research and development projects on living aquatic resources.

2. Exchange of information between the two countries about aquaculture.

3. Exchange of scientists.

1. Cooperative research and development projects on living resources.

A joint project on oyster mortalities has been underway for the past several years studying the causes of a summer kill of oysters which is found in both countries. Samples of oysters have been exchanged and are examined for possible disease. Several other cooperative programs have been proposed including an index of marine aquaculture diseases, an aquaculture information system, and a joint study on abalone seeding which hopefully will materialize in the near future.

2. Exchange of information between the two countries about aquaculture.

At the annual meetings summary papers have been presented describing the status of aquaculture in each country. These have been very helpful. In addition, papers have been presented on particular technical aspects of aquaculture. To date three significant publications have come out of the panel meetings:

- a. Proceedings of the First U.S.-Japan Meeting on Aquaculture at Tokyo, Japan, October 18-19, 1971. NOAA Technical Report NMFS Circular No. 388, February 1974. (17 papers on various aspects of U.S. and Japan Aquaculture Programs).
- b. Proceedings of the Third U.S.-Japan Meeting on Aquaculture at Tokyo, Japan, October 15-16, 1974. Special Publication of the Fishery Agency, Japanese Government and Japan Sea Regional Fisheries Research Laboratory. October 1975. (14 papers on diseases found in aquaculture, methods of diagnosis, and knowledge related to their limited control).
- c. Proceedings of the First International Conference on Aquaculture Nutrition, October 1975. (This Conference was sponsored by the Delaware Sea Grant College Program in cooperation with the U.S.-Japan Aquaculture Panel).

Aquaculture is highly specialized, and literature exchange, at present, is being conducted between panel members in their field speciality. The literature offered from the U.S. to Japan probably exceeds those from Japan to the U.S. in number because the Japanese scientists can read English. Over 100 publications have been exchanged to date. The exact number is hard to determine because the exchange is directly among many different panel members, conducted over a long period of time.

In development of the aquaculture panel, both sides unanimously agreed that cooperation had to be derived from understanding the aquaculture problems of the other country through visits to field stations. Hence, an integral part of each meeting is the inclusion of scientific tours covering as wide an area as possible in each other's country. Consequently, both sides have had free access to a wide diversity of geographic areas, laboratories, and field stations.

3. Exchange of scientists

Several exchanges of scientists have occurred during the last few years. Three Japanese researchers have spent up to one year in the United States and a fourth arrived last month for a 3-month stay. Two U.S. scientists have gone to Japan. Areas of interest to these exchange scientists included shellfish culture, biology and disease; seaweed diseases; and genetics. Under the sponsorship of the panel, a U.S. commercial abalone grower spent several weeks in Japan. The exchange of information proved beneficial to both sides.

Summary

The aquacultural panel of the UJNR has been a success. Because of the close cooperation between the two panels, and mutual visits of panel members to each other's country, the essence of aquaculture in both countries has been mutually understood. This will greatly influence either directly or indirectly the future development of aquaculture industries and various research activities in Japan and the U.S.

Closer partnerships among other countries for development of mariculture programs will definitely help in easing many of the constraints affecting the growth of this industry. It will also assist in focusing on problems of mutual interest found in mariculture practices, and stimulate closer cooperation between research organizations. An advantage of the partnership program concept is that the growth of understanding will be accelerated by the ICES member countries, thus contributing uniquely to human welfare through increased production of food from the sea.

Acknowledgement

I appreciate the assistance of Dr. Clarence Idyll and Mr. Benson Drucker of the National Marine Fisheries Service/National Oceanic and Atmospheric Administration with UJNR information for the preparation of this document.