Caribbean Region Views on Prospects for Fisheries Development

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I would like to make a few remarks about NMFS's interest in getting more involved in fisheries development of the Caribbean Region. We are all aware of the need to increase food production, especially protein, in the region; the lack of which has come to the forefront as a major problem throughout most of the world. The Caribbean Region is no exception in its needs for increased food production, and in our case, we emphasize food production increase in *fish production* on a sustained basis.

You all know about the recent efforts by the U.S. administration to assist the Caribbean nations in solving some of their problems, including food shortage, through the efforts of international agencies such as FAO and the U.S. Agency for International Development (AID). This agency, which in recent years has emphasized increase in food production through agriculture and, in part, aquaculture, has expressed interest in marine fisheries development as well.

Based on this growing interest by AID and other international donor agencies, our NMFS Regional Office, in collaboration with our Miami-based Center, has collated views from many sources and developed tentative project proposals. These project proposals, which I would like to share with you shortly, if implemented could lead to increased fish production on a sustained basis.

For those of you not too familiar with fish distribution, development and management use in the region, I will first give you some background. The Caribbean Basin consists of island and coastal nations which rim the Caribbean Sea. Each of these nations has strong historical ties to the sea and its resources. Fishery products have long been a staple in the diets of Caribbean people whose average per capita consumption of seafood is two and a half times that of people in the United States.

More than half of the seafood consumed in the Caribbean is imported from outside the basin. Salt dried cod imported from Canada and European nations has been important to the area since colonial times. Mackerel and other processed fish are imported from the United States in growing quantities, while tuna is brought in from the Pacific and Atlantic for canning in Puerto Rico.

The types and magnitudes of marine resources available in the Caribbean vary widely. They are affected by common ocean currents that influence species mix and distribution. Shallow and deep water reef fish are widespread in certain habitats. The continental shelf, from the Guianas northward, supports major commercial fisheries for shrimp, lobster and bottomfish. In general, along the continental shelf, most of the resources are only partially exploited. This contrasts with the island chain where most resources, except for certain pelagic species, are fully utilized. Artisanal and subsistence fisheries operate in poorly developed areas, while some islands, such as Barbados, depend primarily on one or two species (flying fish). Vigorous development and management efforts by Cuba have resulted in productive fisheries for most species available near their shelf, demonstrating what can be done through such effort. Excellent potentials for recreational fisheries exist throughout most of the region, but are pursued only in selected locations. Additionally, underutilized pelagic resources in the herring and mackerel families, among others, are seasonally abundant in certain areas.

A significant potential clearly exists for increasing fishery production from Caribbean waters. Such increases can displace some of the fishery imports to Caribbean nations and provide other high value Caribbean products, such as spiny lobster, for export from the basin. Impediments to increased production must be overcome. They include lack of know-how in modern fishery management practices, fishing gear and methods, the wide and uneven distribution of resources and lack of investment capital to upgrade current harvesting and marketing practices.

Gains in fishery investment and production in the Caribbean are possible through tax incentives, tariff reductions and the necessary expertise. Recent closure of FAO regional project office (WECAF) in Panama was a step backward in fishery development in the Caribbean and created a void in terms of international assistance in fisheries. It is unlikely that individual or collective action by Caribbean nations can be focused on the root problems that inhibit greater utilization of fishery potential without such international assistance. These circumstances make this an opportune time for us to exert positive action to achieve rapid development and coordinated management, where needed, of Caribbean fishery resources.

The National Marine Fisheries Service, through its research and management staffs in the Southeast, has familiarity with all aspects of the proposed project and has knowledge of the best experts to direct and operate international Caribbean fishery assistance efforts. This expertise is available in private groups, in universities, state governments and in NMFS itself. These projects propose to increase fisheries investment and production through training, technology transfer, demonstration projects and increased accessibility to proven expertise. Similarly, fisheries management capabilities can be enhanced through technology transfer, training in required disciplines and field investigations to delineate resources.

We propose that a fishery management training institute be established. The institute would afford opportunities to Caribbean nations for special short-term advanced educational training in fishery resource management. Funding for the institute could be used to support students and faculty, curriculum development, workshops and work experience programs. Linkages can be developed with educational institutions in the Caribbean and U.S. to expand educational options for students and encourage faculty exchanges. The institute could also encourage cooperative arrangements with governmental and private organizations to offer relevant work experience in fishery management, enforcement and planning.

Fishermen in the Caribbean have been isolated from the many fishery technological developments that have taken place in the more fully-developed maritime nations over the last two decades. Lack of awareness of state-of-the-art technology is currently a major constraint to fisheries development in many areas of the Caribbean. Existing technology, in both the engineering and business sense, can be quickly transferred to the Caribbean, thus creating immediate, attractive investment opportunities.

Modern harvesting methods, with potential application throughout the Caribbean, can best be evaluated by on-site demonstrations utilizing appropriate fishing gear and multi-purpose commercial fishing vessels. Such demonstrations would entail the operations by charter of two commercial fishing vessels with experienced crews and technicians to demonstrate a broad range of fishing techniques such as gillnetting, vertical and surface longline fishing and pelagic and bottom longlining. Other gear would be demonstrated as appropriate.

In addition to at-sea demonstrations for evaluating these techniques, fishery technicians aboard these vessels would demonstrate gear handling, gear repair, fish handling sanitation and preservation of the various types of commercial species so as to identify the need for eventual Caribbean-wide training programs.

A considerable loss of otherwise wholesome seafood in the Caribbean Basin can be attributed to inefficient handling and distribution of the catch, a lack of refrigeration, an inefficient marketing system and a lack of knowledge in advances made in some areas such as detecting ciguatera fish toxin. The basic approach to resolving these problems is to transfer existing technology, already available in many areas of the world, into the Caribbean artisanal fishery. The use of inexpensive systems such as ice, salt and solar drying, to minimize product spoilage before it reaches population center would be stressed.

A core group of fishery seafood extension specialists could be located in an existing institution in the Caribbean area. These specialists, trained in handling foods in a tropical environment, would schedule intensive, hands-on demonstrations to introduce technical improvements in the fisheries of cooperating countries. These demonstrations would allow host nations to evaluate technologies as they might apply to their own economy and would lead, in turn, to future comprehensive training. By upgrading the basic technology of the existing artisanal fisheries, better use of potential loan capital would be encouraged. Improving the quality of fishery products would improve general nutritional levels in the Caribbean.

With limited handling and preservation methods, the distribution of seafoods produced locally in most Caribbean nations has been geared largely to local, rapid consumption. Exceptions include the higher-valued species consumed in the hotel and restaurants catering to tourists and to spiny lobster production for the export market. As improved handling, processing and preservation takes place, options must be developed for more sophisticated marketing and distribution, particularly to population centers located away from the waterfront itself. Special emphasis would be placed on the development of infrastructures and food processing procedures which would provide clean, wholesome and safe fishery products of a high quality for domestic use and export. Additional practical assistance would be given in operating the infrastructures to the best advantage.

Market research would be tailored to each country's potential for distribution, its supply of fishery resources and the present stage of processing or preservation development. Business expertise from food marketing firms would be retained to design and establish specifications for appropriate marketing and distribution projects. These consultations would become the basis for pro-forma business prospectus to be used for justifying loans and loan guarantees. Existing studies by local governments, FAO, and the like would be fully utilized as a basis for departure.

Experience has indicated that certain fish species are of great economic value as a target for recreational fishing activity. Sport fishing opportunities, in turn, can be a major tourist attraction, particularly in the water-oriented Caribbean. Marine recreational fishing and sport diving attractions can be developed with few infrastructure requirements. Often the most primitive settings are the most attractive to sportsmen.

Market research is needed to determine the extent of marine recreational fishing potential for each Caribbean Basin country with an existing or potential tourist industry. Major impediments to expansion such as resource limitations, infrastructure, volume of existing tourism and others would be identified. Specific public and private investment opportunities would be specified and evaluated. Infrastructure investment opportunities in both the public and private sector would be developed as they pertain to better access, fish attractors and fish concentrators.

Specific on-site training in the use of processing equipment, fishing gear and sanitary procedures would be required after actual investment begins to take place. Fishing crews, fishing processing plant workers, sales personnel and other labor or management personnel must be trained according to the needs related to each area of investment. A source of funding could be established to provide teachers and experts now available through U.S. Sea Grant Marine Advisory programs and from fishing industries of the U.S. and other countries. Funding would provide for compensation for professional time, equipment leasing and vessel charters as needed according to the specific investments that would take place. On site, country-by-country training would be funded and coordinated through the program management office.

In addition to the expertise involved in transforming technology into opportunities, there is a need for providing appropriate analytical capability. There is a specific need for economic analyses in the Caribbean region project selection, the evaluation of projects in progress, and in evaluating investment loans and loan guarantees. There is a further need for assessing overall benefit-cost relationships for fisheries programs to ascertain whether or not future programs might be worthwhile in other technical areas such as mariculture.

A professional economist would be retained to identify study needs and to select qualified professionals in host countries to conduct the actual work. They would enlist the cooperative efforts of other economists located in or working with the Caribbean countries. Contract or cooperative agreement funds would be provided for cooperating economists or private consulting firms.

On fishery research, we believe the approach should be on a regional basis on issues of common interest and impact. Two such special issues come to mind which I would like to address.

Fishery resource management in the Caribbean Basin poses complex problems that eventually must be considered within the framework of regional management plans. The proximity of nations and the dominant effects of ocean currents cause living resources to be shared by neighboring countries. The migrations of pelagic fish and the perplexing effects of currents on the distribution of early life stages of most species is yet to be studied in detail. Only recently have Brazil and the Guianas begun to cooperate in evaluations of shrimp movements off their coasts. This type of information is critical to rational management, because the well-being of each country's resource is influenced by environmental conditions or harvests made elsewhere in the system. An extreme example is provided by the spiny lobster whose larval stages may drift for many months. In spite of the apparent complexities surrounding the replenishment or recruitment process, there is an underlying stability to marine ecosystems which is predictable, given key information.

The Southeast Fisheries Center (SEFC), in cooperation with universities and resource agencies of the region, proposes to investigate recruitment processes of reef fish and spiny lobster in island and continental shelf environments and to develop predictive models for use by managers. The specifics of the research plan parallel agreements reached at the 1977 IOCARIBE meeting, wherein leading scientists from the region identified priority research needs. This study would provide the necessary data needed to develop models for proper management of the living reef resources of the Caribbean Basin. It would contribute to a theory of reef resource management and in the process it would thoroughly involve Caribbean scientists in the design, execution and analysis of the experiment.

Increased fishery production from the Caribbean will require new fisheries for underutilized species and will exert added pressures on currently fished stocks. Both situations call for substantial additions to existing information related to fish population sizes and locations. The costs of data collection through conventional shipboard surveys are prohibitive because the area exceeds 750,000 square miles.

A logical alternative is to employ aerial remote sensing technology which provides Caribbean-wide real-time data at low-cost after initial investments. This approach has been used successfully to assess coastal changes, bathymetry and the distribution of fish in other areas.

The seasonal movements of many pelagic species (tuna, billfishes, mackerels, herrings) are dependent on environmental conditions which can be monitored with spaceborne sensors. Timely information on current boundaries, chlorophyll concentrations and ocean temperature can be used to improve the efficiency of fishing operations and provide indirect information on population movements. Computer enhanced satellite data can also be used to measure the areal extent of shallow reefs and classify them in terms of potential productivity. If the area and type of reef habitat are known, it is feasible to estimate the reef populations that can be supported. In turn, those data are essential to determinations of sustainable yields and appropriate management practices. Much of the satellite imagery is already available, but needs to be converted to a form where it has relevant application.

Let me also mention that the recommendations made by the participants of the WECAFC meetings, recently held in Kingston, Jamaica, have also been incorporated, in part, in the project proposals just described. Be assured that these projects are suggested with flexibility in mind and can be modified or changed to best meet the needs of the individual nations.

In closing, let me say we plan to contact you directly, in concert with AID in the near future, with the intent of consulting with you on the best way to proceed with fisheries development in your area.