Resource Assessment and Fisheries Technology Development

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In the past few years, at least one speaker at every GCFI session has pointed out that marine resource management must be considered an integral part of marine resource development. Yet, it is unusual to consider resource assessment and fisheries technology development in a single presentation, and when this program was first drafted these were to have been handled as separate topics. If one considers the history of fisheries development in the eastern Caribbean, however, it becomes very clear that the two topics are intimately related, and many problems in the past have resulted from attempts to deal with one independently of the other. I would like to review some of this history and attempt to extract some of the lessons which may be learned from past experience.

During the 1940's, the Anglo-American Caribbean Commission undertook a series of studies which concluded that fisheries development should emphasize careful management and cautious application of limited technology to increase catches without depleting stocks (Berleant-Schiller, 1981). This perspective changed with the emergence of regionalism and the West Indies Federation. Typically, imitation of developed nations was seen as the route to obtaining the benefits enjoyed by those nations and desired by the Caribbean islands. This resulted in greater attention to mechanized commercial fisheries, and emphasis was placed upon projections of fisheries potential which would attract investment capital.

From 1965 through 1971, the United Nations Development Program, together with the Food and Agriculture Organization, undertook a major exploratory fishing program under the Caribbean Fishery Development Project. This project concluded that fishery resources in the eastern Caribbean were of insufficient magnitude to support large-scale commercial development (Wolf and Rathjen, 1974). But despite this conclusion and mounting negative experience, the highly capitalized industrial model of fisheries development has persisted for over 20 years.

Between 1970 and 1983, the Caribbean Development Bank provided direct financing, grants and indirect lending in excess of $8 million for projects in the fishery sector. Of five projects actually implemented, three failed completely at a cost in excess of $4.2 million. This trend, incidentally, is not unique to the eastern Caribbean - between 1964 and 1981, the World Bank provided $259 million in loans for fishery projects, the majority of which involved large-scale development. But rates of return on these investments have repeatedly been less than anticipated (Sfeir-Younis and Donaldson, 1982).

Overly optimistic projections of potential yield are common. For example:

- A $1.1 million loan for shrimp trawlers was withdrawn when the company was unable to meet payments because fishing proved uncertain in the target area.

- In St. Kitts an expatriate investor established a deep sea fishing operation, but when catches proved inadequate to meet fuel costs, effort was shifted to nearshore fishing. The resulting conflict with local fishermen contributed to collapse of the enterprise.

- Another expatriate investor has proposed establishment of a fleet of vessels to harvest spiny lobster in Grenada for export, despite the existence of two local operations engaged in similar trade, a local demand exceeding supply and widespread concern that current exploitation is already close to sustainable yield.

If enough of this sort of history is reviewed one begins to feel that overcapitalization is virtually inevitable. A recent FAO report describes six phases typical of fisheries development: predevelopment, growth, full exploitation, over-exploitation, collapse and (sometimes) recovery (Csirke, 1984). Indeed, a fisheries development consultant remarked earlier this year that he would recommend the highest level of capitalization possible for one of the eastern Caribbean islands, because the fishing industry would eventually find the appropriate level of development after a series of collapses and recoveries. This may be true, but small island nations have much less margin for error than larger countries. The impact of bankruptcies and sharp declines in local fish landings can be long-lasting in small countries where other sectors of the economy may be unable to absorb the effects of these events. In addition, the results of direct conflict between large and small-scale fishermen are typically violent, and include arson and murder.

Failure and various other forms of disaster are not inevitable consequences of fisheries development projects; but past experience suggests five lessons which may guide future projects.

The first lesson is that the industrial fisheries model is generally inappropriate to small Caribbean islands. Most objective evidence suggests that fishery resource potentials in these areas are not of a scale which would be commercially attractive in larger nations. In addition, large-scale projects carry a greater risk of rapid depletion of fishery stocks, making it impossible to achieve long-term viability and profitability. But these limitations do NOT mean that there is no potential for fisheries development in the eastern Caribbean. There are almost certainly fishery resources which are underutilized, and these potentials can have significant impact on small-scale economies, even though they may not be attractive

to large nations.

The second lesson is that direct transfer of innovations in fishery technology are typically unsuccessful. There is no doubt that harvest of most underutilized species involves some change in technology. It is difficult, for example, to locate new grounds for deepwater demersal fishing without a depth recorder. But each Caribbean nation is unique, and techniques must be specifically adapted to local vessels, fishing grounds, crew skills, marketing systems and social structures. Fishermen are notoriously conservative. In fact, it is interesting to note that in most islands basic fishing styles and target species have not changed in over 200 years (Price, 1966). This does not necessarily mean that fishermen are reluctant to change; a more accurate interpretation may be that traditional techniques are well adapted to local conditions. The past record of failed innovations leads most fishermen to regard new ideas with some suspicion, and usually to require a clear demonstration of the superiority of new approaches before abandoning proven techniques.

This leads to the third lesson, which is that fishermen must be intimately involved with fishery development projects. This is not merely to make the fishermen feel that they are part of the process, but because fishermen are often the best source of information on local conditions, and are always the best source for information on current fishing operations. The importance of this information cannot always be imagined in advance. For example, an anthropologist working in one island reports that in some areas the boat owner is responsible for ensuring the divine protection of this boat and crew. When a new boat is nearly completed, the owner sends away the builder, and once alone drills a hole somewhere in the boat into which he inserts a written prayer. He then pegs the hole, sands it, and paints as much of the boat as possible so that no one will be able to remove the prayer. His crew trust him to have done this, and are reluctant to go out in a boat which has not been so protected. Such procedures are not part of normal operations in most commercial boatyards, and new vessels may thus be rejected for reasons which can only be explained by the fishermen themselves.

The fourth lesson is that innovations to small island fisheries should be undertaken in stages. At present many essential characteristics of these fisheries are poorly understood, yet are extremely sensitive to external influence. This makes it imperative to evaluate the impacts of innovations in the specific local context, and to provide a means through which the innovation process can be modified as better information is obtained on the specific fishery system. This can best be accomplished when innovations are undertaken on a pilot scale of at least two years' duration.

A good example of the above is a fishing vessel improvement project underway in St. Lucia (St. Hill, 1984). It is, incidentally, to the credit of St. Lucia's fishery personnel that some lessons of history, in this case, appear to have been heeded.

The first attempt to modify St. Lucia's fleet was made nearly

25 years ago. Diesel powered skiffs were provided on loan to graduates of the local fishermen's training school. Few loans were repaid, and the vessels were abandoned or used for non-fishing purposes. At this point it was decided that unsuitable recruits had been selected.

The second project was implemented in the mid-1970's, and provided three fiberglass boats. Fishermen lost interest in these vessels because capital costs were too high, repairs called for skills which were not locally available, and because local markets could not absorb additional inputs of fish.

A third project was funded in the early 1980's to introduce 100 fiberglass boats with cold storage capacity, but was terminated at an early stage when it was realized that the proposed change in technology was too great for existing market and distribution systems.

The current project involves making three types of fiberglass vessel available to local fishing cooperatives so that the fishermen's evaluation can be obtained prior to promoting any particular design.

The fifth lesson is that fishery development projects and technology innovation must be based upon realistic estimates of probable yield, as well as the harvest effort corresponding to that yield. At present, yield estimates for currently utilized stocks in the eastern Caribbean are so variable that they are useless for development planning. There is a tendency in many reports to give a single figure for potential yield, with no indication of the variability which applies to these figures. Two recent consultancies for fisheries development in St. Kitts/Nevis illustrate the problem. One report estimates sustainable yield of coastal shelf resources at 674 metric tons, while the other estimate was three times as great.

This does not mean that detailed technical studies must be done prior to any other development activity. On the contrary, the most effective means of obtaining the desired information is probably through actual fishing operations, an idea which has been developed in some detail by John Munro of the International Center for Living Aquatic Resource Management (Munro, 1983). The working groups operating under the auspices of the Western Central Atlantic Fisheries Commission show real promise of coming to grips with the questions of stock assessment, and management of common resources. In St. Kitts, a development project has been proposed in which modified local fishing vessels would undertake exploratory fishing operations to provide for local technology adaptation as well as initial assessment of yield potentials.

In summary, while fishery resources of the eastern Caribbean cannot support the level of exploitation practised in temperate regions, significant benefits are possible in local economies whose scale is similar to that of indigenous living marine resources. Additional potential is offered by controlled culture of selected species as well as by enhancement of habitats associated with commercially important stocks. But the critical factor of scale is often ignored, and development efforts typically focus upon direct transfer of technology used in other

regions, and fail to address the unique biological, social and economic features of eastern Caribbean fishery systems.

We now face an urgent need for an alternative approach to fisheries development in this region. At present, development decisions are undertaken with little or no information on productive biological systems, and are probably influenced by an unrealistic concept of the modern fishery. Without an alternative, traditional development strategies will continue to be applied, ignoring the history of past failures and often missing the real opportunities for improvement. This trend may actually jeopardize the economic and political stability of small island nations having limited capacity to absorb the consequences of overcapitalization.

But there is hope. There is an increasing awareness of the limited nature of marine resources, and Ministerial-level officials in eastern Caribbean countries are conscious of the history of failure that has characterized many previous fishery development efforts. Fisheries Division personnel are better trained and more committed to sound management and development than at any time in the past. The diverse expertise represented at this Institute is a clear indication that the talent is available to support an alternative development style. And this is fortunate, because the need is no longer to merely select technologies which catch the most fish. The challenge today is to adapt and develop technologies which emphasize production and management as well as harvest, and which are compatible with maximum long-term benefits to the Caribbean people.

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