Historical, Nutritional, Sociological, and Economic Importance of Fisheries to the Countries of the Caribbean – An Overview

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INTRODUCTION

When I was invited to give this overview, I had rather mixed feelings, for while there is no doubt that fisheries are of immense nutritional, sociological, and economic importance to all Caribbean countries, I knew that there would be some considerable difficulty in preparing this overview. First, it is obvious to all of us who have worked with fisheries in the Caribbean that the quality of information available on fisheries, range from the scientifically sound to the culturally mythical. Second, we are all aware of the extreme diversity of resources and the efforts applied in exploitation. Finally, there is the problem of the relative sizes of the various countries, a factor which cannot be overlooked. For example, while the total production of flying fish in Barbados may be insignificant in terms of total overall production in the Caribbean, this particular resource assumes the same relative importance to that country as shrimp does to the United States. Thus we must define what we are dealing with in this conference and emphasize the view that it is almost impossible to draw sharp dividing lines between the different fisheries in the area.

One of the first definitions is our meaning of a "small-scale fishery." I think a usable definition might be one in which we recognize that management of the fishing operation is in the hands of the owner of the capital investment. I stress this to separate fishing operations where day-to-day management is in the hands of a company whose managers may not in fact be involved in fishing operations. I realize, as most of you will, that this is a somewhat unsatisfactory treatment of the problem, for once a small-scale fishery becomes really profitable, as has happened in isolated cases, the managers spend less and less time on actual operations and progressively more time on general management and on expansion of effort.

It is also necessary to establish the time scale with which we are dealing. While it is possible and certainly of interest to consider developments historically from say the colonization of the New World, such an exercise will be extremely time consuming and would distract attention from some of the major developments in the area. Thus, I suggest that we consider events since the turn of the century and in particular, since the end of World War II.

Through much of the area, extending back into pre-Columbian times, something which we call subsistence fishing was practiced and continues to be practiced. Again, although most of us have some general notions as to what is subsistence fishing, for purposes of this overview we might best regard such

fishing as operations in which an individual fisherman spends some significant part of his time in fishing operations geared towards giving him and his family food and giving him cash income from the surpluses. Such a fisherman might also maintain a garden plot in which food is produced for family consumption and the surplus sold for cash. This type of operation is of some considerable importance to the small Caribbean island states and to the more remote village settlements of northern South America and Central America.

I think it also important that we recognize that while most of the small-scale fisheries are basically inshore fisheries, there are several remote fisheries at off-shore keys necessitating comparatively distant travel. Strictly speaking, such fisheries are not off-shore fisheries; the additional navigational and technological skills involved require special recognition.

Finally, it is essential that we bear in mind the extreme diversity of the countries of the area, particularly in terms of size. Some of the island states have land areas of less than 100 square miles and generally have populations in excess of 500 persons per square mile. Most of the island states have extremely limited land resources and are dependent to various extents on marine resources. With this wide range of size, it is inevitable that there must be in the area, some diversity of development.

I propose in this overview to briefly focus on the nature of the resources, and the nature of the fishing effort and then to deal in more detail with the main topics which are the nutritional, sociological, and economic importance of the fisheries to the countries in the area. I make no apology for commenting on the nature of the resource and of the fishing effort, for it is clear to many of us that projections over the years on the extent of the resources have fallen behind actual production in many cases. This may be so because of our lack of understanding of energy transfer processes in tropical conditions and possibly because we have been overly dependent on ecological models evolved under temperate conditions.

Nature of the Resource

Generally speaking, when compared with other areas of the world's oceans, the Caribbean Sea is relatively barren. There is no need for explanations of these phenomena as most fisheries scientists will be familiar with the general oceanography of the Caribbean Sea and adjacent waters. The problem of levels of production is also affected by the bathymetry of the area where most of the island states lack a significant shelf which might support demersal fisheries. The overall picture, however, is not necessarily a gloomy one as there are two extensive areas of continental shelf, the Gulf of Mexico and the Guyana Shelf, both of which receive extensive run off and support major large scale fisheries. In addition, along the northern coast of South America there is significant up-welling supporting small scale coastal pelagic fisheries and along the Atlantic coast of Central America there are extensive barrier reefs supporting demersal fisheries.

Apart from pelagic, coastal pelagic, and demersal fisheries, all of which might fall within the definition of small-scale fisheries, there are also the fisheries for invertebrates which might even be exploited at subsistence level. When taken overall in the Caribbean, these may be of paramount importance. The principal

such resources coming to mind are the spiny lobster and the queen conch both of which are exploited throughout the Caribbean area. Mention must also be made of the cetaceans which continue to be utilized as a source of food and oil in certain parts of the Caribbean.

The Nature of Fishing Effort

While superficially extremely varied, fishing effort in small-scale fisheries is comparatively narrow in application of technologies. This is undoubtedly related to historical and sociological factors which will be considered later, but also to the nature of the resources. Thus for example, the classic methods of the artisanal fishermen, hand-lining and fish potting for demersal species and trolling for pelagic species is widely practiced throughout the area. There are, of course, variations of trivial detail rather than of substance. In certain areas particularly where the resource permits, methods such as gill-netting, ring-netting, and seining have been adopted while under special circumstances trawling has also been developed.

Concerning the types of craft used, it is clear that there are very strong historical factors which have influenced their development. For example, in the area may be seen types of fishing craft evolved from the Amerindian dug-out canoe (Trinidad and Jamaica), the ships long boat, or whale boat of the 18th century (Barbados, Grenada, Antigua, Bahamas, and Central America), and the caravel (Venezuela, Colombia). From the present day craft, it is sometimes difficult for the layman or fisheries' scientist ro recognize the historical continuity between such craft and their antecedents. This subject is undoubtedly within the realm of the naval architect. The lesson this phenomenon gives us is that while there has been an indigenous evolution of fishing boat design, the process indicates a marked conservatism of our artisanal fishermen. This has some important implications for any attempt at development of methodologies.

Historical Background

As mentioned earlier, I suggested that the quality of information relative to small scale fisheries is most uneven. It would, therefore, be probably misleading for me to give an in-depth treatment of the material. However, having reviewed available material, I do think that it is possible to focus on the historical factors involved in the development of these fisheries. Three prominent factors, each interrelated with the others, appear to have been operating. These are (a) natural development from subsistence fishing operations; (b) state or government sponsored activities; and (c) commercial development in response to market situations. Of these three factors there is clear historical continuity between subsistence fishing in pre-Columbian times and subsistence fishing as we see it today. In contrast, government sponsored operations and commercially developed operations appear to be comparatively recent phenomena, arising in most cases since the second world war and, in part, in response to rapidly expanding populations in the area and worsening protein shortages.

We may look briefly at these factors. Archaeology shows us that throughout the Caribbean area and including the Gulf of Mexico, fishing at the subsistence level played an important part in the nutrition of Amerindian peoples. This is

reflected in the extensive kitchen-middens found throughout the Caribbean islands and at coastal settlements in northern South America and Central America. There is also evidence that fish and other marine products may also have found their way from the coast to settlements inland as part of a bartering system. Thus for example, may be seen the *Strombus* motif adorning temples in Toltec and Mayan cities. Undoubtedly, these fishing operations must have been fairly similar to those which currently exist in remote fishing communities in the Caribbean. These operations involve variants of the dug-out canoe or the ships boat and simple hand-lining or trapping operations.

Government or state sponsored developments have been more varied, often reflecting political systems existing in a particular state. Also, such sponsored projects have tended to be geared toward development of co-operative projects rather than individual commercial enterprises. It must be recognized, however, that there are no sharp dividing lines between state sponsored projects and commercially developed projects as in many cases the commercially developed project is, to varying degrees, dependent on political decisions. Generally speaking, state sponsored fisheries development has not been particularly successful and it is my view that this is so, in part, because of failure to recognize the extreme conservatism of the artisanal fisherman. This is not meant to put any particular blame on such a fisherman as he clearly will stick by tried methods knowing in advance the return for his efforts. Forcing such persons into something which they might regard as a purely artificial social structure, while at the same time not recognizing that there are more facets to the development of a fishery than simply catching fish, leads inevitably to non-development of a fishery. There are countless examples of such developments to be seen in the Caribbean area and many of these, particularly in the south-east Caribbean, are intimately familiar to the author. If there is any lesson to be learnt, it is that it takes more than simply showing fishermen how to catch fish to develop a fishery. What must be done, is that the fishermen must be shown how to make more money for his efforts.

There are comparatively few commercially developed small-scale fisheries in the Caribbean area. Notable examples may be found in Venezuela, Colombia, and Mexico and undoubtedly participants in this conference will be hearing more detail of these, either in formal sessions or in informal talks. In these fisheries, while I recognize a certain degree of state involvement, if only in creating a suitable atmosphere and providing capital, the dominant factors in development have been the existence of a reliable resource, a market for the resource or its by-products and above all, the follow up of application of management skills and risk capital. However, it would be optimistic to think that the developments in Venezuela, Colombia, and Mexico can be achieved throughout the Caribbean. The availability of resources will be the limiting factor. In summary, therefore, I suggest that development of small-scale fisheries will be predominently under the influence of the two factors, availability of resources and market demand. I think, nevertheless, that much remains to be done in identification and assessment of resources. This will not be done by the fisherman himself, not by many of the smaller states frequently lacking scientific personnel.

Sociological Factors

It is perhaps presumptuous of a zoologist to enter the realm of a sister science, and the views which I express are largely impressions formed with a limited background of sociology but extensive first hand experience in the Caribbean.

Sociological factors have undoubtedly played a major role in the development of small-scale fisheries. I think that we must recognize two general patterns related to the general development of societies in the area. Considering first the Antillian chain, historically, settlement was largely through European colonization with its attendent plantation systems and slavery. In the process of this settlement, indigenous peoples and their folk ways were effectively eliminated and the slave community deculturized. Developments, therefore, have tended to follow patterns related to similar processes of fisheries development in Europe. Thus for example, today may be seen small inshore fishing craft in the Lesser Antilles, no different in construction from ship's boats of the mid-18th century. In contrast to what has happened in the island states, European settlement of the mainland both in northern South America and Central America has, to a great extent, been inland. This almost certainly must have been on account of adverse environmental conditions in the coastal zone of the mainland. Moreover, the indigenous peoples, particularly in Central America, had by the 15th century, evolved considerably complex societies rivaling those of Greece and Rome and as a consequence were able to assimilate the European influences more readily than the peoples of the Antilles. One consequence of this sociologically, is that there is apparent amqngst the Spanish-speaking fishing folk of the Caribbean, a lesser degree of conservatism than is typically found in the Antilles.

There is also a sharp division in the two general sub-areas between the social structure of fishing communities. In the case of the island states, owing largely to size, coastal villages have tended to grow in continuity with larger population centers and as a result, it has been possible for ideas and technology to move fairly rapidly through such small communities. To cite an instant of the influence of overall size on movement of new methodology, I need only refer to the spread of inshore otter-trawling in the island of Trinidad. Until 1954, shrimp were caught in the Gulf of Paria entirely by seining. Following brief domonstrations of otter-trawling in Port of Spain, within 1 year this method had spread throughout most of the fishing villages along the coast in the Gulf of Paria. Thus, size of country and good communications may be important factors in development of small scale fisheries. In contrast, along the coast of northern South America and Central America, there are still extensive areas of coastal zone which remain relatively undeveloped and which, from the point of view of communications, remain remote from main-stream activities. It is possible that this may be a negative factor militating against development.

Nutritional Importance

Earlier I referred to the rather thorny problem of the quality of information available concerning fisheries. Many of the countries in the area do in fact produce statistical digests of one kind or another and it is possible on the basis

of these to speculate on the importance of fish in nutrition. However, it must be emphasized that in many cases information simply is not available, or of such poor quality as to make speculation an idle gesture. I might, nevertheless, illustrate some of the peculiarities of the problem. In one particular island state, I have watched with interest the projections of actual fish landings over the past 20 years, and have noted gradual increases more or less in the range of 10%. Thus over 20 years, a three-fold increase in production has been claimed. At the same time, the particular digest also gives details of numbers of fishing craft and fishermen employed, but no corresponding increase is shown. Bearing in mind the fact that the basic methodologies employed in this case remain the same, I find it difficult to accept 200% increases in production without any corresponding capital investment or increase in effort. I have seen a similar pattern in another Caribbean state and I am reluctantly forced to a conclusion that our production figures are illusory and probably result from a not unnatural desire on the part of fisheries administrators to make favourable projections of the efficacy of their policies. The problem, unfortunately, remains. Generally speaking, statistics on production in the area are unsatisfactory.

In spite of what I have said above, I nevertheless feel that some speculation is possible and some general conclusion may be drawn. Taking the island of Trinidad, which has a visibly active fishing industry in which some of our artisanal fishermen have managed to move towards small fleets of ocean-going shrimpers, the wholesale market production figures indicate an annual figure of approximately 5 million kg. With a population of 1 million people, fish consumption is, therefore, in the area of 5 kg per capita. Looking at the figures for another island state a comparable value of about 6 kg per capita is demonstrated. When one compares the Trinidad fishery with those existing in other parts of the Caribbean, with few exceptions, it is impossible to envisage drastically different fish consumption figures of more than perhaps 10 kg per capita. We must, therefore, conclude that while fish forms an important part of the diet of many peoples in the area, overall fish consumption figures are substantially lower than those of the countries of the Far East. Whether or not fish consumption increases will be determined by a variety of factors. For example, presently unexploited resources may be developed. On the other hand, as has been found in Europe, as economies develop, the disadvantaged elements in society shift their protein consumption habits from cheaper fish, through poultry, to the more expensive beef.

It is obvious to all of us that there has been a major dislocation of the economic world related to the rise of the OPEC countries, and while some of the Caribbean countries look forward to continued growth of economies, with attendent changes in consumption habits, many of the countries lack energy resources and most now devote larger segments of their production to payment of energy costs. I think, therefore, that we can look forward in the future to increasing dependence on fish resources both for human consumption as well as for production of animal foods. To emphasize the pressures being faced in some of the Caribbean countries, I need only refer to the fact that some people today employ cow hides in their diet while the trigger fish, *Balistes*, is openly sold in markets.

Economic Importance

In reviewing available information concerning the economic importance of fisheries in the area, I have come up against the same general problem cited above, namely that of the quality of information. The overall production figure given by FAO for the Western Central Atlantic is approximately 1.4 million tons. This area includes not only the oceanic areas to the east of the Caribbean but also an extensive area of continental shelf along the northern coast of South America as far south as Brazil. The bulk of the total figure is produced by the United States and Mexico and fully one-third of the catch consists of menhaden used in fish meal production. Moreover, this figure also includes pelagic species such as tuna, taken by Japanese and Korean vessels. If one excludes the United States, Mexico and foreign landings estimated at approximately 1 million tons, the countries bordering the Caribbean Sea produce about 0.4 million tons per year. Bearing in mind the populations of these countries, it cannot be concluded that fisheries in the area make more than a merely modest contribution to the different economies. It is recognized, nevertheless, that in individual cases, the relative importance of fisheries may be significant, particularly in the smaller island states which are heavily overpopulated.

CONCLUDING COMMENTS

In this paper, having had to take a broad overall view, I could not do more than simply focus on some essential issues at the cost of detail. I think, however, that I would be doing a disservice if I did not also try to establish in conclusion, some brief view on future developments. So far most of the developments we have seen have come largely, as I have suggested earlier, in response to market demand. At the same time as fisheries develop, emphasis has been placed to too great an extent on production policies and far too little on what continues to be the central problem to most new food-product development, that of marketing. The importance of dry salted fish in the Antillian states is one such pattern which evolved from the plantation system which required a cheap protein source for slaves. There is no real reason why a substitute for this product cannot be found within the area. In the event, however, that a substitute is not developed, the problem of consumer habit will persist until such time as economic factors prevail. Similarly, there is the problem of wholesale and retail marketing of fish. Traditionally, the produce is sold as fresh fish and preservation is only employed as a last resort. Somehow, we must find the means of convincing the various elements in society involved in the marketing and consumption of fish to recognize the realities of tropical temperatures.

I think too, that we must continue to explore the resources of the area as there is no doubt that much remains to be learnt. At the same time, however, I would suggest less dependence on the scientific challenge and more on the pilot production operation. Finally, I recognize the continued need for the development of management skills within small-scale fisheries.

Importancia Histórica, Nutricional, Sociológica y Económica de la Pesca en los Países de la Región del Caribe

RESUMEN

En esta ponencia se ofrecen algunas definiciones preliminares sobre pesquerías en pequeña escala. Se refiere a la naturaleza de los recursos de las varias pesquerías explotadas y a las metodologías empleadas. Se concluye que, aparte de la pesca organizada desde los Estados Unidos y México y a lo largo del norte de América del Sur, la mayor parte de las pesquerías en pequeña escala no son más que pesquerías de sustento, empleando embarcaciones pequeñas y técnicas primitivas de pesca. Se sugiere que el desarrollo de las pesquerías en pequeña escala ha resultado de tres factores: el desarrollo natural de las operaciones pesqueras de sustento, actividades patrocinadas por el Estado y un comercio en pequeña escala derivado de las exigencias del mercado. Se procede a sugerir que los proyectos organizados estatalmente no han salido tan bien como debiera esperarse, tal vez porque no se haya prestado la atención debida al problema de la venta en el mercado. Factores históricos y sociológicos parecen ser responsables de la tendencia conservadora entre los pescadores. Por lo general el pescado parece desempeñar un papel modesto en la nutrición ya que se consume un promedio de cinco kilos por persona. Hay que admitir, al mismo tiempo, que debe haber excepciones. La producción general de pescado en el área caribeña se afirma ser 1.4 millones de toneladas, pero la mayor parte de esta cantidad es producida por los Estados Unidos y México, y una porción substancial consiste de sardinas (Brevoortia spp.) Se concluye que, mientras la producción de la región caribeña resulta significativa e importante económicamente para unos cuantos países, en general la contribución de las pesquerías a la mayoría de las economías no es más que modesta. Se admite al mismo tiempo, que no se ha sacado el máximo provecho del área y que los esfuerzos se podrán dirigir ventajosamente al desarrollo de sustitutos de productos para la importación y al descubrimiento y explotación de recursos hasta ahora poco utilizados.