

PN-AAG-191

CONFERENCE ON THE DEVELOPMENT OF SMALL-SCALE
FISHERIES IN THE CARIBBEAN REGION

Cartagena, Colombia

November 16-17, 1977

Conveners and Cochairmen

Philip M. Roedel
U.S. Department of State
Agency for International Development

and

Francis Williams
Rosenstiel School of Marine and Atmospheric Science
University of Miami

Edited by

James B. Higman, Francis Williams and Philip M. Roedel

Miami, Florida

September 1978

¹Reprinted from Annual Proceedings 30th Gulf and Caribbean Fisheries Institute, 1978.

ACKNOWLEDGEMENT

The Conference on the Development of Small-Scale Fisheries in the Caribbean Region was supported by the Agency for International Development, U.S. Department of State, Under Grant No. AID/ta-6-1404 to the University of Miami.

CONTENTS
CONFERENCE ON DEVELOPMENT OF SMALL-SCALE
FISHERIES IN THE CARIBBEAN REGION

Opening Session

Roedel, P.M. and Williams, F.	Introduction to the Conference	119
Kenny, T.S.	Historical, Nutritional, Sociological, and Economic Importance of Fisheries to the Countries of the Caribbean – An Overview . . .	122

Benefits of Past Experience

Gibson, J.	The Successes and Failures of the Fishing Cooperatives of Belize	130
Rosa, H.	Small-Scale Fisheries in Brazil	141
Urroz Escobar, J.	Situación de la Pesca y Alcances, Experiencias y Recomendaciones para un Desarrollo de Cooperativas Artesanales en Nicaragua	144
Wood, H.E.	Two Case Histories of Fisheries Development in Trinidad and Tobago	153

Benefits of Past Experience: Discussion . . . 163

Criteria and Opportunities for Development

Bullis, Jr., H.R.	The Biological and Technological Basis for Further Development of Artisanal Fisheries in the Caribbean Area	166
Lampe, H.C.	Demand Analysis and its Implication for Fisheries Development	174
Martinez, H.E.	Oportunidades y Problemas en la Elaboración y Mercadeo del Pescado en Honduras	181
Lawson, R.M.	Processing, Distribution, and Marketing Constraints in Small-Scale Fisheries Development	190
Miller, G.W.	Small-Scale Fisheries Management and Administration	194
Carranza Fraser, J.	Formacion y Capacitacion Pesquera	200
Kirwan, S. and A. Espeut	Financial Assistance to Small-Scale Fisheries in the Commonwealth Caribbean Countries	205

Doucet, W.F.	Technical Assistance to Small–Scale Fisheries in the Western Central Atlantic through the UNDP/FAO WECAF Project	213
--------------	--	-----

Evaluation and Priority Needs

Juhl, R. et al.	Report of the Evaluation Team on Resources and Harvesting.	220
	Reporte del Grupo de Evaluacion sobre Recursos y Captura.	221
Wade, B. et al.	Report of the Evaluation Team on Demand Factors	223
	Reporte del Grupo de Evaluacion sobre Factores de la Demanda.	224
Espinosa Gray, R. et al.	Report of the Evaluation Team on Processing, Distribution and Marketing.	225
	Reporte del Grupo de Evaluacion sobre Elaboracion, Distribucion y Mercadeo	226
Nanni Echandi, H. et al.	Report of the Evaluation Team on Management and Administration	228
	Reporte del Grupo de Evaluacion sobre Manejode y Administracion	229
Clark, W.G. et al.	Report of the Evaluation Team on Education and Training	230
	Reporte del Grupo de Evaluacion sobre Instruccion y Adiestramiento	231
Burnett-Herkes, J. et al.	Report of the Evaluation Team on Financial and Technical Assistance	233
	Reporte del Grupo de Evaluacion sobre Asistencia Tecnica y Economica	234
Storer, J.A.	Summary of the Conference.	236
Roedel, P.M. and F. Williams	Closing Remarks	240

WEDNESDAY a.m. NOVEMBER 16, 1977

OPENING SESSION

Co-Chairmen – Philip M. Roedel
Department of State
Agency for International Development
Washington, D.C.
Francis Williams
Rosenstiel School of Marine and Atmospheric Science
University of Miami
Miami, Florida

INTRODUCTION TO THE CONFERENCE

P. M. Roedel – *Co-Chairman*

I will open this Conference on the Development of Small-Scale Fisheries in the Caribbean Region by giving you some background on the genesis of the meeting and then a rather broad statement of what your conference co-chairman (Frank Williams and myself) hope to achieve over the next two days. The conference is co-sponsored by the University of Miami (GCFI) and the U.S. Agency for International Development. Until 2 or 3 years ago the interest of AID in fisheries was rather minimal but through a variety of circumstances the Agency decided to expand its program, which for the preceding several years had been devoted almost exclusively to tropical fresh-water aquaculture. The broadening of interest led to a consideration of small-scale fisheries' needs and to an examination of the whole fisheries system – if you will – everything that happens from the time you go fishing till the time someone eats or refuses to eat (for whatever reason) your catch.

My affiliation is with the U.S. Department of Commerce's National Oceanic and Atmospheric Administration and I am presently on secondment to AID to assist in the development of policies and programs in fisheries. About 2 years ago we were looking for ways of highlighting AID's new attention to this area. I had been talking with Frank Williams on a variety of fisheries topics related to the Caribbean region and it appeared that it could be extremely useful to both organizations (USAID and GCFI) jointly to hold a conference on small-scale fisheries and that conversation has led to our being here today. Thus the program has been approximately 2 years in its development, for *ad hoc* conferences do not grow overnight, and they require an unbelievable amount of advance planning. Frank Williams and I did not put this Conference together without a great deal of assistance from a number of people. I think many of you sitting here today played major roles in offering suggestions for topics that would be worthy of discussion. I would like to mention specifically Winston Miller, Harvey Bullis, and Jim Higman who served with Frank Williams and me as a Steering Committee to develop the program.

Since arriving here several people have asked me “what is a small-scale fishery?” I have been unable to provide a succinct definition probably because small-scale fisheries are somewhat in the eye of the beholder, and a small-scale fishery in one man’s view is a large-scale fishery in another man’s. The definition also varies from region to region and from country to country within these regions. However, several years ago, in the early days of AID’s expanded fisheries’ program, we did prepare an AID definition which we presented at a conference in November 1975 sponsored by OECD, the Organization for Economic Cooperation and Development. Let me read from our presentation¹ –there is nothing sacred about it but it can perhaps serve as a guideline that you may wish us to use or modify in some way, to reflect things in your area more truly. I quote: “This definition excludes fisheries ventures of a capital intensive nature, so the development of high seas or distant water fleets lies outside of AID’s purview. In the AID context we are talking about largely rural inland and coastal fishermen in the poorest of the developing countries whose catch goes largely for human consumption, who are themselves poor, and who fish with relatively unsophisticated gear and vessels in nearshore marine waters or in the freshwater environment. There is of course a continuum between small and large-scale fisheries and, in the absence of an accepted global definition, the dividing point is arbitrary. AID, however, is devoting its attention to the lower end of the spectrum. The AID definition does not exclude fisheries ventures aimed at high value products for either the domestic or the tourist trade, if they have substantial employment-generating effects. However, the priority is on fish production as a source of relatively low-cost protein and as a source of employment.” This definition incidentally is quite close to that which has been employed by FAO in recent years.

Now, what do we, Frank Williams and I, and our parent organizations, the University of Miami and AID, really hope to bring about as a result of this meeting? What we hope for is your best collective judgement as to the problems impeding the development of small-scale fisheries in the Caribbean region. We hope to get from you some sense of priorities and some sense of who might best be able to assist in reaching solutions to the problems. In this latter area the field is wide open, and possible sources are, I think, fairly obvious – interregional or regional banks; private foundations; FAO/UNDP, particularly the WECAF program here in the Caribbean; bilateral donors such as AID; individual countries themselves or groups of countries working in consortia; and the private sector. Principally, I think we would like to leave here with a sense of true accomplishment and the knowledge that this session of the GCFI will in fact lead to development of small-scale fisheries in the Caribbean. We will then be able to look back upon it a few years hence with a sense of true satisfaction that this meeting led to something real in the real world.

¹ Roedel, P. M. The bilateral assistance program of the United States for small-scale fisheries, p. 96-104. *In* Economic state and problems of small-scale fisheries, OECD, Paris, 1976.

F. Williams – *Co-Chairman*

When we were planning this Conference, the Steering Committee wanted to invite a speaker who we believed could provide us with a very broad review of what small-scale fisheries really mean to the Caribbean region in a historical, cultural, sociological, and economic sense. We were very fortunate, therefore, in obtaining as our keynote speaker, Dr. Julian Kenny, Chairman of the Department of Zoology of the University of West Indies at St. Augustin, Trinidad. Dr. Kenny has been associated with the University for the last 14 years. He is primarily interested in aquatic sciences and tells me this morning that his current interest is in coral reef communities which are under stress. However, I think it is important for you to know that before he went to the University, Dr. Kenny was the Senior Fisheries Officer for Trinidad and Tobago. He is still extremely interested in fisheries and teaches the subject. He was educated at the undergraduate level at the University of Toronto in Canada and then received his Doctorate at the University of London in England. It is a very distinct pleasure for me to introduce Dr. Kenny who will give his keynote address on the historical, nutritional, sociological, and economic importance of fishing to countries in the Caribbean region.

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

J.S. KENNY

*Department of Zoology
University of the West Indies
St. Augustine, Trinidad and Tobago*

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 to 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 predominantly 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 attendant 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 amongst 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 demonstrations 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 attendant 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.

BENEFITS OF PAST EXPERIENCE

The Successes and Failures of the Fishing Cooperatives of Belize

JANET GIBSON
Fisheries Officer
Fisheries Unit Laboratory
Belize City
Belize

INTRODUCTION

Belize is well known for its Mayan ruins and archaeological sites. These include prehistoric fishing settlements along the coast and some of the cays. Judging from bone fragments found, Mayans appear as well to have hunted manatees (Craig, 1966), which are still found in Belize, but in much reduced numbers.

The cultural heritage of the Indians has been transmitted down through the years and until very recently the traditional methods of fishing have been maintained. The fishing practices of Belizeans were then at subsistence level and exports were low. The lucrative spiny lobster industry was controlled by a U.S. citizen and this comprised the main source of fishery exports.

From 1960, however, with the establishment of the first fishing cooperative, Northern Fishermen Cooperative Society Ltd., the fishing industry advanced rapidly. Five years later, this cooperative had total assets of approximately US\$37,600 and a membership of 120. By 1977, their assets had increased to US\$436,000 and the membership had grown to 176. During this period they were joined by four more fishing cooperatives, all of which deal with marine products (Table 1).

The major objective of the cooperative is stated as being "to promote the economic and cultural welfare of its members by providing procedures and means for the efficient production, distribution, processing, and sale of marine products through the united efforts and funds of its individual members" (Supplementary By-Laws, 1968).

Since their establishment these cooperatives have been for the most part very successful. They are efficiently run and have grown considerably and much of this must be due to the measure of organization within the groups. Each has an elected governing body drawn from the member fishermen, each of whom is required to subscribe to a minimum of 15 shares. An executive secretary is also employed. The activities of the individual cooperatives are supervised by the Belize Fishermen Cooperative Association, a nine-member body elected from the membership.

The cooperatives purchase and process the products from their members. At the end of the financial year, after operating expenses have been deducted, the members are given a second payment which is based on each fisherman's proportion of total catch.

Table 1. List of the fishing cooperatives giving their location and date founded

Co-operative	Date Founded	Location
Northern Fishermen Co-operative Society Ltd.	1960	Belize City
Caribena Producers Co-operative Society Ltd.	1963	San Pedro, Ambergris Cay
National Fishermen Producers Co-operative Society Ltd.	1966	Belize City
Placencia Producers Co-operative Society Ltd.	1967	Placencia, Stann Creek
Sarteneja Fishermen Co-operative Society Ltd.	1968	Sarteneja, Corozal

During their initial stages the cooperatives were granted loans from organizations such as the Development Finance Corporation. Within a set period these loans were paid off and most of the cooperatives now own their processing plants, freezers, and ice-making machines.

Each cooperative secures its own export markets and negotiates its own prices and hence has over the past years, established more or less stable relationships with companies in the U.S.A.

TRADITIONAL PRODUCTS

The backreef lagoon of Belize may be considered a single fishing bank having a length of 200 km and an average width of 30 km. The lagoons of the three outer atolls, separated from the barrier reef by depths approaching 3000 m in places, provide good fishing grounds. The margins of the mangrove cays, the patch reefs, and the outer margins of the barrier reef are additionally fished. Within the atoll lagoons and the barrier reef are very extensive and, fortunately, still intact mangrove formations, which are of vital importance as breeding grounds, particularly for scale fish.

The cooperatives deal mainly in spiny lobster, conch, scale fish, and more recently, in shrimp.

Spiny Lobster

This has been the chief money-earner for the cooperatives and is the most important fishery. In 1976, spiny lobster earned 65.6% of the total value of the fishery exports with total exports that year of US\$1.975 million. The U.S.A. is the sole export market.

The spiny lobster, *Panulirus argus*, makes up more than 99.9% of the catch and is taken in the shallow water between the mainland and the barrier reef as well as in the lagoons of the outer atolls of Glover's Reef, Lighthouse Reef, and Turneffe Island. Most are caught in the *Thalassia* grass beds north and east of Belize City by trapping and diving techniques. The practice of these techniques differs radically amongst the cooperatives. For example, the Northern Cooperative fishermen, operating chiefly in the region surrounding Cay Caulker, use traps to take 90% of their catch. On the other hand, the Caribbean Cooperative fishermen from nearby Ambergris Cay catch 77% of their spiny lobster by skin-diving.

Table 2 shows the exports of spiny lobster by each of the cooperatives for the past seven seasons. The season extends from July 15 to March 15, with a 4-month closed season between these dates.

Only the fishing cooperatives are legally permitted to export spiny lobster, each cooperative being given an export quota by the government (Table 3). This system seems to be an effective conservation measure by limiting the maximum catch. Over the past few years, it can be seen that exports, which are a good representation of total catch with approximately 95% of the product exported, have remained relatively stable.

Queen Conch

The conch industry, based on the large gastropod, *Strombus gigas*, is the second major fishery in Belize. One cooperative in particular, National Cooperative, has traditionally dealt in large volumes of this mollusc and in 1976 was responsible for more than half of the total conch exports. As the demand of the U.S. market has increased, coupled with price increases, more and more conch were exported. In 1977, approximately 90% of the conch production was exported. The U.S.A. received the major portion but a small quantity also went to Mexico. Figure 1 shows that exports rose to a peak in 1972. Subsequently, instead of leveling off to a plateau, the catches have steadily declined. Due to continually rising prices, it is highly probable that the species is being overexploited, although adequate catch-per-unit-effort data has only been collected for the past year and thus it cannot yet be shown definitively that a decrease in population is involved. If this is the case, recovery is likely to be slow since the conch may take 4-6 years to reach maturity in nature. As a conservation measure a closed season is being introduced in an effort to save the fishery.

Nevertheless, although the conch exports have been decreasing, steadily rising prices have ensured that it remains a profitable product.

Shrimp

Two of the fishing cooperatives, Caribbean and Placencia, deal with shrimp, each utilizing three trawlers. Both the cooperatives feel that there is great room for expansion in this fishery and are thus planning to invest in more trawlers.

Table 2. Exports of lobster by season in metric tons for each cooperative from 1970 to 1977

Co-operative	70/71	71/72	72/73	73/74	74/75	75/76	76/77
Caribena	50.6	62.5	58.7	56.6	62.0	54.4	51.7
National	32.5	39.7	33.3	36.2	44.5	38.7	58.7
Northern	110.2	90.4	80.7	62.7	80.9	99.7	88.9
Placencia	12.6	16.8	14.0	8.7	12.2	8.6	13.0
Sarteneja	-	9.8	12.3	6.6	7.1	9.0	11.6
TOTAL	205.9	219.2	199.0	170.8	206.7	210.4	223.9

Table 3. Export quotas assigned to each cooperative and their cold storage capacity

Co-operative	Export Quota (metric tons)	Cold Storage Capacity (metric tons)
Northern	79.4	58.1
National	54.4	68.0
Caribena	63.5	50.3
Placencia	20.4	29.5
Sarteneja	13.6	27.2
TOTAL	231.3	233.1

In 1967, a U.S. citizen held a 5-year shrimp concession. Since 1972, however, when the shrimp industry was taken over by the fishing cooperatives, exports have risen steeply (Fig. 1) and are continuing to increase with the addition of trawlers. In 1977, 72% of the shrimp catch was exported to the U.S.A.

Scale Fish

Spiny lobster catches have remained more or less stable over the past 10 years and conch catches are declining; thus, apart from the shrimp fishery, which can withstand a limited expansion, the future expansion of the fishing cooperatives lies in the further exploitation of the scale fish resources. All cooperatives are

beginning to become aware of the need for diversification within their industry and all showed a marked increase in their fish exports for the past year. Compared with fish exports for 1975, exports for 1976 have doubled (Fig. 1). Even so, 41% of the scale fish produced by the cooperatives was consumed locally in 1977. The remainder was exported to the U.S.A. and Jamaica and small quantities to Honduras and Guatemala.

Annual reports of the fishing cooperatives for 1976-1977 repeatedly state that growth in the fishing industry will depend on their ability to increase production of scale fish. The present levels of inshore fishing cannot be sustained and thus the cooperatives will have to turn to deep-sea fishing beyond the barrier reef. Large investments will have to be made to acquire deep-sea vessels and to provide the necessary training in deep-sea fishing techniques. Presently there are two vessels conducting scale fish operations beyond the reef but their fishing is still in the exploratory stage.

At present only a proportion of the available species of scale fish are being exploited but public education will be necessary to inform the people that many species other than those presently eaten are also edible and should be utilized.

PROBLEMS AND FAILURES

Despite the overall successes of the fishing cooperatives, there have been several instances in which the organizations have experienced serious problems. Mostly these stem from financial or mechanical problems but social and cultural factors have also contributed.

Mechanical problems have included a lack of adequate cold storage facilities, processing equipment, and ice-making machines, although in general the present situation is much improved.

There have been occasions when the cooperatives have experienced difficulties in preserving their produce due to poor refrigeration and shipping arrangements. For example, during the 1964-1965 spiny lobster season, difficulties arose at Northern Cooperative when the weekly shipping space proved inadequate to cope with incoming catch and the freezer plant was too small to accommodate the surplus. The Society, as a result, had to dump 5066 kg of spoiled spiny lobster tails.

Since Belize City is the port of export and the site at which most of the product is sold locally, those cooperatives based on the outlying islands or districts have the additional problem of transporting their produce without suitable refrigeration.

Due to a shortage of ice-making facilities, production has often been held up by lack of ice. Cooperatives are remedying this by investing in new plants. When shortages of ice occur, it is encouraging to note that there is a fair amount of cooperation between the cooperatives in helping each other with supplies.

The processing plants of the cooperatives have had to be refitted gradually to conform with the requirements of the U.S. Food and Drug Administration and this usually means a considerable additional expense. Several of the societies have, for example, replaced their processing tables with stainless steel ones.

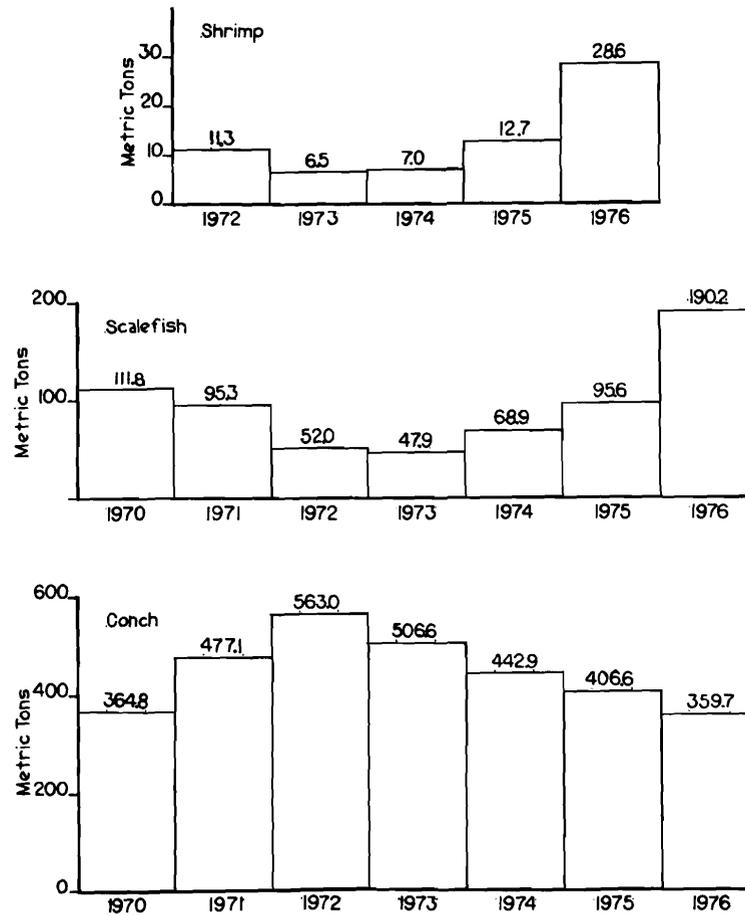


Figure 1. Conch, shrimp and scale-fish exports for years designated.

Conservation is another major problem which faces the cooperatives. As previously mentioned, the conch fishery appears to have been depleted rapidly. For the fisheries to be sustained, the cooperative members must be prepared to accept conservation measures such as closed seasons or closed areas. At present there is a spiny lobster closed season but many of the cooperative members do

not adhere to this law and enforcement is difficult. Although the cooperatives themselves cooperate by not buying spiny lobster from their members during the closed season, it is known that some fishermen start their catch during the latter part of the closed season and keep the lobsters in closed pens until the season opens. Needless to say, it is extremely difficult for the cooperative management committees to persuade their fishermen of the value of conservation measures when poachers are breaking the law, but again the problem is obviously one of inadequate enforcement.

Such a system would doubtlessly be very costly, especially when one considers the large extent of the territorial waters that need to be patrolled.

The map shows (Fig. 2) that all the cooperatives are in the northern half of the country, with the exception of the Placencia Cooperative. The reason for this unequal distribution is no doubt based on a sociological problem. A fishing cooperative was established in the southern town of Punta Gorda in 1971 but this organization is now defunct. Its failure may be traced to the tendency for most of the fishermen in this region to be part-time farmers as well. Many of the people in the area are Black Caribs who settled in small coastal villages where they became subsistence farmer-fishermen. These people are self-sufficient and contribute little to the general economy (Craig, 1966). Because of this division in the activities of the members involved, the operations of the cooperative could not be sustained. It may be of interest to note that the same problem appears to apply to the small scale agriculture of the region as well. For example, the traditional milpa farming, which incidently, was once adequate to support the Mayan Civilization, appears no longer sufficient in itself and has to be augmented by other activities such as fishing and hunting (M. Kellman, personal communication). The failure may also be linked to the cultural fishing practices of the people of that region. The fishermen in the south consistently use less effective handlining methods rather than trapping, netting, or skin-diving. It may be significant that skin-diving is popular among the fishermen of Placencia (Craig, 1966).

Some of the cooperatives have also had to deal with problems of loyalty. For the cooperative to be successful and prosperous, it is essential that its members are loyal and sell their catch to their cooperative. At times, it has been suspected that members have sold their catch elsewhere, usually illegally over the border, either in Mexico or Honduras, where they receive a marginally higher price. In such cases, the fishermen disregard the fact that although their cooperative may be buying initially at a slightly lower price, this is later supplemented by second payments. It is ironic that this nearsightedness of attitude reduces their income in the long run. The cooperatives may also suffer from a lack of production incentive amongst their members. This is especially acute after the second payments have been made at the end of the financial year. At this time the fishermen are reasonably well-off and some apparently then lose the motivation to work and produce. It has been stated before that the cooperative is responsible for the economic as well as the cultural welfare of its members. A conflict may arise between the social and economic well-being of the members which must be closely studied by the management of the cooperatives. If the desire to gain

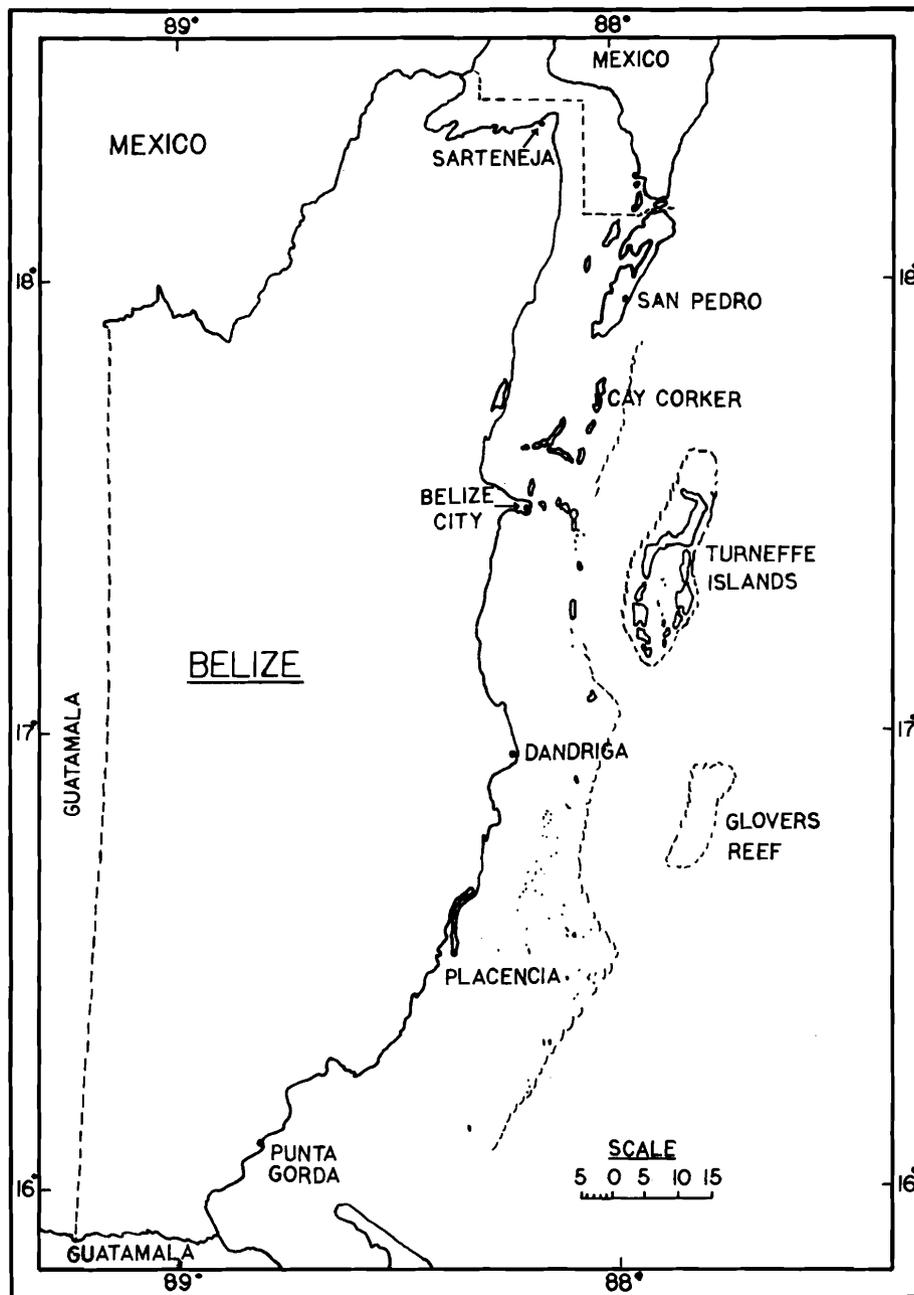


Figure 2. Map of Belize showing the sites of the five fishing cooperatives.

material possessions is willfully nurtured among the members, this will inevitably result in an increase in production, and consequently an increase in the economic well-being of its members. But one can never be certain that such an increase in economic status will be tied to a social well-being. In fact, the opposite may often be true and the continuous desire for more possessions and the competition between the members may well destroy rather than enhance the well-being of the fishermen.

ADVANTAGES

Membership of the fishing cooperatives offers definite advantages to the fishermen. As mentioned before, the cooperative provides valuable processing and exporting facilities. It also carries out the large-scale marketing of the produce and is hence in a better position to place sales and negotiate prices than the individual fisherman. Very few, if any, of the fishermen catch in large enough quantities to warrant self-controlled storage, processing facilities and, marketing and export services, even assuming that they could do so with the same degree of economy. There are a few individual fishermen who export corned fish but this is very seasonal and in small quantities).

Apart from the benefit of having a secure market for their products, membership of the cooperatives also carries other advantages. These include loan facilities for the purchase of periodic and moderately high capital expenditure items such as outboard engines. According to the by-laws of the fishing cooperatives their business should include "lending money to aid its members." The funds of the Society itself should include "loans from financing institutions and other sources." These loans use the shareholding of the members as collateral. By this means, for example, the two cooperatives which deal in shrimp are able to provide a loan system by which the individual fishermen eventually own the trawlers. The cooperatives themselves first buy the trawlers and each trawler is then assigned a captain. A portion of each shrimp catch is subsequently taken over by the cooperative and in this manner, the captain gradually pays off the price of the trawler until he becomes the full owner. Usually this occurs within 5 years.

In addition to loans to members, the cooperatives contribute to reserve and educational funds for members' use. At present, one fourth of the net surplus accruing from any one year's operations is transferred to reserve fund. The remainder of the net surplus may be used in contributions to an educational fund. Some of the cooperatives are also beginning to organize both pension and sickness funds. A similar scheme run by the cooperatives provides a saving system for its members in which a set amount is put aside in a savings account for each pound of product sold. This seems to be working well.

The rapid growth of the cooperatives is indicative of an increase in prosperity amongst their members. Over the past years, during which the fishing

cooperatives have been operating, there has been a remarkable increase in the standard of living of the fishermen. Most of the fishing villages, such as San Pedro and Cay Caulker, have grown considerably and the housing and facilities have noticeably increased in quality. This, no doubt, reflects also an increase in quality of boats and fishing equipment leading in turn to a higher technical sophistication and potential increase in catch.

CONCLUSIONS

It has been suggested that the fishing cooperatives would be even more successful if they were to amalgamate and form one central cooperative. By pooling resources it would be easier for the members to overcome problems such as shipping, adequate refrigeration, and marketing as well as obviating the need for duplication of processing and refrigeration equipment that exists at present. Most of the existing cooperatives are aware of the need to diversify their production and the field of diversification and expansion lies mainly in that of deep sea fishing, with the emphasis on scale fish. Such a venture will require a large capital investment in boats and equipment and in training in deep-sea fishing techniques. Whilst the cooperative effort is partitioned, however, such investment will be slow to materialize. As a united group, the venture would probably be much more feasible.

Apart from diversification in actual production, the cooperatives also need to diversify in their product development. The products are exported after the minimum of processing; that is, they are generally exported as fresh-frozen produce. It would be more profitable if the product were processed somewhat further, for example, to produce "breaded" products. But again, such a venture would tend to require a single, larger corporate body. An additional advantage of such a venture is that it would probably decrease the present level of wastage in the cooperative processing plants. The wastes, which would still occur, if pooled in this way, would probably be high enough and sufficiently localized to support the development of an animal food or fertilizer processing industry.

In connection with this Snyder (1976) has also pointed out the need for a Belizean cooperative marketing association; such a cooperative could function as a marketing distribution group in the U.S.A. directly representing the Belizean fishing industry. Thus the existing broker-distribution intermediaries would be eliminated and result in an increase in revenue for products. The cooperative could also provide marketing efforts related to new products.

At present, however, the cooperatives are individualistic in concept and the idea of uniting to form one large cooperative does not appeal to them.

The fundamental conservatism of the fishermen and the cultural factors involved have contributed to the limited exploitation of the resources. At the same time, however, the fishing co-operatives have been sufficiently successful for the United Nations F.A.O. to chose Belize as a suitable site to train others in the organization of their own cooperatives.

We must recognize, however, one major controlling factor basic to this success; that is, the high demand for fishery products on the international export market.

Exitos y Fracagos de las Cooperativas Pesqueras de Belice

RESUMEN

Las cooperativas de pesca que fueron iniciadas en Belice en 1960, han contribuido en gran parte al alto nivel de vida y educación del pescador, suministrando un mercado de exportación para los productos principales: langosta, caracol, pescado y camarón. Constantemente se le pasa revista detallada a la contribución de estas cooperativas pesqueras lo cual ayuda a mantener las medidas de conservación donde sea necesario. Aunque la perspectiva generalmente es de gran éxito animador, ha habido fracasos y dificultades, como en el caso de fallos en las plantas procesadoras, surgiendo así el concepto de individualismo al tener cooperativas separadas. La expansión futura de la industria pesquera pudiera verse perjudicada por esto, especialmente en áreas donde se requiere grandes cantidades de fondos, como en la pesca en mares profundos. Los aspectos culturales y sociales han contribuido a una producción por debajo del máximo, lo cual puede ser contrabalanceado por las implicaciones sociales de un cambio muy drástico en la forma de vida tradicional del pescador.

LITERATURE CITED

- Anon. 1968. Supplementary By-Laws, Sarteneja Fishermen Co-operative Society Limited.
- Craig, Alan K. 1966. Geography of Fishing in British Honduras and Adjacent Coastal Waters, Louisiana State University Press, Coastal Studies Series Number 4. 143 pp.
- Snyder, Donald G. 1976. Processing, Product Development and Marketing of Belizean Fishery Products, FAO Report F1: DP/BZE/71/007/2. 39 pp.

Small-Scale Fisheries in Brazil

HORACIO ROSA
Superintendencia do Desenvolvimento da Pesca
Brasilia, Brazil

INTRODUCTION

Both industrial and small-scale fisheries are practiced along the whole coast of Brazil; the latter being also found in inland waters.

The small-scale fisheries are characterized by the lack of infrastructure and boats of less than 20 tons, a large number of which are row or sail boats. They can be grouped as "subsistence fisheries", carried out with such rudimentary equipment and under such conditions, that the financial yield does not normally reach the minimum subsistence level of the fishermen; and as commercial fisheries carried out by professional fishermen. Small-scale fisheries are carried out in inshore waters, estuaries, lagoons, rivers, and lakes and they complement the industrial fisheries.

The fishermen in Brazil are organized in "colonies", each colony with a minimum of 300 members. There are about 240 colonies in the country with a membership of about 90,000 registered members. The colonies have certain social welfare functions such as schools, medical, and dental services and, according to their statutes, they promote among their associates the organization of production and consumption cooperatives.

The colonies are affiliated with the Federation of Fishermen established in each state and territory of the country. These in turn are affiliated with the National Confederation of Fishermen.

THE SMALL SCALE FISHERIES

The small-scale fisheries contribute about 50% of the total fish production of the country or approximately 950,000 tons.

There has been a gradual mechanization of the craft used by the small-scale fishermen. Of the 121,271 boats registered in 1960, only 3,176 or 3% were motorized. In 1968, of the 54,695 registered units 9% were motorized, 53% were row boats and 38% were sail boats.

To assist the small-scale fishermen a Plan of Assistance to the Small-Scale Fisheries (PESCART) has been implemented since 1973 by the Superintendency of the Development of Fisheries (SUDEPE) – the federal fisheries service of Brazil, in collaboration with other national, regional, or state institutions and programs. The basic objectives of the PESCART are to: (1) raise the technical level of the small-scale fishermen; (2) raise the income of the small-scale fishermen and consequently the standard of living of their fishing communities. Specifically it assists in the following sectors: (a) methods of capture; (b) processing, distribution and marketing; (c) training; (d) credits and loans; (e) cooperative and community development.

During the period 1973-1976 PESCART invested about U.S. \$2.4 million in the development of its activities, and it operates 79 extension service units with a staff of 185 technicians assisting 64,000 fishermen and their families.

In 1976, 320 maritime engines of 10 to 100 h.p. were introduced by PESCART in the small-scale fisheries, as well as 20 boats from 1 to 10 tons and a further 50 smaller boats. Nine hundred loan projects were approved as were 60 credit schemes amounting to U.S. \$230,000. Twenty-nine cooperatives were strengthened or organized.

Assistance to the Small-Scale Fishermen in the State of Santa Catarina

Santa Catarina is a good example of the result of active assistance of PESCART and other institutions. There are 14 extension units in operation. The state has a coastline of 531 kilometers; there are 22,000 small-scale and industrial fishermen.

The catches of the small-scale fisheries are increasing. The catches in 1974 were 29,800 tons representing 23.5% of the total catch of the state, an increase of 1.8% over the catch of the previous year. The majority of the boats are powered by small diesel or gasoline engines but there are also row and sail boats.

The increase of the catches of the small-scale fisheries is due largely to the assistance given during the last 6 years by the association of Credit and Assistance to the Fisheries of Santa Catarina (ACARPESC) in cooperation with PESCART, SUDEPE, and other institutions.

The objective of the assistance is to increase the productivity of the small-scale fishermen and raise their standard of living at the community level. ACARPESC is giving assistance to 140 fishing communities.

The results of the extension work carried out in 1976 were as follows:

- (1) Three hundred and thirty-nine gasoline engines were replaced by diesel engines resulting in a reduction of the operational costs of the boats of about U.S. \$600,000. The operation was initiated in 1975 when 405 gasoline engines were replaced by diesel engines. The total replacement in 1975/1976 was of 744 engines and the saving during the same period was of about U.S. \$1.3 million. There was no reduction of the catches.
- (2) The traditional single species capture practices were the main cause of small catches, depletion of the species and consequently a low income per capita. The diversification of the fisheries has been successful, resulting in a continuous production during the year and a reduction of excessive effort on a few species.
- (3) Fish handling and preservation were improved by the introduction of isothermic boxes on board some of the boats, the installation of small freezers, cold storage units, and the use of isothermic trucks.
- (4) A conservation program was initiated as a result of which over 200 fishermen used new fishing methods to protect various species, particularly shrimp.
- (5) Credit schemes were initiated in 1975 and, at the end of 1976, 625 loans had been granted to a total of about U.S. \$68,000. The loans were made

mainly for the introduction of diesel engines, various types of fishing boats and gear, and the purchase of isothermic trucks and freezers.

- (6) A program to eliminate the excessive number of fishermen was developed.
- (7) Courses were given in various fields to utilize idle manpower.
- (8) Programs were developed to improve the diet, medical and dental care, and housing of fishermen and their families.
- (9) A program was carried out to (i) improve the 16 fishermen colonies of the state and to increase their membership, which is about 15,500 fishermen; (ii) to teach the fishermen the principles and advantages of the cooperative systems. A unit was installed in one of the colonies to buy fishing equipment at wholesale prices and sell it to the fishermen with a small profit to cover the administrative expenses. The unit will be developed initially into a consumption, and eventually into a mixed cooperative.

CONCLUDING REMARKS

The extension services, the systems of credits and loans and the educational and social assistance being provided by PESCART in cooperation with federal and state institutions, are being successfully developed within the available financial resources. However, the improvement of the colonies, and the expansion and strengthening of the cooperatives, still require substantial efforts to make them effective instruments in the organization of the activities of the small-scale fishermen and their communities.

The main problem of the cooperatives is the need for efficient management to demonstrate to the fishermen in a short period the benefits that they may bring to them and their communities. It is expected, however, that through extension services and educational and social assistance the small-scale fishermen will be eventually prepared to manage effectively their own colonies and cooperatives.

La Industria Pesquera en Pequeña Escala en el Brasil

RESUMEN

La pesca en pequeña escala contribuye aproximadamente con un 50% de la producción total de pescado del Brasil lo cual representa unas 950,000 toneladas.

Este trabajo describe los programas de asistencia a los pescadores en pequeña escala, que está llevando a cabo la Superintendencia para el Desarrollo de la Pesca –SUDEPE– servicio federal a la pesca del Brasil– en colaboración con otras instituciones federales y estatales; un buen ejemplo de los resultados de la asistencia a estos pescadores lo es la información suministrada al Estado de Santa Catarina sobre los programas que se están realizando.

**Situación de la Pesca y Alcances,
Experiencias y Recomendaciones para
Un Desarrollo de Cooperativas Artesanales en Nicaragua**

JAMIL URROZ ESCOBAR

*Instituto de Fomento Nacional (INFONAC)
Managua, Nicaragua, C.A.*

PANORAMA DEL SUB-SECTOR PESQUERO

Durante 1976 el rubro de la pesca ocupó el séptimo lugar en importancia dentro de los principales productos de exportación, con un aporte equivalente al 4.1% del valor FOB de las exportaciones del país. La contribución del sub-sector de caza y pesca, en la formación del Producto Interno Bruto (P.I.B.), ha pasado de 0.5% en 1968 a 1% en 1976.

En 1977 la actividad pesquera ocupa cerca de 6,000 personas, de las cuales un 50% laboran en la industria establecida y el resto en extracción de subsistencia y en actividades de comercialización. Operan 17 plantas que procesan básicamente camarón, langosta, y pescado. De ellas, siete están ubicadas en el Atlántico, siete en el Pacífico y tres en el interior del país. Dos tienen características de pequeña empresa y se dedican al secado de camarón y pescado o bien a su venta fresco. En conjunto las empresas establecidas tienen una capacidad para procesar 284,000 libras diarias, congelar 245,000 libras diarias (81,700 lbs/turmo de 8 horas) y almacenar 2.5 millones de libras. El capital invertido en la industria pesquera es del orden de los 200 millones de córdobas, estimando la actividad artesanal en un 2–3% del total.

Para los principales productos, la producción pesquera se estima alcanzó en 1976 cerca de 34 millones de libras, de las cuales un 44% (15 millones) provienen del Atlántico, un 30% (10 millones) del Pacífico y un 26% (9 millones) de aguas interiores (lagos y ríos).

La flota pesquera industrial está formada por embarcaciones mayores de 8 metros. En 1976 trabajaron un promedio de 289 embarcaciones, dedicándose 130 a la extracción de camarones, 99 a la langosta y 60 a especies de escama, principalmente pargo. En el Atlántico trabajaron 182 barcos (64%), en el Pacífico 100 (34%), y en el Gran Lago de Nicaragua 7 (2%).

Encuestas realizadas sobre la flota pesquera artesanal señalan que operan cerca de 1,400 pequeñas embarcaciones (menores 8 m), la mayor parte denominadas “cayucos”, que están hechas de troncos de árboles.

El consumo per cápita anual de productos de la pesca se elevó en 1973 a 3.1 kilos (6.8 lbs.), siendo para el pescado 2.8 kilos (6.2 lbs.) o sea 8 gramos diarios por persona; y para camarones, langostas y otros mariscos importados 0.3 kilos (0.6 lbs.). Para 1976, se estima el per cápita anual en 3.3 kilos (7.3 lbs.)

Administración Pesquera

El Ministerio de Economía, Industria y Comercio es el que tiene la mayor responsabilidad en la administración pesquera. Sus funciones básicas están determinadas por las leyes principales No. 316 y 557 que reglamentan el otorgamiento de las concesiones para la pesca comercial. Otorga las concesiones que son procedentes y posteriormente fiscaliza y controla el cumplimiento de los términos planteados. Está facultado para aplicar sanciones que pueden llegar hasta la cancelación de la licencia. Se encarga de calificar las peticiones de importación de artículos para las embarcaciones, artes, implementos, lubricantes y combustibles, e informa al Ministerio de Hacienda para que éste tramite la liberación de derechos en las aduanas. Por último, dicho Ministerio fiscaliza el movimiento de las plantas según las especificaciones de las licencias y aplica sanciones y multas a los contraventores de ellas.

El Ministerio de Agricultura y Ganadería es el organismo técnico responsable de la aplicación de las disposiciones pertinentes de la Ley Especial de Pesca No. 557, especialmente respecto al manejo de las licencias de pesca doméstica, deportiva y científica, así como de cultivos controlados de mariscos. Tiene acción punitiva en la aplicación de sanciones.

El Instituto de Fomento Nacional (INFONAC) estableció el Programa Pesquero (División de Pesca), con el fin de promover el desarrollo de la actividad pesquera, a través de una adecuada asistencia técnica y financiera. En términos generales, realiza estudios de pre-inversión, promoción, financiamiento, investigación de recursos y sirve como unidad asesora del estado y de la iniciativa privada en este campo. En particular procura: (a) Incrementar la producción y exportación pesquera, a fin de contribuir positivamente a la Balanza de Pagos a través de programas de financiamiento; (b) Diversificar el sector, con el propósito de aprovechar al óptimo posible la disposición de los recursos existentes; (c) Lograr el aumento en el consumo de productos pesqueros a nivel nacional; (d) Crear una flota pesquera nacional; (e) Recopilar y elaborar información sobre la pesquería a nivel nacional, para su utilización en estudios técnicos. Dicho programa efectúa acciones y actividades coordinadas con organismos del gobierno y entidades privadas nacionales e internacionales, relacionadas con esta materia. En asuntos de zarpes, participa con sus inspectores en la autorización junto con los comandantes de armas y administradores de aduanas. Los inspectores califican a su vez la seguridad abordo, certificándola en cada uno de los zarpes.

El Ministerio de Defensa y Marina es responsable de la recepción de los barcos, del control de la carga, de la revisión de pasaportes y visas, y de la autorización de todos los zarpes. Coordina con la Guardia Marina en los aspectos de patrullaje de la costa y control de contrabandos. Atiende problemas de tierra como huelga, manifestaciones, saqueos, robos, etc.

RECURSOS PESQUEROS

La actividad pesquera tradicional del país se ha fundamentado desde sus orígenes en la explotación del camarón, la langosta, el pescado, y la tortuga. En

el litoral del Pacífico se ha explotado únicamente el camarón y ciertas especies de escama. Sin incluir los ríos y las lagunas existentes, las áreas de explotación pesquera se clasifican de la manera siguiente: (a) Litorales Atlántico y Pacífico; (b) Lago de Nicaragua; (c) Lago de Managua; y, (d) Lago de Apanás.

Varias especies de camarones, en su mayoría del género *Penaeus*, habitan en ambos litorales. El habitat preferencial de los adultos son los fondos arenosos y fangosos, a profundidades de 5 a 40 brazas. Los tamaños varían de acuerdo a las especies, siendo el camarón blanco el que alcanza mayor tamaño, y el camarón café, de menor tamaño. Su reproducción es un ciclo que inicia la hembra en el mar, desovando los huevos previamente fecundados; éstos, en poco tiempo pasan por los estados de nauplius, protozoa y mysis, los cuales son arrastrados por la corriente y, ya en estado de postlarva, llegan a los estuarios donde inician su crecimiento hasta alcanzar el estado juvenil; los juveniles emprenden su retorno hacia el mar, donde en estado adulto alcanzan su madurez sexual. Es aquí donde se realiza la pesca de los adultos, la cual se hace exclusivamente con redes de arrastre. También se pescan los camarones en estado juvenil cuando se encuentran en las lagunas y playas litorales, realizándose la captura por medio de atarrayas y/o chinchorros, lo que se considera perjudicial para el recurso.

Las langostas del género *Panulirus* se presentan en ambos litorales, *P. argus* en el Atlántico y *P. gracilis* en el Pacífico. Prefieren un habitat de fondo rocoso o promontorios coralíneos, donde encuentran variada alimentación, ya que son omnívoras y muy voraces. Estas especies son muy fecundas, observándose que las hembras cargan los huevos debajo del abdomen. Su pesca se realiza por medio de nasas, sistema de buceo y ocasionalmente se captura en los arrastres de los barcos camaroneros.

En el Atlántico y Pacífico las especies comerciales que se desembarcan con mayor frecuencia son: pargo, bagre, róbaló, corvina, lisa, mero y macarela. En el Lago de Nicaragua predominan los desembarques de guapote, mojarra, sábalo, pez sierra, tiburón y gaspar. En los lagos de Managua y de Apanás se limitan casi a guapotes y mojarras.

En el litoral Pacífico existen entre otras especies de valor comercial, apreciables recursos de pargo y mero; asimismo se ha observado la presencia de cardúmenes de sardina y arenque que al parecer no pueden soportar una pesca comercial. Las capturas de pargo oscilan entre 15 y 20 kg/anzuelo/día.

Varias especies de pescado comercial se encuentran distribuidas casi paralelamente a lo largo de la costa del Pacífico.

Se ha observado concentraciones en algunos puntos como desde Cosigüina hasta Aserradores, desde Corinto hasta Puerto Somoza —preferentemente frente a la Isla del Venado, frente a Masachapa, y entre San Juan del Sur y Bahía de Salinas. Los peces considerados como comerciales en este caso son: bagres, corvinas, lenguados, salmonetas, roncadores, mojarras, pargos, róbalos, tiburones, rayas, atunes, jureles, dorados y meros. Otras especies de camarón que existen en este litoral entre las 70 y 190 brazas son el “fidel” (*Solenocera agassizii*) y el “rojo pequeño o langostilla” (*Heterocarpus vicarius*), que no se están pescando comercialmente.

En el litoral Atlántico la FAO realizó investigaciones en 1971, encontrando una población importante de pargos (*Lutjanus sp.*) a lo largo de la plataforma.

Chemico, en reporte No. J0071A-B/6 de Febrero de 1970, expresa también una aparente abundancia de pargo rojo en el litoral Atlántico de Nicaragua, que puede ser explotado a un costo relativamente bajo.

Los principales recursos en el litoral Atlántico se encuentran en el Banco Mosquitos, entre Honduras y Nicaragua. Todo el banco ocupa una superficie de 120,000 km², siendo el 40% de su fondo irregular y accidentado, lo que lo hace un refugio ideal para las langostas. Asimismo se cree poco probable la creación de una pesca industrial importante del camarón en aquellas zonas costeras alejadas de los bancos camaroneros tradicionales del oeste del Mar Caribe, aunque se está consciente de la necesidad de mayores investigaciones para conocer los fundamentos de la posible magnitud de esta pesquería.

Exploraciones realizadas por la FAO en 1971 descubrieron abundantes recursos del “bogavante” en la parte exterior de la plataforma caribeña del país. Esta especie se encontró entre 20 y 30 brazas, siendo mayor la densidad de su población a más profundidad.

Estas especies abundan y se pueden obtener fácilmente desde Panamá hasta el centro de la costa de Nicaragua, pero desde este punto hacia el norte se hace más difícil su captura debido al tipo de fondo que no se presta para la pesca de arrastre.¹ El rendimiento como número de colas por libra es menor que el del camarón que se pesca tradicionalmente. La explotación del camarón de aguas profundas sería un valioso complemento del de aguas someras, explotado actualmente con gran intensidad. De estas dos especies, el “fidel” alcanza mayor tamaño y normalmente se pesca en aguas menos profundas que el “rojo pequeño”. La presencia del “camarón rojo pequeño” se observa en apreciables concentraciones frente a Puerto Somoza, entre los 86°50'–87°20' Oeste y los 11°40'–12°20' Norte. Hay otras concentraciones detectadas pero mucho más pequeñas en varios puntos de la costa. Este camarón fue detectado por travesías de barcos de la FAO entre la costa y las cien brazas de profundidad, con la excepción de una pequeña concentración frente a Corinto (entre los 88° 20'–88°30' Oeste y los 12°30'–12°40' Norte) que se encontró a más de las cien brazas. Entre Cosigüina y Corinto no se encontró la presencia de este camarón.

También existe en toda la costa del Pacífico una gran población de “langostino chileno” (*Pleuroncodes planiplis*). Su rendimiento es menor (6–8%) que el camarón de agua profunda, pero en este caso es probable que quede compensado por la abundancia del recurso aprovechable.

Las investigaciones hechas por la FAO aseguran la abundancia de este crustáceo en casi toda la plataforma con excepción del área de Cosigüina a Corinto, entre los 87°10'–87°50' Oeste y los 12°20'–13° Norte.

PESCA ARTESANAL

A lo largo de los litorales y en los lagos existe una pesca tradicional en pequeña escala a nivel de subsistencia que abastece de pescado en gran medida al mercado interno. Esta actividad ocupa de 3,500 a 4,000 pescadores que utilizan

artes y métodos de pesca rudimentarios como líneas de mano, chinchorro y atarraya, siendo sus embarcaciones en su mayoría de madera y pequeñas, lo cual las hacen técnicamente deficientes y poco rentables. En cambio la pesca industrial goza de fuentes permanentes de crédito, teniendo una buena organización empresarial, gerencial y capital intensivo, además, sus operaciones de pesca, procesamiento y comercialización son llevadas a cabo con embarcaciones, maquinaria y equipos modernos que dan altos rendimientos y una calidad excelente. El pescador artesanal se desenvuelve en condiciones precarias, sin facilidades que le permitan obtener mayores cantidades de productos y lograr una mejor contribución a la producción nacional. El sistema de comercialización y distribución de las capturas está en manos normalmente de intermediarios, que a pesar de cumplir una función económica, causan a veces perjuicios al encarecer el producto a los consumidores. No obstante, se debe reconocer que en algunos casos estos comerciantes son útiles, en particular para aquellas comunidades pesqueras que se encuentran alejadas de los centros de consumo y cuyos medios de transporte son escasos.

Asistencia Técnico—Financiera

En los países en vías de desarrollo —como Nicaragua—, por lo general los organismos estatales y los bancos de fomento siguen la política de otorgar financiamiento sólo a aquellos elementos de la pesca que gozan de respaldo económico y que por tales circunstancias son catalogados como elegibles sujetos de crédito.

Esto ha traído como consecuencia que el pescador artesanal, por falta de garantías que ofrecer, ha sido marginado de los planes de financiamiento. Asimismo, la asistencia técnica, en gran parte o en su totalidad, ha sido absolutamente insuficiente, como ocurre en Nicaragua. Lo anterior viene a señalar que el artesano —en particular el de Nicaragua— necesita de una ayuda técnica y financiera inmediata, provista de condiciones “blandas” que le permitan obtener, amparado en grupos organizados, recursos económicos carentes de requisitos gravosos. De otra forma se hace la ayuda inoperante debido a que el pescador, tomado individualmente, carece de la mínima capacidad para contraer obligaciones. En este caso no se sabe cuál sería el sistema de ayuda óptima aplicable al sector artesanal. A nuestro juicio, este es un asunto complejo, que aún no ha podido ser resuelto en muchos países por factores propios, como el grado de conciencia, políticas bancarias, tradiciones, costumbres, educación, etc. En todo caso, se cree que una mayor atención de los organismos internacionales podrían jugar un papel muy importante en la búsqueda de una respuesta a esta problemática en procura de un cambio a este panorama, con la puesta en marcha de proyectos que tiendan de manera sustantiva a propiciar la creación y consolidación de cooperativas, a través de una asistencia técnica razonable y la canalización de recursos suficientes, que permitan la adquisición de embarcaciones y artes adecuados, la provisión de obras de infraestructuras portuarias y el establecimiento de esquemas de comercialización.

DESARROLLO COOPERATIVO

Origen y Experiencia

El cooperativismo en la rama pesquera nicaragüense es reciente, originándose en 1969, al formarse la primera organización de este tipo en el Lago de Apanás (Departamento de Jinotega), en la región central-norte del país; en sus 50 kms² de extensión, 40 pescadores se dedican a la captura y mercadeo de peces. Posteriormente se formaron otras cooperativas, una en Puerto Morazán (Departamento de Chinandega), con 60 pescadores que explotan crustáceos y peces del Golfo de Fonseca, y otra en la comunidad de Casares (Departamento de Carazo), con 35 pescadores. La política de agrupar pescadores artesanales se debe al empeño de organismos del gobierno y privados, con el propósito de propiciar su mejoría socio-económica. No obstante, este movimiento ha tenido un éxito relativamente pobre ya que en ocho años sólo se han formado tres de estas pequeñas empresas, de las cuales sólo una está operando parcialmente, estando las otras inactivas. Los aspectos fundamentales que se creen han detenido la consolidación y el fomento de cooperativas pesqueras son: (1) Falta de un organismo con planes definidos para propiciar un desarrollo integral con sentido social; (2) Carencia de recursos económicos suficientes para canalizarlos a esta finalidad; (3) Falta de experiencia en organización y manejo de programas de esta naturaleza; (4) Grado de educación de los pescadores, que los convierte en cierta forma en un estrato social, con algún sentido de frustración y falta de confianza para trabajar en conjunto; (5) Inexistencia de una ayuda técnica y financiera suficiente, tanto nacional como internacional, para enmarcar proyectos concretos de formación de este tipo de cooperativas.

Legislación Cooperativa

La Ley General de Cooperativas fue creada en el Decreto No. 1833 en Julio de 1971. Sus disposiciones más importantes son: (1) Libre adhesión, retiro voluntario; igualdad de derechos y obligaciones de los miembros; y neutralidad política y religiosa; (2) Derecho de un voto por miembro, independiente del número de certificado de aportación que posee; (3) Número variable de miembros, nunca inferior a 10. Estos deberán ser mayores de 18 años; (4) Capital variable y duración indefinida; (5) No perseguir el lucro como fin primordial; (6) No poder ser dueño de más de un 10% del capital social; (7) Distribución de excedentes en proporción a las operaciones que éstos realicen con la cooperativa o a su participación en el trabajo común; (8) Fomentar la educación cooperativa.

Entre otras consideraciones que contempla la ley se señala que las cooperativas pueden ser de todo tipo, de las que se mencionan específicamente las cooperativas pesqueras, las cuales a su vez son de dos categorías: (1) Las que disponen de equipos y que distribuyen un porcentaje de las ganancias a los obreros que laboran en ellas; (b) Aquéllas con equipos adquiridos por sus miembros, las cuales distribuyen el excedente de acuerdo al trabajo realizado.

Los aportes de los cooperativistas, de acuerdo al estatuto de la cooperativa pueden ser hechos en dinero, bienes muebles o inmuebles o en servicios.

Tres o más cooperativas de un mismo tipo y dentro de la misma región pudieran integrar una unión regional. Para todos los efectos legales estas organizaciones serían consideradas como cooperativas.

Las cooperativas están exentas de todos los impuestos fiscales y de los impuestos o derechos de importación sobre maquinarias, herramientas, repuesto y todo tipo de equipo necesario para su funcionamiento.

Administración Cooperativa

El Departamento de Promoción del Cooperativismo está adscrito por la ley al Ministerio del Trabajo. Entre sus funciones más importantes se encuentran: (1) Iniciar, promover y dirigir todo tipo de cooperativas; (2) Estructurar planes de fomento y desarrollo junto a otras instituciones gubernamentales y privadas; (3) Velar que las cooperativas cumplan con las normas legales y los principios del cooperativismo; (4) Autorizar el funcionamiento de las cooperativas que cumplan los requisitos legales; y (5) Proceder a la disolución y liquidación de las cooperativas conforme a la ley.

CONCLUSIONES Y RECOMENDACIONES

En Nicaragua el movimiento de formación de cooperativas pesqueras a nivel de artesanos es muy reciente, lo que explica en parte el limitado desarrollo alcanzado en este campo.

Se cuenta con “comunidades de pescadores” que reúnen características adecuadas para ser orientadas al trabajo común, así como recursos ictiológicos suficientes en los litorales y lagos internos para propiciar un mayor aprovechamiento.

Existe una legislación cooperativa satisfactoria, pero el aspecto promocional ha sido deficiente.

Hay varios organismos que tienen ingerencia en la formación de cooperativas, y esto causa que se pierdan energías y se dupliquen esfuerzos.

No hay un ente especialmente dedicado y preparado para organizarlas, coordinarlas y administrarlas en forma permanente; además se necesita de un plan maestro que señale políticas, procedimientos y programas sistemáticos, así como niveles de recursos económicos específicos para propiciar un desarrollo gradual y efectivo.

No existe en el presente ninguna ayuda internacional tendiente a proveer cooperación técnica especializada en este campo.

El desarrollo de cooperativas pesqueras en el país ha retrocedido o está prácticamente estancado.

Es evidente la predisposición y el entusiasmo del pescador por el trabajo conjunto en pequeñas empresas cooperativas, no obstante, no existen al presente medidas y facilidades que satisfagan las necesidades de asistencia que esto requiere.

Considerando lo anterior se esbozan a continuación algunas recomendaciones que se creen podrían a corto plazo, si se llegan a concretar, sacar del estancamiento económico al sector artesanal de Nicaragua: (1) Asignar en un organismo del gobierno la responsabilidad de planear, organizar y administrar la formación de cooperativas de pescadores artesanales, considerando la disposición de fondos para implementar los señalamientos y la disposición del elemento humano capaz de brindar la asistencia necesaria; (b) Procurar la obtención de una cooperación financiera técnica internacional para asistir a los beneficiarios en aspectos tales como: educación para crear conciencia sobre las ventajas que trae el trabajo en equipo y el consecuente logro de mayores ingresos, obteniéndose así una mejoría económico-social; asistencia en la formación y administración del organismo empresarial propiamente dicho; adquisición y manejo de embarcaciones, artes y equipos convenientes, y en la supervisión y control de las operaciones hasta lograr la consolidación empresarial; además, para capacitar personal en varias técnicas relacionadas con la pesca y el mercadeo; (c) Nuestra experiencia hasta el presente señala que no se han alcanzado los frutos deseados por falta de una atención adecuada y por pasadas improvisaciones. Esto nos lleva a sugerir la asignación de funciones en un organismo rector que señale todo lo concerniente a la implementación gradual de un plan de esta naturaleza, basado en prioridades derivadas de la situación del pescador en sus respectivas comunidades.

Status and Production of Fisheries, Experience and Recommendations for Development of Artisanal Cooperatives in Nicaragua

SUMMARY

Fisheries activities in Nicaragua are carried out in fresh waters and in the Atlantic and Pacific Oceans.

The industrial fishery production was estimated at approximately 34 million pounds in 1976, consisting of: fish, 73%; shrimp, 20%; and spiny lobster, 7%.

The invested capital in the fishing industry is approximately U.S. \$18.6 million, only 2-3% of that amount is invested in artisanal fisheries.

Annual per capita consumption of all fishery products, including imports, increased from 3.1kg (6.8 lb) in 1973 to 3.3 kg (7.3 lb) in 1976.

Artisanal fisheries employ approximately 4,000 fishermen who use rudimentary fishing gears and methods; their situation is considered precarious due to: (1) lack of financial assistance, because the artisanal fisherman offers little security; (2) insufficient technical assistance, both national and international; (3) fishery products are overpriced when sold by retailers.

Because only one, out of the three organized cooperatives, is still partially operating, the development of artisanal cooperatives has not succeeded in Nicaragua. From this experience we recommend: (1) establishment of an office with definite plans which could provide integral development; (2) providing technical and financial assistance; (3) facilitating international technical cooperation, and educating the artisanal fisherman in those techniques related to fishing and marketing.

Two Case Histories of Successful Fisheries Development in Trinidad and Tobago

HUBERT E. WOOD
Division of Fisheries
Ministry of Agriculture
Port of Spain
Trinidad and Tobago

INTRODUCTION

Between 1672 and 1708, 156,000 slaves were brought to the West Indies to replace the white laborers on the plantations where agriculture was confined to sugar production. The result was a shortage of protein foods in the West Indies. The colonizers of the coastal areas of the New World, which subsequently became Canada, were already shipping dried cod to the European navies and the large Catholic populations of France and Portugal. They used this new incentive to further develop their fisheries, and thus they accidentally imprinted this taste for dried cod on the West Indian menu to this day.

By 1841 the combined British West Indies and other West Indies colonies absorbed over 70% of the fish exported from Nova Scotia. It is recorded that the trade between Canada and the West Indies at that time involved over 400 merchant ships and 10,000 seamen.

With changes in the world economic climate, it was found expedient that the "colonies" should become more self-sufficient so as to pay for their own food while producing raw material for the mills of the "mother country" for transformation into "added value" products. The pressure was now on the colonies to feed themselves and various advisors produced an array of documents proposing solutions to this problem. Nevertheless, imported dried cod continued to be a major source of protein in the diet of the colonies.

During the early 1960s Jamaica, Trinidad and Tobago, and Barbados became independent nations, within the British Commonwealth. This, with the changing status of other islands in the Caribbean, placed on them the burden of feeding themselves and developing their own resources so that they could survive as complete economic entities in a highly competitive world.

The following two case histories show how in one particular country the fishery resources have been utilized to achieve the above goal.

CASE HISTORY I – DEVELOPMENT OF TRAWL FISHERIES

In 1910, Harry Vincent, an ardent sport fisherman, wrote a book "The Sea Fish of Trinidad." In it he demonstrated the feasibility of using a steamtrawler and commented, "it will be seen by these notes that a steam trawler of good capacity can be brought out here, ready for action and fully equipped for about

twelve thousand dollars, and I see no reason why the venture should not be a profitable one and at the same time supply the Colony with good fresh fish at six cents per pound.”

Thirty-five years later Whiteleather and Brown (1945) in their report to the Anglo-American Caribbean Commission found, after an experimental survey in the area using a 77 foot (overall) vessel, that four species of shrimp were present, and that catch rates of fish from 202 to 574 lb per hour were possible.

On fishing gear they concluded, “It is believed that the otter trawl has a future in the Gulf of Paria. . . More consistent catches of fish were made with the small otter trawl even under experimental conditions than by any other type of fishing gear in local use at the corresponding time.” On marketing, they concluded, “since the market demand for all kinds of fish greatly exceeds the supply, a fair price would be commanded by trawl caught fish.”

A further report for the Government of Trinidad and Tobago and the Caribbean Commission was made in 1955 by A.R. Richards. He was very much influenced by the Whiteleather and Brown (1945) report and commented, “one or two minor private attempts were made subsequently to apply their recommendations but in general local fishermen continued to use the seine nets and handlines.” It should be pointed out at this time that the survey in question was financed by Thor Dahl, Inc., a company that was described by Richards as, “having amongst other enterprises, extensive fishing, freighting and whaling interest in many parts of the world.” After six months’ work Richards concluded, “it was apparent that trawl fishing could not be carried out on the very large scale hoped for originally for Thor Dahl, Inc., and the future lay in fishing on a smaller scale if prices improved.”

It may be prudent at this point to introduce the question of prices. At this time (1955), trawl type fish was described as “d” class fish and the average wholesale price was 14-16c T.T. per pound. In fact Richards in his analyses used 13c T.T. per pound as his working figure.

A case for establishment of a small fleet was made by Richards (1955), predicated upon the fact that “saltfish is consumed in preference to fresh fish because it is available in unlimited quantities all year around and because of its keeping qualities.”

It appears therefore that the attitudes toward fisheries development over the years went through a variety of stages and are listed progressively as follows: (1) to feed the “Colony” in the first stage; (2) to reduce the importation of salt fish, which could be achieved by increasing the production of fresh fish locally; and (3) import substitution for stabilization of the economy. Having realized that none of these concepts were working, we decided to adopt a new strategy.

In view of the fact that shrimp was already being landed on the local market, and increased landings invariably meant a reduction of prices on the local market, a secondary terminal market was established so that all surplus could be channeled off the local scene.

In 1968 there were nine foreign companies operating 88 Gulf of Mexico-type trawlers out of Trinidad, and fishing off northeast South America (the Guyanas and Brazil). We rationalized that if these companies could get shrimp for the

U.S. market without having to worry about production and attendant problems, then they should be pleased.

Arrangements were made to have a merchant purchase the shrimp in Cedros, employ girls to take the heads off, place the shrimp in large tins of ice water and transport them for sale to the owners of the already established foreign fleet. This effort was an immediate success. By June 1968, I (Wood, 1968) had documented that: (a) 80% of the country's inshore trawling fleet had migrated to the south of Trinidad; (b) shrimp production had increased by 133% over total landings for the country within a week and over 250% of the total for the same period the year before; (c) 50% of the catch was being processed for export; and (d) 60 new jobs (removing shrimp heads) had been created. I concluded, "It does seem that refinement of this system and application to specific fisheries does seem to be the answer to increase production to the inshore fishermen in the Caribbean."

One year later Jordan (1969) showed that: (1) 75 new trawlers were constructed between 1968 and 1969; (2) more shrimp was being made available and utilized locally; and (3) by June 1969, approximately 500 persons were directly employed in all aspects of the shrimping industry (artisanal).

In early 1969 only two Trinidad and Tobago registered Gulf of Mexico-type trawlers fished locally (Fig. 1), but by the end of 1969 we had nine.

During 1969 and 1970, we attempted to stimulate the development of fin fish through export promotion. By late 1969, our first shipment of snapper and Spanish mackerel went to Jamaica. In early 1970 we entered the U.S. market via Miami; a little later we had fish in New York, and by September of the same year, we had our first shipment in Montreal (Wood, 1972 b).

In the meantime, fish was being removed from the local market, hence a false demand picture occurred and wholesale prices went up. This provided further stimulus for the purchase of 75-foot trawlers. During 1970, three documents were produced and circulated (Wood, 1970 a and b; Wood, 1972 a) in an attempt to have the Government and local entrepreneurs purchase a decent fleet. By 1972 we had 30 registered trawlers while exports continued to rise and so did local prices (Fig. 2).

By 1972, tests began on processing of underutilized species into fish balls, fish sticks, canned and dried products (Wood, 1972). Unfortunately, we have not as yet been successful in getting these products into the local market. The Government purchased a shrimp fleet in 1972 and later, in 1973, purchased a shrimp processing plant.

The total registered deep-sea fleet in Trinidad and Tobago now (1977) consists of 70 vessels (Fig. 1).

Evaluation

According to Richards (1955) grade "d" fish (croaker and salmon) was 16 cents per pound. By 1969 croaker and salmon fetched an average of 36 cents per pound on the wholesale market. Thus, the price of these grade "d" fish increased over a 14-year period by 125%. However, on the subsequent introduction of export marketing over a 5-year period they rose by 200 to 300%.

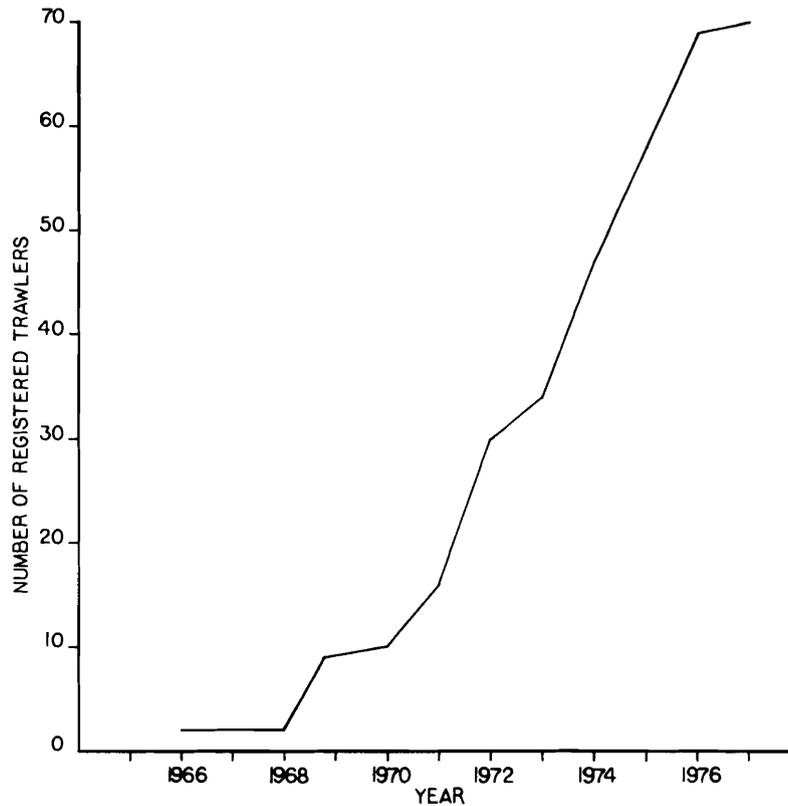


Fig. 1. Number of registered trawlers in Trinidad in the years between 1966-1977.

Examination of the data provided on the prices of flesh protein 1972 to 1977 reveals that there had been substantial increases in the price of fish. Although the magnitude of the price differential differs considerably among species and between other flesh protein suppliers, pork and chicken in particular, the reasons that could be attributed for this situation are: (a) the existing cost/price ratios; (b) increasing incomes and therefore increased ability to purchase; (c) increasing population and therefore increased demand; (d) spiralling inflationary trends; (e) non-seasonal nature of substitute items – pork and chicken; (f) periodic discrepancies in both factor and product markets; and (g) absence of effective price regulating mechanisms.

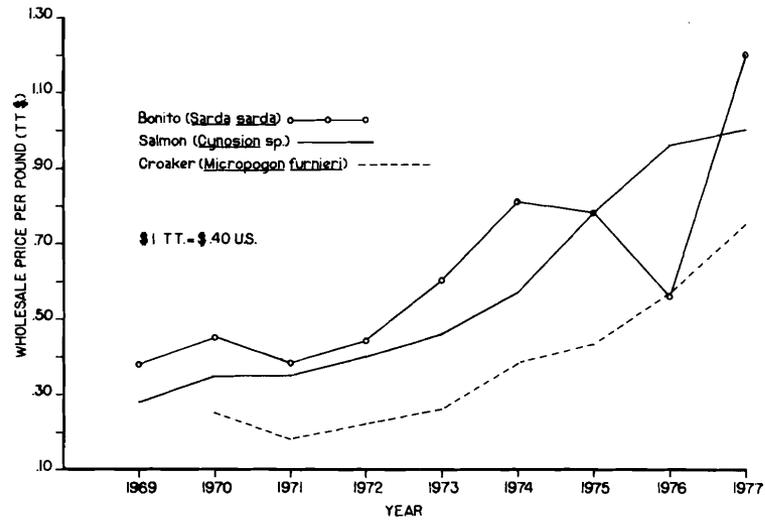


Fig. 2. Price per pound (wholesale) of fish in the years between 1969-1977 in Trinidad and Tobago.

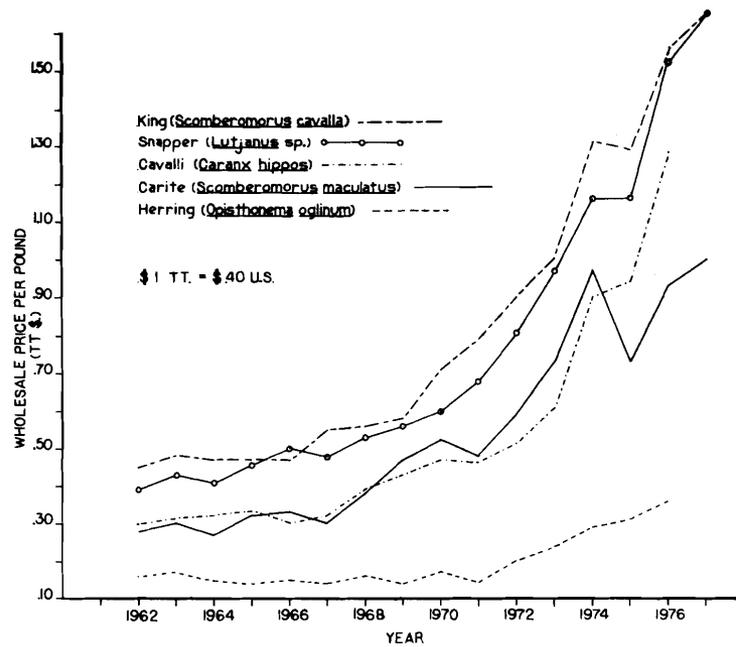


Fig. 3. Price (wholesale) per pound of fish in Trinidad from 1962 to 1976.

Fisheries development over the years has witnessed irreversible successes in terms of: (1) Increased supplies to domestic and foreign markets – in the former, a greater stride toward self-sufficiency in food, and in the latter, the provision of valuable foreign exchange for sustained development. Figures are not available to examine the effects of import replacement. (2) Increasing employment opportunities because of the multi-dimensional nature of the industry – from boat-building to packaging. The concomittant income-generating effects had a substantial positive impact on overall development of the industry.

It would seem that although heavy investments were made in fisheries development over the years, funds were injected into areas that cannot now be said to be economically feasible entities. Further development paths for national fisheries development would therefore call for more rigidity in planning and implementation stages, and constant review and modifications with time. The interplay of economic, social, and other relevant factors must be taken into account.

CASE HISTORY II – DEVELOPMENT OF THE FLYING FISH FISHERY

In 1962 a private investor bought a classic Barbados fishing vessel and by 1967 he went into the processing of flying fish, a fish previously unused in the fishery. In 1977 he processed 600,000 flying fish of which just under 500,000 were exported. For a fishery that was previously non-existent in Trinidad and Tobago to where it stands today, the development of the fishery must be considered a definite success story.

History

The present processor, prior to entering the field of fisheries, was a professional manager of a coconut estate from which he earned his livelihood in Tobago. In 1962, he teamed up with another resident of the island and went into the fishing business. In 1962, these entrepreneurs purchased a vessel from Barbados on which they employed two Barbadian fishermen. The fishermen apart from trolling, introduced a technique known as “lurking”, which is technically a six-hook long-line, fished with live flying fish for pelagic species such as dolphins, tunas, sailfish, and others. There was then no market for flying fish in Tobago.

After 2 years of operation the partners separated and the present operator retained ownership. Somewhere during this period the Barbadian fishermen married girls from Tobago to whom they imparted the knowledge of the process of deboning of flying fish. Meanwhile, the owner of the boat religiously retailed his fish through the streets in a Land Rover vehicle.

It is no longer clear how the marriage of the “Bajan” fishermen, their wives learning the deboning technique, the owner of the vessel getting tired of selling his fish through the streets, and the Government trying to bring in Barbadian women to teach the technique of deboning in Tobago, aggregated to create a trigger mechanism which launched the present industry.

Method of Fishing

The flying fish vessels average 22-26 ft. overall length and are manned by two men. The boats are of the typical Tobago "bum-boat" construction; four of these use diesel engines and the rest are powered by outboards, making a total of 16 boats involved in this fishery.

The nets are similar to those used in Barbados in that they are about 30-feet long and 12-feet deep. They are hung on the full as the flying fish will tangle in anything as soon as the spawning behavior takes over.

To find the concentrations of flying fish, the fishermen look for masses of floating debris, e.g. sargassum weed, and oil slicks on the water. The behavioral patterns are not yet clear, but it appears that the flying fish get into a spawning frenzy as they attempt to deposit their egg mass on the net. Meanwhile, the "lurking" lines are out and they catch ancillary pelagic species which are attracted to the concentration of flying fish. Among the attracted pelagic species are sharks and as a result flying fish nets have to be picked up every hour to prevent the sharks attacking the gilled flying fish.

Experiments in Tobago have shown that the red-colored flying fish net catches more flying fish than the conventional green netting, but the green netting continues to be used. Bales of net are brought in from Barbados by the processor and sold to the fishermen at cost.

At present the fishery consists of 16 boats with 32 men of which the average earning for the season is \$12,000 T.T. per boat. One particular boat that we have monitored earned over \$18,000 T.T. over the season; the result of 124 days of work, an average of \$145 T.T. per day.

The money earned by a boat is divided into three parts, one half goes to the owner of the boat and the other half is divided equally between the two fishermen. It is customary for one of the fishermen to be the boat owner, hence he receives three-quarters of the proceeds. Hence, in the above example, he would have grossed \$108 T.T. per day. In comparison with other wages in the country – an average of \$26 T.T. per day for a skilled craftsman – it appears that at the time flying fish fishing is the most lucrative trade available.

Processing

Fish are landed on the beach, then transported to a cold storage unit in a shed in the backyard of the processor, where they are kept on ice. The following morning the fish are distributed to 10 homes in the village, each of which has a team of 10 women who proceed to fillet the flying fish. These are then collected by the processor about every 2 hours and taken back to his home. There the fish are packed six to a plastic bag (10-12 oz.) and frozen. The women fillet an average of 200 fish per day and each of them earns between \$50 to \$80 per week.

The advantages of this cottage-type industry are obvious. The processor has no union problems, no factory overhead, and the workers have no transportation costs. Given the size of the villages where this industry operates, it provides employment for almost all of the female labor force.

Evaluation

For centuries flying fish have been present around Tobago but the fishermen caught them only for use as bait in trolling operations. It holds little or no consumer acceptance in Tobago and it does not even appear in the market. Small quantities were being sold in the supermarkets in Trinidad but even so, only persons of Barbadian heritage, who knew the fish, were prepared to purchase it.

The real boost for expansion came in the development of a secondary market.

A recent market survey done by the Fisheries Division showed a potential market for over 4 million lb of flying fish per annum as it is the only fish in the region that is tailor-made for the institutional markets at home and abroad.

CONCLUSIONS

These examples of case histories show that it is possible to develop a fishery from a zero position, and additionally, it is possible to add linkages to a fishery either to further develop its productivity or to initiate new fisheries on a modular basis to already developed lines.

At this time, it is virtually impossible to measure the various parameters of the steps in development and the gross economic gain. However, it is clear that there has been a net economic gain to the community and a virtual irreversible trend in the advancement of the utilization of the fisheries resource.

Probably the overriding aspect of this development is the lack of involvement of state funds in these achievements, and the minor degree of practical application contributed by various studies of the specific resources.

Some of the benefits that have normally been ascribed to international agencies, but have been achieved without help, are as follows: (1) Trinidad and Tobago now has three processing plants, one owned by the government and two privately. Of these, two are relatively large, one with a capacity of 2,000 tons of cold storage and one with a fish meal plant. (2) Trinidad has changed from an importing country to an exporting country with respect to wet fish. (3) Trinidad fishing boats landed 2,000 tons of shrimp heads-on, in 1976 for the export market. This fishery has been extended from an artisanal fishery to an offshore fishery over 1,000 miles from their base. (4) A change in consumer acceptance of fish species has been affected. (5) A development of ancillary industries and transfer of technology has been achieved. (6) The filleting of fish has been perfected without external help. (7) The village of Cedros has shown remarkable development in housing and recreation. (8) From one Gulf of Mexico-type trawler in 1968 we now own 72 of these vessels. (9) Most of the development has been due to personal refinancing. (10) Our dockyards have been extended. (11) There is now a lively interest in marine biology on the part of the public. (12) As an empirical measure, a few of our trawler owners are millionaires.

The famous nineteenth century French economist, J.B. Hay, claimed that when there was a surplus, demand could be created; we believe that where there is a demand, a surplus could be created.

Dos Casos Históricos sobre el Exito del Desarrollo Pesquero en Trinidad y Tobago

RESUMEN

Durante tiempos coloniales, la dieta en proteínas en las Indias Orientales dependía principalmente en bacalao seco importado. A principios de la década de 1960, Jamaica, Trinidad y Tobago, y Barbados, al alcanzar su independencia dentro del Protectorado Británico, se vieron obligados a alimentarse por sí mismos y a desarrollar sus propios recursos.

Los siguientes casos históricos nos muestran como en un país determinado, los recursos pesqueros pueden ser utilizados de tal manera que permita alcanzar dicha meta.

El primer caso se refiere al desarrollo histórico de la pesca de arrastre. Harry Vincent (1910) menciona las ventajas del uso del arrastre a vapor, pero no fue hasta 1945 que Whiteleather y Brown, demostraron que la tasa de captura en arrastres experimentales, usando red de puertas (otter trawl), era entre 202 y 574 lb. de peces por hora, capturándose además cuatro especies de camarones.

Richards (1955), influenciado por el reporte anterior, comentó que a pesar de las recomendaciones de dos empresas privadas, los pescadores locales continuaban pescando con red barredera, y cordel y anzuelo; además añadió que preferían el pescado salado al fresco, ya que se obtenía en cantidades ilimitadas todo el año y por su ventaja de almacenamiento.

Por lo anterior, parece que las aptitudes hacia el desarrollo pesquero han pasado por las etapas siguientes: (1) Alimentar a la "Colonia", (2) Reducir la importación de pescado salado, aumentando la producción local de pescado fresco, y (3) Importar sustitutos para estabilizar la economía.

Debido a que los factores anteriores no funcionaron, y al hecho de que ya se estaba desembarcando camarón localmente, se decidió aumentar su desembarco lo que causó una reducción de su precio, desarrollándose así rápidamente la industria camaronesa. Wood (1968) y Jordan (1969) mostraron el crecimiento vertiginoso de la pesca e industria camarones, creándose así nuevas fuentes de trabajos, inclusive para mujeres en el descole de camarones; por consiguiente la construcción de arrastreros también aumentó considerablemente entre 1968 y 1969. Durante 1969 y 1970 se estimuló el desarrollo de las capturas de peces, habiéndose exportado pargo y serrucho a Jamaica. Desde 1970 a 1972 se extendió nuestro mercado a Miami, Nueva York y Canadá; en 1973 se adquirió una planta procesadora de camarón; actualmente (1977) se cuenta con una flota de aguas profundas de 70 embarcaciones.

El segundo caso histórico relata el éxito alcanzado en la pesquería del pez volador, desde que se inició en 1962 por un inversionista privado hasta la actualidad (1977) en que se procesaron 600,000 ejemplares, de los cuales se exportaron 500,000.

Esta pesca comenzó en Tobago en 1962 con dos pescadores de Barbados que pescaban curricaneando y que introdujeron el método de "lurking" que consiste en un palangre de seis anzuelos, usando pez volador como carnada viva para pescar entre otros peces, delfines, atunes y agujas. Dichos pescadores enseñaron a sus esposas de Tobago el proceso de deshuesar el pez volador. El hecho de que el dueño de la embarcación se cansó de vender el pescado por las calles, y de que el gobierno tratara de traer mujeres de Barbados para enseñar en Tobago el método de deshueso, provocaron el inicio del auge de la industria presente.

El pez volador se usa en Tobago casi exclusivamente como carnada en la pesca de curricaneo, teniendo poco o ningún mercado; en Trinidad solo lo consumen aquellos que provienen de Barbados.

La falta de fondos estatales y la falta de aplicación práctica de los estudios realizados sobre los recursos, han dificultado el desarrollo pesquero en Trinidad y Tobago.

A pesar de no recibir asistencia internacional se han obtenido los siguientes progresos: (1) Trinidad y Tobago tienen tres plantas procesadoras, (2) de país importador de pescado fresco, Trinidad se ha convertido en exportador, (3) en Trinidad se desembarcaron 2,000 tons. en 1976; (4) cambio en la aceptación de especies de pescado por parte del consumidor, (5) desarrollo de industrias subordinadas, (6) perfeccionamiento del fileteado de pescado, (7) la villa de Cedros se ha desarrollado considerablemente en viviendas y recreación, (8) aumento de arrastreros Golfo de México, de una embarcación en 1968, a 72 en 1977, (9) casi todo el desarrollo se ha realizado con refinanciamiento personal, (10) los astilleros han sido ampliados, (11) existencia de un gran interés público en Biología Marina, y (12) muy pocos de los dueños de los arrastreros, son millonarios.

LITERATURE CITED

- Jordan, C.
1969. A survey of the shrimp industry of Trinidad and Tobago. Fisheries Division, Ministry of Agriculture, Lands and Fisheries (mimeo).
- Richards, A.R.
1955. Trawl fishing in the southeastern Caribbean. Caribbean Commission Central Secretariat, Port of Spain, Trinidad. 147 pp.
- Vincent, H.
1910. The sea fish of Trinidad. J.J. Little and Ives Co., New York. 97 pp.
- Whiteleather, R.T. and H.H. Brown
1945. An experimental fishery survey in Trinidad, Tobago, and British Guiana with recommended improvements in methods and gear. Anglo-American Caribbean Commission. 130 pp.
- Wood, H.E.
1968. Results of an experimental secondary terminal market on production of shrimps. Fisheries Division, Ministry of Agriculture, Lands and Fisheries. (mimeo). 5 pp.
- _____ .
1970a. Present and future status of the fishing industry in Trinidad and Tobago. Fisheries Division, Ministry of Agriculture, Lands and Fisheries. (mimeo). 5 pp.
- _____ .
1970b. Potential for fisheries development. Fisheries Division, Ministry of Agriculture, Lands and Fisheries (mimeo). 10 pp.
- _____ .
1972a. Proposals for a trawler fleet. Fisheries Division, Ministry of Agriculture, Lands and Fisheries. (mimeo). 9 pp.
- _____ .
1972b. Ye Charibby revenge. Fisheries Division, Ministry of Agriculture, Lands and Fisheries. (mimeo). 3 pp.
- _____ .
1972c. The high cost of our prejudice. Fisheries Division, Ministry of Agriculture, Lands and Fisheries. (mimeo). 12 pp.

Benefits of Past Experience: Discussion

W. Royce (University of Washington). Cooperatives have frequently foundered because of the quality of leadership and I would like to ask Ms. Gibson how the quality of leadership was enhanced in Belize.

Janet Gibson (Fisheries Unit Laboratory, Belize). I am not sure that I can satisfactorily answer your question. I know that the leaders of the cooperatives were carefully chosen from the community with the help of the Department of Cooperatives, which is an arm of the government.

Richard Scully (Auburn University, with INDERENA, Colombia). Do you consider, Ms. Gibson, that a subsistence fishery where the people are also very dependent on farming, really is not conducive to fishing cooperatives. Would you generally agree?

Janet Gibson. Yes, based on our experience in southern Belize where most of the people are of Caribe-Indian background. It is a part of their culture that they carry out both subsistence farming and subsistence fishing, the latter only for their own family and friends. In northern Belize the people are different and they fish full-time as a profession.

Victor Sarmiento (U.S. AID). This question is addressed to Ms. Gibson. Do the cooperatives in Belize have some kind of professional advice? I ask because in some of the cooperatives I have seen, professional advice was almost always intermittent and the manager was one of the farmers or one of the fishermen. After a while, even in those cooperatives which initially were successful, the management deteriorated and money often disappeared and the members did not know how to handle the ensuing problems. In other cases, of course, the cooperatives were too small to have professional staff and also began to lose money for that reason.

Janet Gibson. The cooperatives do get a lot of advice from the Department of Cooperatives, but in most of the cooperatives the managers are professionals and hence they do not have the basic problem you mentioned. Perhaps I should add here that the Belizean fishermen have, on the whole, quite a high level of education, many of them having completed high school.

Arthur Lyons (Miami). Ms. Gibson, are the cooperatives limited to buying the catch only from their members or can they buy from individual fishermen who are not members of the cooperative?

Janet Gibson. They can buy catches from non-members.

Albert Jones (Miami). Ms. Gibson, I understand that the government of Belize places an annual upper limit on the catch of spiny lobsters which is in accord with the biological productive capacity of the resource. Is there any limitation on either the number of cooperatives which can come into being or the number of members of each cooperative? Also with respect to the developing shrimp fishery, is there any projection as to the number of trawlers which may be in accord with biological estimates of the size of the resource?

Janet Gibson. The annual spiny lobster quota is based on biological data. The fishing cooperatives, as far as I know, do not have any limit on their memberships and accept whomever they want.

There are six shrimp trawlers working at the moment and I know there are negotiations underway for another trawler at one of the cooperatives. I consider that the government will have to put a limit on the number of trawlers but no studies have been made so far on the stocks of shrimp. This is something that will have to be done soon.

Arthur Lyons. I have a question for Sr. Urroz from Nicaragua. What is the stage of development of the cooperatives in Nicaragua today? Do they have physical facilities under construction or are they just in the planning or preplanning stage?

J. Urroz (Nicaragua). Existen tres cooperativas funcionando con plantas físicas en tierra, además una programación está encargada de establecer nuevas cooperativas. Se está tratando así de cambiar la mentalidad de las instituciones financieras para que consideren también al pescador artesanal como sujeto de crédito. Nuestras cooperativas se dedican mayormente a la explotación de pescado; se está tratando de formar un programa integral que incluya no sólo la comercialización de la captura de infraestructura sino también la educación del pescador y del consumidor; se trata de una tarea difícil que tomará de cinco a ocho años.

H. E. Martínez (Honduras). Sr. Urroz, quisiera saber si las cooperativas pesqueras de Nicaragua tienen zonas especiales de pesca, o si pescan en las zonas camaroneras causando conflictos entre ambos sectores.

J. Urroz. No ha habido ningún conflicto entre ambos sectores debido al tipo de embarcaciones que ellos usan; el sector industrial (flotas camaroneras y langosteras) dispone de barcos que pescan más allá de las 10 a 15 millas de la costa, fuera del radio de acción de los pescadores artesanales que utilizan pequeñas embarcaciones o cayucos.

H. E. Martínez. Sr. Urroz, cuando en Honduras los barcos se acercan a una milla y media o dos millas de la costa, los pescadores artesanales reclaman tres millas en determinadas zonas. ¿Existe algo semejante en Nicaragua?

J. Urroz. En Nicaragua no existe este tipo de limitación ya que el pescador artesanal utiliza las lagunas marginales y no sale mar afuera debido a la fragilidad de sus embarcaciones; cuando el pescador artesanal captura camarón juvenil que entra en las lagunas para desarrollarse, puede afectar negativamente el recurso.

Entrevistador desconocido: Sr. Urroz, ¿qué papel ocupa o espera ocupar la acuicultura en Nicaragua?

J. Urroz. EL INFONAC está iniciando un programa de piscicultura, especialmente con mojarra, guapotes, especies de cíclido y tilapias, para más tarde llevarlo a nivel nacional; se ha terminado un estudio sobre el cultivo del camarón con proyecciones de mercado internacional.

J. Carranza (México). Sr. Urroz, ¿cuáles son los resultados económicos y sociales del desarrollo de las cooperativas pesqueras?

J. Urroz. El desarrollo logrado por las cooperativas es pobre debido a varios factores negativos como la carencia de recursos económicos suficientes y el bajo grado de educación de los pescadores que los incapacita a trabajar en equipos; además no se tiene una programación tanto nacional como internacional que suministre sistemáticamente la ayuda técnica y financiera necesarias.

Lawrence Strasburger (New Orleans). I would like to address this question to Mr. Wood in relation to the cottage industry in Trinidad. It is a well known fact that, throughout the history of the fishing industry, producers have always been able to find a market gap into which they could place any kind of product. Seriously though if your cottage industry is to remain viable it seems to me that you will have to maintain a rather strict measure of quality control. If the product is to be exported to countries which exercise strict microbiological controls it seems to me that you might be in some trouble.

H. Wood (Trinidad). The main point I am making is that you have to list your priorities in the development of a fishery. The most important thing is to catch the fish and then dispose of it; later we can start considering the refinements of quality control, management of the yield from the stocks, and those sorts of things. Development of fisheries creates fish surpluses in villages where there were no surpluses.

CRITERIA AND OPPORTUNITIES FOR DEVELOPMENT

The Biological and Technological Basis for Further Development of Artisanal Fisheries in the Caribbean Area¹

HARVEY R. BULLIS, JR.
Director
Southeast Fisheries Center
National Marine Fisheries Service
Miami, FL 33149

When I agreed to discuss resources and harvesting criteria for development of small-scale fisheries in the Caribbean area, the proceedings of the Seminar-Workshop on Artisan Fisheries Development and Aquaculture in Central America and Panama, held in Costa Rica in 1975 (Estes, 1976) had not been published. I had already separated the "resources/harvesting" aspect as a clearly discernible entity in the overall definition of artisanal fisheries without the benefit of information from those proceedings, which has just become available.

In the workshop proceedings, under the heading "Resources Availability Related to Artisanal Fisheries," J. Kesteven (1976) asked a series of questions which are worth repeating: (1) In what way and to what degree is the productivity of artisanal fishermen fixed by the resources they exploit? (2) Are those resources of a kind and magnitude that would permit important expansion in total production? (3) Are the resources of a kind such as to make them especially susceptible to overfishing? (4) Are the resources of a kind that lend themselves to effective intervention? (5) In what way would the future technology of these fisheries be determined by the nature of the resources?

What Kesteven asks is simply this, "Does the descriptor *artisanal* signify a resource boundary?" He concludes that it does so indirectly, but the primary denominator is technological. He then identifies three levels of fisheries based upon their technico-socio-economic situations: industrial, artisanal, and subsistence. His clearly defined separation of "artisanal" and "subsistence" fisheries helps to identify the requirements needed to raise subsistence (inadequate) fisheries to artisanal (successful) fisheries.

The Fisheries and Fisheries Resource of the Caribbean Sea by Fiedler et al. (1957) presents an excellent historical perspective of the Caribbean regional fisheries, which at that time were virtually all either artisanal or subsistence according to the above definitions. The conclusions of their report were: (1) The Caribbean is not a greatly productive area. (2) The most productive areas are the lagoons and estuaries. (3) Most areas can withstand limited expansion of effort but this added "strain" must be controlled. (4) Pelagic fish offer greatest

¹ Contribution No. 78-07M, Southeast Fisheries Center, National Marine Fisheries Service, Miami, FL 33149

development potential. (5) Other fishery resources are available, but in limited quantities.

Following these uninspiring conclusions came three decades of extensive development of industrial fisheries for shrimp, lobster, tunas, and snapper. In re-reading Fiedler et al. it is evident that too few changes have occurred for the better regarding artisanal fisheries. Following are some personal observations and thoughts that might contribute to planning for the improvement of our regional small-scale fisheries.

During the 1950s and 1960s, U.S. Fisheries Services conducted surveys of many reef areas and banks in the western Caribbean Sea. I frequently visited Serrana Bank off Belize because it provided an interesting fauna for biological collecting and a diversity of potentially available stocks of spiny lobster, snapper, and grouper. Serrana Bank is a small cluster of coral rock and sand islands, uninhabited, and best known as a sea bird rookery. Boats from Belize, the Caymans, and Jamaica were annually collecting hundreds of thousands of tern eggs. The largest islet on the banks scarcely exceeds a few hectares. Now large amounts of spiny lobsters and red snappers are taken from the Bank.

In 1957, the U.S. research vessel OREGON anchored on the south side of Serrana Bank. We observed a small, crude, driftwood shelter on one of the outer islets. When we went ashore we found in the shelter eight hawksbill turtles lying on their backs with front flippers tied to prevent escape. Realizing that we were inspecting private possessions, we returned to the ship. Shortly, two small dug-out canoes appeared. There were two men in each canoe; the man in the stern was paddling, while the man forward was furiously bailing with coconut shells, barely keeping a freeboard of 2 or 3 inches. When the canoes reached the shelter of the home islet the men returned our waves of welcome.

We joined them ashore and learned that they were a "team" of fishermen from Old Providence Island. They explained that during the spring and summer months, an Old Providence company put parties ashore on various banks from carrier vessels. Their tour on Serrana Bank was for 30 days. Fishing was usually confined to depths of less than 10 m. They lived on dumplings, fish, lobster, and bird eggs. Salt brine for curing the catch was made by boiling down sea water. Their hooks were handmade from iron nails and their line was handmade hemp twine with a tensile strength of not more than 20 lb.

As their provisions were austere and limited we returned that evening with fresh food, circle hooks (recently introduced in the U.S. snapper fishery), and a 1,000 m roll of nylon twine. We learned that their dried catch was carried to and marketed on Old Providence Island. They were paid a fee or salary with no incentive for producing over a minimum catch. The profit incentive for undertaking such a tedious and precarious life came from the opportunity to catch hawksbill turtles, for the shell brought a good price. They captured beached females before egg laying because fresh hawksbill eggs were a prized delicacy and they could be sold or bartered.

The next day we took the fishermen to their grounds on Serrana Bank in outboard-powered dories. Using the new hooks and lines, over 300 lb of snapper and grouper were quickly caught by the fishermen. They were not particularly pleased because they had reached the minimum quota and still had 20 days to

wait for the relief vessel. Our offer to return them to Old Providence was declined since it was still nesting season and perhaps more hawksbill turtles would appear.

A few years later, the R/V OREGON called at one of the larger Caribbean islands where there was an active beach seine fishery for thread herring. Due to unusually high availability, the normal ex-vessel price of U.S.\$0.04 a pound was declining and the fishermen were about to go on strike. At that time we were engaged in exploratory longline fishing that required a large quantity of herring-like bait fish. The situation appeared to offer an opportunity to acquire a bait supply at a reasonable cost, and give the fishery a temporary financial boost. Through the local marketing system we offered to purchase all surplus thread herring catches over a 4-day period at \$0.05 a lb, up to a maximum of 50,000 lb. A spokesman inquired if we were prepared to pay as much as \$0.06 a lb. We agreed, but said we would then limit our purchase to 40,000 lb. We were then queried on \$0.08 per lb and again agreed, but with a 30,000-lb limit. A following query at \$0.10 per lb was rejected.

During the 4 days we were in port, the price on thread herring rose to \$0.50 a lb, ex-vessel, without a single crew fishing or a single pound of fish landed. It was our understanding from local friends that the economics of thread herring production remained in chaotic condition for weeks after our departure.

It appears that technical assistance, while seeming to provide immediate improvements in the productivity of a fishery, may have results that are either trivial or even counter-productive if they negatively disrupt established systems; and financial incentives injected into established fisheries can do more damage to the entire system than the contributions of apparent short-term benefits. This also has been said by other researchers.

Small-scale fishermen are very knowledgeable about the types of fish found in their respective areas, and their seasonality and relative abundance. Time and time again, biologists have been excited with the capture of what was assumed to be a rare species, only to learn that local fishermen know the species well by common names. Many are produced for the local market. Ten years ago taxonomists studying western Atlantic jacks (Carangidae) were limited to two known specimens of the scad (*Decapterus macarellus*). However, fishermen from St. Lucia, Dominica, and adjacent islands, had been producing catches of "robins" (scads) since the introduction of gill nets decades ago. Even with all of the sophisticated collecting systems of recent exploratory fishing and resource survey expeditions, many species are still to be found in local fish markets only.

It would add little here to identify and list the species and stocks that are sufficiently abundant and available to be considered for expanded production by Caribbean area artisanal fisheries. In broad terms, the larger components of the fish and shellfish biomass have already been identified (Klima, 1976). Many elements of these have been in some form of utilization in one area or another. Locally, where fishermen have been working traditional grounds for generations, there is probably little new information that can be provided to make significant contributions to knowledge on abundance and seasonal availability. One positive step would be to arrange the present data base in some semblance of order to permit greater use by both fishermen and managers.

Improvements to harvesting technology, appropriately linked to handling, processing, and marketing, offer a productive channel for developmental efforts. However, numerous "development programs" have demonstrated that increasing productive capacity by introduction of new methods and equipment does not in itself lead to increased production. As previously indicated, the results sometimes have been counter-productive socially and economically.

I view the biological and technological requirements and opportunities for assisting the regional artisanal fisheries from two perspectives: (1) The uniqueness of individual fishery units has to be recognized before much can be accomplished in bringing about constructive and meaningful changes. But the technological resources simply do not exist to do "something for everyone." It becomes, at least, a task of enormous proportions. (2) There are threads of commonality to some of these fishery units, and success or failure of technical or other forms of assistance can well depend upon how these are taken into consideration and acted upon.

Only marginal planned use has been made of a valuable biological asset of the region – the productivity of these warm waters where a dynamic biological flux produces many stocks that come and go with only one or two-year classes. When such resource elements have been identified with high market value and ready availability (such as penaeid shrimp and spiny lobster), development has been rapid, profitable, and quickly reaches an industrial level. We have not spent much time looking for developmental benefits that might be achieved through national and international management of other high-value species. Some of these might better apply to the small-scale fisherman.

It would be worthwhile to take a specific example. Recently, the Atlantic hawksbill turtle was added to the International List of Endangered Species – and with good cause. In the United States there is an explicit, legislated goal to work towards the rehabilitation of hawksbill turtle (and other species) to the population level where they can be removed from the endangered species list. Despite the high value of this species for their tortoise shell, there is meager indication of concerned effort to reverse the trend of diminishing abundance of this species. "Does the responsibility for developing an appropriate conservation and management plan for Atlantic hawksbill turtles lie within this geographical area, or can the problem be left to the international conservation community?" Like so many other problem areas, the data base to address the question is most inadequate. It appears certain, however, that unless some measures are taken now, the wild population may be reduced to virtual extinction in the very near future. With hawksbill shell now valued at \$20 per lb (Anon., 1977) on the world market (as compared to \$1 to 3 per lb 25 years ago), who can question the motivation of a fisherman to take each turtle he can catch?

I find this problem very relevant to my discussion because the harvesting of hawksbills has been almost exclusively carried out by small-scale fishermen. Catch rates due to reduced availability are now at a level that most of what is produced is fully utilized by local artisanal craftsmen with little left for world trade.

There are increasing expressions of concern by the worldwide conservation community on the status of hawksbills. However, we might also ask "Who will

be the greatest loser?" or "Who could benefit most if the turtle stocks were rehabilitated and harvested at MSY?" It seems to me the answer would be "the artisanal fisherman." Another question is "Can we tackle the problem with some assurance of success?" My answer now is "I don't know." A final question might be "Is there a seemingly logical approach that can be adopted and followed under these circumstances and, if so, what is it?" I think there is a logical approach and I offer the following: At \$40,000 per ton, hawksbill shell out-classes lobster tails 4 to 1 in value. Naturally, there would be limits to the global demand for the product but current markets show a substantial demand. Japan reported imports of 220 tons during 1971-75 (Anon., 1977). However, it must be remembered that *we are talking about an endangered species*. The approach I propose follows:

- 1) An internationally coordinated series of national programs in the Caribbean area that would: (a) impose immediate restrictions on all harvest or taking of hawksbills of any size; (b) establish educational programs directed at the total fishing community to explain the need for taking drastic conservation measures now, and describing the possibilities for long-term economic payoff; (c) plan for the establishment of a central regional export marketing consortium, through which the raw materials eventually to be produced will be channeled into world trade; and (d) reserve for the small-scale fisheries the exclusive rights to commercially produce hawksbill once the stocks have been brought back to a level where harvesting can be considered.

- 2) Establish a trans-Caribbean scientific program to work first on the problems of population enhancement, and then to monitor stocks and recommend levels of harvest, define fair and reasonable allocation, and provide further information as needed.

Some pragmatists might say "It can't be done," or "It won't be done." But it is a major problem and is representative of some of the realities that have to be faced.

I have discussed this problem with colleagues, who view the conservation of turtles as a matter of extreme urgency and alarm. There is a reluctance to consider a commercial future for this species. Nevertheless, the species has a high profit potential that can serve as an incentive to work on behalf of hawksbill stock rehabilitation to MSY.

I have found no records of attempted population modeling for hawksbills. As a result of green turtle tag and release studies over the past two decades, however, some preliminary opinions have been expressed on mortalities and survival, from which one can tentatively derive population extrapolations for stock rehabilitation and management plans. These are not presented here with any sense of fine tuning but more as a need to start somewhere.

In recent discussions on green turtle mortalities, it has been estimated that the range of survival from nested egg to sexual maturity would be in the range of 2 to 3%. Some estimates for population segments are as low as 0.1% where heavy nest predation occurs. With the present consensus that hawksbill stocks are declining rapidly, it appears that egg to maturity mortalities far exceed the 99.9% level. Using the presently cited maturity at 3+ years (Carr, 1952), the

three nestings per season of 150 eggs per clutch, a 0.1% survival through maturity still provides for a steady population increase that can be roughly extrapolated to be threefold every 5 years (Table 1). Obviously, that is not being achieved. On the other hand, if enhancement of survival through maturity can be made to account for a 3% rate that some believe may now be possible with green turtles, by insuring maximum hatch and release success, and elimination of baby turtle harvest, extrapolation of the observed biological parameters reveal a potential for a population explosion of impressive dimensions for the hawksbill.

Any serious management effort could quickly impact the deteriorating condition of stocks of this species, and within a reasonable time frame provide a valuable renewable resource that could be widely shared throughout the region.

From recent studies on the population accumulation rates of artificial reefs, there is reason to believe that culture and release programs for small islands could enhance and maintain populations that are typically diminished by exploitation throughout the year. An aspect of this is being examined in some areas with the conch (*Strombus gigas*). Culture methods are achieving some encouraging success, and there are prospects for both repopulating habitats that have been decimated in the past as well as enhancement of presently exploited populations. Other encouraging possibilities exist for additional species. Some of the greatest payoffs can be for the artisanal fisheries.

On the basis of present knowledge, the problems of enhancing artisanal fisheries do not seem to have immediate impediments in either lack of resources or in the potential for development of harvesting technology. I will conclude my comments with a brief listing of the resource prospects that seem most promising.

Demersal and pelagic sharks continue to offer opportunities for small-scale fishery development. Due to deficient statistics, we cannot evaluate the numerous small shark fisheries that are now in various developmental phases. In both the offshore and coastal waters of the region we have several species of small tunas and bonito that are virtually unexploited. These include the little tuna (*Euthynnus alletteratus*), blackfin tuna (*Thunnus atlanticus*), the skipjack tuna (*Euthynnus pelamis*), and others. All are suitable for canning or fresh-frozen marketing throughout the region. The meager efforts to utilize these remain enigmatic.

Other pelagic or oceanic species groups remain largely underexploited. Old-timers of the GCFI can recall the excitement of the Barbados flying fish fishery development. Their potential is far from realized. At the other extreme, it has been demonstrated that the Caribbean is a major spawning area for swordfish – virtually unexploited by the surrounding countries.

Although the coastal reef fish communities are undergoing increasing exploitation, experimental fishing on continental slope depths indicates unexploited populations of deep-water grouper, tilefish, and other species. In the inshore areas, there are both large (but poorly defined) stocks of coastal migratory predators, such as Spanish mackerel, and quantities of smaller forage-type schoolfish, such as anchovies, dwarf herring, and silversides. Experimental purse seining for thread herring off Cartagena in the mid-1960s was discontinued

Table 1. Theoretical green turtle population increase

Year	Number Adults (♀)	Number Eggs Produced	3% Survival to Maturity	Total Turtles
1	1	450	13	14
5	13	5,850	175	255
10	522	235,000	7,050	13,450
15	43,000	19,000,000	570,000	1,529,000
20	2,700,000	1,200,000,000	36,000,000	69,000,000

because the individual sets were small, 5 to 10 tons per set, but many schools were seen.

In summary, the problems and challenges in doing something meaningful to assist the local and small-scale fisheries of the region will not be handicapped by the inherent productivity potential of this region, by its species composition, or their availability. The biological requirements are there.

Fundamentos Biológicos y Tecnológicos para Fomentar el Desarrollo de la Industria Pesquera Artesanal en el Area del Caribe

RESUMEN

A pesar del desarrollo extensivo de la pesquería industrial en el área del Caribe de camarón, langosta espinosa, atún y pargo, se han efectuado muy pocos cambios para el mejoramiento de su pesca artesanal.

Basado en ejemplos específicos, parece que la asistencia técnica, que aparentemente mejora la productividad pesquera, ha dado resultados negativos al interrumpirse el sistema existente; además, la ayuda financiera dada a las pesquerías existentes, puede ocasionar más daño al sistema que los beneficios a corto plazo que ofrece.

Cuando la productividad de estas aguas templadas es identificada con altos valores del mercado y adquisición inmediata, su desarrollo aprovechable y rápido hace que alcance el nivel industrial en poco tiempo. Hasta el momento no se ha insistido suficientemente en las ganancias que se pudieran obtener mediante la administración nacional e internacional de otras especies de gran valor. La pesca artesanal pudiera ser usada para algunas de estas especies.

La rehabilitación de la tortuga "hawksbill", considerada en peligro de extinción beneficiaría especialmente al pescador artesanal ya que su pesca se lleva a cabo casi exclusivamente por los pescadores de pequeña escala.

Se aconseja la creación de una serie de programas nacionales en el Caribe que estuvieran coordinados internacionalmente con el fin de: (1) hacer cumplir la veda de la tortuga

"hawksbill", (2) establecer programas educacionales que explicarían la necesidad de las medidas de conservación, y su beneficio económico a largo plazo, (3) planificar el establecimiento de una sociedad central regional de mercado que comercializaría los productos crudos, y (4) reservar el derecho exclusivo a los pescadores artesanales a la pesca comercial de la tortuga "hawksbill", tan pronto se estime aconsejable su explotación.

También sería beneficioso el establecimiento de un programa científico trans-caribeo, que se dedicara primero a los problemas del aumento de la población, y luego al control de las reservas y a la recomendación de diferentes niveles de colecta. Entre los recursos que ofrecen oportunidades a los pescadores artesanales se encuentran los tiburones, tanto demersales como pelágicos, algunas especies pequeñas de atún y bonito, el pez volador, la cherna de aguas profundas, la sierra, anchoas y sardinas.

La productividad potencial del Caribe, su composición de especies y su disponibilidad no serán impedimentos para ayudar su pesca local y artesanal.

LITERATURE CITED

- Anonymous
1977. Imports of hawksbill turtle shell in Japan. *Marine Turtle News* (January). No. 2: 1-12.
- Carr, Archie
1952. Handbook of turtles, the turtles of the United States, Canada, and Baja California. Cornell University Press. Ithaca, N.Y. 542 pp.
- Estes, T.S., ed.
1976. Proceedings of the seminar-workshop on artisan fisheries development and aquaculture in Central America and Panama. University of Rhode Island, Kingston, R.I. 182 pp.
- Fiedler, R.H., M.J. Lobell, and C.R. Lucas
1957. The fisheries and fishery resources of the Caribbean area. U.S. Dept. Int., Bur. Comm. Fish., Fish. Leaf. No. 259. 211 pp.
- Kesteven, G.L.
1976. Resources availability related to artisanal fisheries. Pages 130-142 *in* T.S. Estes, ed. Proceedings of the seminar-workshop on artisan fisheries development and aquaculture in Central America and Panama. University of Rhode Island, Kingston, R.I.
- Klima, Edward F.
1976. A review of the fishery resources in the Western Central Atlantic. Food and Agriculture Organization of the United Nations, United Nations Development Program, International Project for the Development of Fisheries in the Western Central Atlantic (WECAF). WECAF Studies No. 3. 77 pp.

Demand Analysis and its Implications for Fisheries Development

HARLAN C. LAMPE

*Department of Resource Economics
University of Rhode Island
Kingston, Rhode Island 02881*

Demand analysis for fish and fishery products in developing countries has long been neglected. There are several possible reasons for this neglect. There seems imbedded in the minds of fisheries development officials the view that supply creates its own demand – hence there is no need to assess demand. In addition, demand analysis is rarely pursued since the data necessary for the analysis are rarely available and the cost of obtaining data is perceived as being high. For whatever reason, demand analysis appears to have been regarded as an unnecessary refinement in the planning process.

The proposition presented in this paper is that demand analysis is central to the planning process and that it can be achieved in the developing country context. A corollary proposition is that statistical systems for fisheries can be, and should be, revised to meet the requirements for demand analysis.

It is not useful to talk about demand without being more specific. The marketplace within which demand operates must be defined, as must the time frame to which it refers. Further, the product or product mix must be defined along with a set of relevant demand determinants. There exists, for example, one set of demand determinants at the port or first buyer level and another at the retail level. Also there is one set of demand determinants in the short run and another in the long run. Furthermore, the implications for demand analysis of the structure of the market system require consideration. Obviously the nature of demand analysis will be essentially determined by the nature of the decisions to be based upon it.

Consider one typical problem with which a development planner might be confronted – the need to make a long term demand projection for fish. The most common approaches taken are two in number. The simplest and least useful is to obtain a supply projection and argue that demand must equal supply and hence demand will be whatever the supply is at any time. This argument is not easy to assail but we notice that nowhere are prices considered. The other approach to estimating future demand is to calculate present per capita consumption and assume that total demand will increase in proportion to increases in population. Again, in this simple approach no consideration is given to prices (although there is often the implied assumption that prices will remain the same).

A somewhat more complex question arises when a development program has the often incompatible objectives of raising prices to fishermen and reducing prices to consumers. The focus here is clearly on price and some analysis is necessary to determine whether or not the stated objectives can be met. Some aspects of the problem are illustrated in Fig. 1a & 1b.

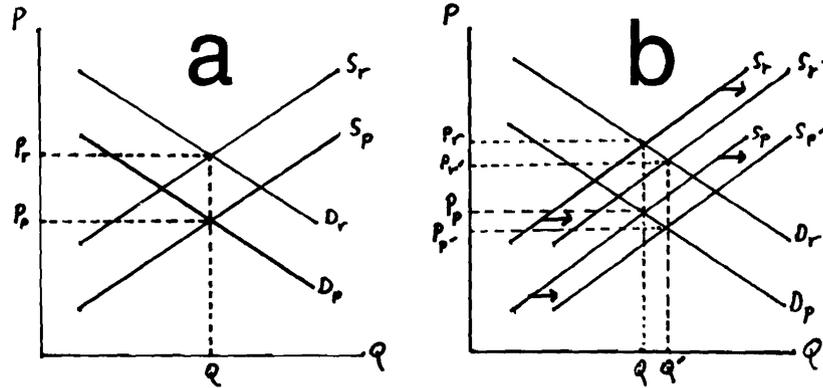


Fig. 1a. Supply and Demand at Retail and at the Fishing Port (P = price, Q = quantity)

Fig. 1b. Conditions in the Market After a Change in Port Supply

Figure 1a shows relationships between supply and demand at the port or landing place and at retail, say in a central major city. The demand curve D_p for the port is a derived demand from the demand curve D_r —the difference between them reflecting the costs of performing the marketing and distribution functions. The Supply S_r at the retail level is the supply derived from the curve S_p which is the supply function of the fishermen. The differences between them again reflect the costs of marketing and distribution. It should be noted that the quantity Q is the same in both markets, and that S_p and D_p intersect at the same Q and S_r and D_r . Obviously the price at retail (P_r) is higher than the price to the fishermen (P_p).

Figure 1b illustrates the effects of a change in supply that might result from improvements in vessels and gear, or from the discovery of a new fish stock. The shift in the fishermen's supply function with unchanged demand will reduce the port price from P_p to P_{p1} . The derived supply at retail will also shift to the right (or downward) and the retail price will fall from P_r to P_{r1} . The quantity sold will increase from Q to Q_1 and both markets will clear.

The precise way in which relative prices at wholesale and retail will change in response to supply changes depends upon the slopes of the supply and demand functions. These slopes in turn depend on a number of factors. The slope of the supply function for the fishermen depends upon the costs and productivity of the gear. The slope of the retail market supply curve depends on the costs of marketing and distribution. The demand at retail depends upon consumers' behavior while demand at the port reflects the costs of distribution and marketing as well. Apart from these factors, the time period considered is important both on the demand and supply sides. The shorter the time period the steeper the curves (in general) and the more marked will be price fluctuations. Both consumers and producers respond differently to influences that persist over time than to those which occur briefly.

Normally one would expect prices to decline as catches increase. Whether or not these price declines will reduce fishermen's earnings depends on many factors, not the least of which is the extent of a price decline as the catch increases. The extent of price changes resulting from production changes is dependent upon a parameter of the demand function called price elasticity. It is a parameter of which economists seem inordinately fond – perhaps because it is a helpful summary statistic even if it does not tell us everything about demand that we might like to know. Briefly, if the price elasticity of demand is equal to -1, (unit elasticity) a change in the quantity consumed will not change total buyer's expenditures or seller's gross incomes.¹ If the price elasticity is between -1 and 0 (inelastic region) then as production increases, expenditures (gross income) decrease and vice versa. In this case, increased output results in sufficiently great price declines to reduce total expenditures (revenue). The third case, where price elasticity is -1 to $-\infty$ results in a condition where as output increases, expenditures increase even though prices decline, since prices do not decline proportionately as much as production has increased (elastic region).

The relationship between consumption (production), prices and expenditures (revenues) are summarized in Table 1.

Gross revenues or expenditures, of course, do not tell the complete story since cost must be considered. It should appear fairly clear that output increases within a range of inelastic demand are going to make increased net earnings much more difficult if not impossible to realize. It should also be fairly clear that the more elastic the demand function, the better the situation in general. However, since we cannot always be sure that elasticities will favor us it is not surprising that we should seek other solutions to possible declines in net earnings as a result of increases in output. The immediate solution usually open to us is to expand the market. Some possible consequences of market expansion are shown in Fig. 2a & b:

Figure 2a illustrates a case where the demand shift from D_0 to D_1 was sufficient to maintain the price at P_0 in the face of a supply shift from S_0 to S_1 . Figure 2b shows a case where the demand shift from D_0 to D_1 was enough to yield a price rise from P_0 to P_1 when supply increased from S_0 to S_1 . Obviously, a demand shift might well be insufficient and prices would fall but not as much as they might without the market expansion.

It is germane to ask what can cause demand expansion (market expansion). Among the more usual responses are advertising, building more market facilities, providing better quality, increased population and increased incomes. Fisheries development programs can do something about the first three but can do little about population or consumer incomes. In consequence, we will consider first incomes and population as they affect market expansion.

In the case of income in relation to consumption, the notion of elasticity again proves useful. In fact there are two particularly useful elasticity parameters relating to income. These are: the income-consumption elasticity and the income-expenditure elasticity. Briefly, these elasticities indicate the percentage

¹ The negative sign is used here to indicate that quantity and prices move in the opposite directions.

Table 1. The relation of supply changes to expenditures under different demand conditions.

<u>Nature of Demand</u>	<u>Production</u>	<u>Price</u>	<u>Expenditures</u>
	Rise	Fall	Rise
Elastic	Fall	Rise	Fall
	Rise	Fall	Fall
Inelastic	Fall	Rise	Rise

change in consumption (by weight) or expenditures (in money) to a one percent change in income. If the income elasticities are negative so that increased incomes result in lower consumption or expenditures then the life of fisheries developers would be much more difficult than it is. On the other hand, it cannot often be expected that the elasticities are greater than +1 (which would indicate that fish consumption or expenditures would expand at a more rapid rate than income). Hence, we expect to find these elasticities between 0 and +1, and the nearer +1 the better (at least for the fishermen). This, however, is not the only interesting feature of these elasticities. An illustrative case study will outline some of the issues concerning income elasticities and other market factors on development.

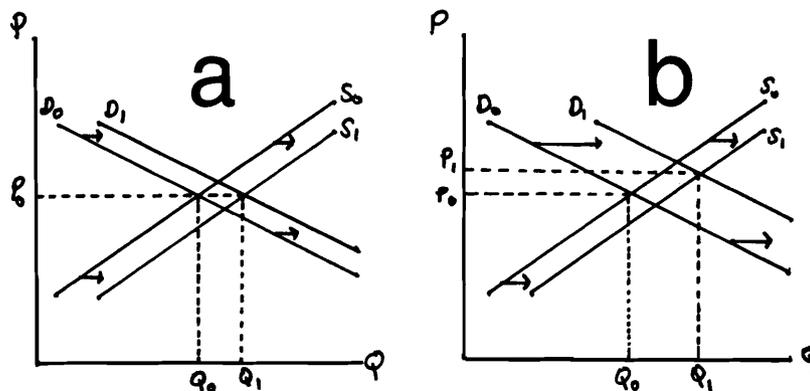


Fig. 2a. Market Expansion (D_0 to D_1) Sufficient to Maintain Original Price (P_0) with Increased Supply (S_0 to S_1).

Fig. 2b. Market Expansion (D_0 to D_1) Sufficiently Large Enough to Raise Prices (P_0 to P_1) in Face of Supply Increase (S_0 to S_1).

A survey of 1,419 households in Guatemala City, Guatemala, was conducted during July-August and early September of 1976. The purpose was to ascertain consumers' attitudes toward fish and fishery products and to gain some insight into possible ways in which the market for fish might be expanded. The households were randomly selected by zone in an effort to obtain a representative sample of income classes. Except for the very poorest households, the sample selected well represents the income groups in Guatemala.

The results of the consumer survey confirm, in many cases, the opinions of professionals working in Guatemala, but provide measures which were not previously available. The survey results also suggest some conclusions that had previously not been considered.

Among the more significant results of the survey are those that relate to income-consumption (IC) and income-expenditure (IE) elasticities. The income-expenditure elasticity is estimated to be .42. That is to say that a one percent change in income will result in a 0.42 percent change in expenditures on fish in the same direction. Hence, as per capita income increases, we would expect the demand for fish to increase. However, it should be noted that the income-consumption elasticity is only .23. This implies that a one percent increase in income will result in a 0.23 percent increase in pounds of fish consumed. The fact that the IE elasticity is higher than the IC elasticity suggests a clear shift from lower priced fish such as jullin and bagre to high priced fish such as robalo or to more expensive products such as fillets. This suggests that the relative market position of lower priced fish will deteriorate relative to that of higher priced fish in the future, and the position of fishermen who specialize in low price species will also deteriorate.

It should also be noted that price consumption (PC) elasticities are very low at -.19. This suggests that a price increase of one percent will result in a 0.19 percent decline in pounds of fish consumed. It also implies that as prices rise, consumer expenditures will increase and as prices fall, consumer expenditures will fall. Available data did not permit the analysis of individual species responses to price changes.

It should be noted that the strongest tendency to shift from low priced to high priced commodities is in the lower one-third of the income groups. This is not surprising since the middle and upper income groups have essentially been able to adjust their consumption patterns.

Several factors place some obstacles in the path of market expansion. For example: 21% of the households indicated that they already eat sufficient fish and would not be likely to increase consumption. Seventeen percent of the respondents indicated that additional fish would not be consumed because not everyone in the household liked it. Nine percent of the respondents stated that eating more fish could be dangerous. A large percentage, 21%, said fish was very expensive. Given the income levels in Guatemala, the latter view is indeed correct; 36% of the respondents paid more than \$0.75 per pound for the last purchase.

On the other hand, the respondents were more regular buyers of fish than had been earlier expected. About one-half of all households had purchased some fish within the two weeks prior to the interview. Thirty-seven percent of the respon-

dents reported liking fish very much, although 37% were also more or less neutral in their like and dislike of fish. While beef and pork are preferred to fish, 51% of the respondents preferred fish to chicken and only 26% preferred chicken to fish.

From the point of view of market development and expansion, the consumer survey does not provide clear directions. For example: 65% of the respondents indicated they would buy more fish if it were available nearer their homes when the question was asked directly. However, when an open-ended question was asked concerning why the households did not consume more fish, just over one percent gave distance to market as a reason. It should, however, be recognized that almost none of the consumers make a special trip to market for fish, in consequence no special distance problem is associated with fish. Further, since the custom is to shop for a variety of foodstuffs at one time, specialized or isolated fish stores would need to provide some special advantages. A surprising 9% of the respondents purchased from street pedlars, so this kind of purchasing is well accepted and some households only purchase fish when the pedlar comes by.

The choice of vendor by consumers is largely based upon the consumer perception of price with 33% indicating lower prices as the criterion by which they chose a vendor. However, a significant 19% said they always bought in the same place. Only 3% reported quality as a consideration. However, in response to another question concerning vendors, 55% of the respondents reported that they went to the vendors they did, because they were clean. This is a surprising result since general sanitary levels among fish sellers are quite low.

Consumer likes and dislikes concerning fish are quite clear. The flavor of the fish was important to respondents with 45% reporting that flavor was a major consideration in purchasing fish. Eleven percent purchased the kind of product they did because it had no bones. Eighteen percent of the respondents reported that what they liked least about fish were the bones. More consumers judged fish quality by the odor than any other single factor (24%), while some looked at the gills (15%) and the remainder considered general appearance.

Since there are no effective information sources concerning fish 82% of the respondents got their information on fish prices and availability personally, only 2% obtained information from newspapers. Consumers' perceptions of the price of fish available in the market place were quite accurate despite the fact that they are not observing the prices regularly. While the differences are not statistically significant, there is a tendency among the poor to overestimate prices particularly of high priced fish.

The results obtained in the above survey suggest certain cautions about future development and certain possibilities for market expansion, which may have general applicability in Spanish speaking countries of Central America and northern South America:

1. As per capita incomes increase, certain market sectors, particularly for cheap fish may be injured, and the producers of these fish further disadvantaged. Provisions will need to be made for providing marketing services.

2. Attention needs to be given to developing products from some less desirable species and from fishes that are bone-free.

3. While results on distance to market as a factor appear to be mixed, the use of mobile vending stations would appear more promising than the building of separate fish stores unless these are near other markets.

4. There is need for better information on prices and availability of fish as well as information on its nutritional value (which is already recognized by a significant, though small part of the respondents - 13%).

5. Since lower priced fish are generally badly handled, some of the shift to higher priced fish might be ameliorated by programs designed to improve handling and preservation of fish.

Demanda y Análisis y sus Consecuencias para el Desarrollo Pesquero

RESUMEN

El análisis de la demanda es absolutamente esencial para la planificación del desarrollo pero ha sido generalmente descuidado por los países en desarrollo al considerarlo muy costoso o innecesario.

Para poder llevar a cabo un análisis de la demanda, es necesario definir no sólo el mercado dentro del cual la demanda se realiza, sino también un lapso de tiempo. Además se debe tener en cuenta la estructura del mercado así como las fuerzas de la demanda a corto y largo plazo a todos los niveles.

Los gráficos nos muestran el cambio efectuado en las relaciones de la oferta y la demanda, tanto en una situación convencional como cuando dicho cambio se debe al aumento del abastecimiento al proyectar un desarrollo futuro.

Se examina el funcionamiento de la elasticidad del precio, ya que relaciona el ingreso de los pescadores con el desembolso del consumidor.

Es una encuesta realizada en la ciudad de Guatemala en 1976 con el fin de conocer la aptitud de los consumidores hacia el pescado y productos pesqueros, además de encontrar los medios de poder expandir el mercado pesquero. Los resultados de dicha encuesta pudieran aplicarse a los países de habla hispana de América Central y del norte de Sur América, sobre su desarrollo futuro y las posibilidades de expansión mercantil. Se debe considerar los siguientes resultados:

1. A medida que aumentan los ingresos aumenta la desventaja de los productos de pescado barato.
2. Se necesita dar atención a especies que tengan poca venta y a los peces sin espinas.
3. El uso de puestos de venta transportables parece ser más ventajoso que la construcción de pescaderías separadas excepto si están cerca de otros mercados.
4. Se necesita una información mejor sobre precios y la disponibilidad de pescado, así como de su valor nutricional.
5. Debido a que el manipuleo del pescado barato es generalmente malo, se pudiera aumentar su precio mejorando la manipulación y la conservación del pescado.

Oportunidades y Problemas en la Elaboración y Mercadeo del Pescado en Honduras

HORACIO ERASMO MARTINEZ
Dirección General de Recursos Naturales Renovables
Tegucigalpa, Honduras, C.A.

SITUACION DE LA PESCA EN HONDURAS

Pesca Marítima

Actualmente operan en el país siete empresas industriales ubicadas en la zona atlántica, las que en 1976 trabajaron con 240 barcos camareros y langosteros, de un tamaño promedio de 70 pies de eslora. Su producción es destinada en un 95% a la exportación. La industria pesquera emplea aproximadamente 7,000 personas en plantas y unos 1,800 entre tripulantes, buceadores y cayuqueros.¹ La pesca de camarón se realiza mediante barcos arrastreros y la de langosta con trampas y buceo, tanto como con equipo autónomo o sin él. En el Mar Pacífico de Honduras no opera ninguna empresa pesquera industrial.

La pesca artesanal se realiza en ambos mares y en aguas continentales. En el litoral Atlántico se estima que operan unos 3,000 pescadores, y en el Pacífico 1,000 —entre permanentes y ocasionales; no se tiene un estimado de los pescadores del interior, los cuales aprovechan los ríos, lagos y lagunas. Se estima que un 10% de los pescadores de las costas están organizados en cooperativas.

Las comunidades pesqueras artesanales se caracterizan por tener un alto índice de analfabetismo, alta emigración de las personas comprendidas entre los 16 y los 30 años, y deficiencia tanto en vías de comunicación como en servicios de agua potable, alumbrado eléctrico, asistencia médica, etc.

En cuanto a los medios de captura y técnicas usadas, Honduras puede considerarse como un prototipo en la pesca artesanal centroamericana, características que fueron descritas anteriormente.

Acuicultura

Esta actividad se inició en el país hace aproximadamente 5 años, existiendo actualmente 2 empresas privadas dedicadas al cultivo de dos tipos de camarones, de mar (*Penaeus* sp.) y de río (*Macrobrachium rosenbergii*); ambas empresas están próximas a iniciar su producción.

El gobierno está ejecutando dos proyectos: uno dedicado al cultivo de camarones de río (*M. rosenbergii*) con la asistencia del Gobierno de Taiwan, y otro dedicado al cultivo del pez tilapia (*Sarotherodon nilotica*) con la cooperación de la Agencia Internacional para el Desarrollo (AID) y el Cuerpo de Paz de los Estados Unidos de Norte América. El primero se encuentra en la etapa final de la investigación, y el segundo se encuentra en la fase de implementación

(construcción de estaciones acuícolas, adquisición de equipo de laboratorio, adiestramiento de personal, etc.); se persigue el propósito de fomentar la crianza de estas especies en las zonas rurales.

Participación de la Pesca en la Economía con Referencia Especial al Sector Artesanal

El Banco Central de Honduras ha proporcionado las cifras del Producto Interno Bruto de Factores a precios de mercado (PIB fm); dichas cifras, que aparecen en el cuadro 1, indican que en 1975 la actividad pesquera participó en un 0.9% en el PIB total y en un 2.9% en el PIB del sector agropecuario.

Los datos estadísticos que se presentan en los cuadros 2 y 3, han sido recopilados por la Dirección General de Recursos Naturales Renovables (DIGERENARE), institución a la que pertenece el Departamento de Pesca, más un 40% que el autor ha añadido con el fin de obtener cifras más reales, lo que hasta la fecha no ha sido posible debido a la falta de medios y a lo disgregadas que se encuentran las comunidades pesqueras. DIGERENARE recopila los datos estadísticos a través de sus 29 empleados de campo: extensionistas, promotores e inspectores, que se dedican simultáneamente a actividades pesqueras, ecológicas y de vida silvestre; se dispone de 12 motocicletas para efectuar sus labores a través del territorio nacional; la ubicación de dicho personal aparece en la figura 1.

El cuadro 3 muestra que la producción pesquera artesanal ha experimentado una tasa de crecimiento anual de 12.5% al aumentar de 589,861 kilos en 1970 a 1,194,261 en 1976; en este último año la participación por especie fue de 75% para pescado, 3% para camarones, 1% para langostas y 21% para otras especies (cangrejos, almejas, curiles y huevos de tortuga.)

Comercio Exterior

A partir de 1971 las exportaciones han crecido a una tasa promedio anual de 30.0% al pasar de SCA 3,295,937 a SCA 12,304,725 en 1976; el camarón, que tiene mayor importancia, participa con un 63% del valor de lo exportado en ese último año, correspondiendo a la langosta el 37%, siendo insignificante el de otros productos. Se exportan las colas con concha de ambos crustáceos, en forma congelada, en cajas de cartón de 5 libras (2.27 Kg) formando bultos de 50 libras (22.7 Kg). El principal mercado es Estados Unidos de Norte América.

Las importaciones han mantenido su nivel alrededor de un cuarto de millón de Pesos Centro Americanos; sin embargo, en 1974 se importaron SCA 750,000 y en 1975 SCA 650,000. Los productos enlatados, como el pescado, tienen mayor participación, sin embargo también se importa pescado y camarones en hielo de Nicaragua y Guatemala.

La Dirección General de Estadística y Censos suministraron las cifras correspondientes a las exportaciones e importaciones, las cuales aparecen en los cuadros 4 y 5.

Cuadro 1. Producto Interno Bruto de Factores a Precio de Mercado (millones de pesos Centro Americanos)

PIBfm	1973	1974	1975
Total	822.0	897.0	948.0
Sector Agropecuario	281.5	289.0	279.0
Sector Pesca	5.0	5.2	8.1

Cuadro 2. Producción Pesquera Total, 1970-1976 (Miles de Kilos)

Año	Camarón	Langosta	Pescado	Otros *	Total
1970	1,413.6	409.2	274.5	166.1	2,263.4
1971	1,987.7	295.9	268.6	61.8	2,614.0
1972	2,140.0	100.7	325.7	88.3	2,654.7
1973	1,958.4	132.3	534.7	89.5	2,714.9
1974	1,611.4	297.3	516.0	114.3	2,539.0
1975	1,637.4	696.5	679.8	183.0	3,196.7
1976	1,599.0	653.5	651.5	183.4	3,087.4

* Incluye almejas, curiles, ostras, cangrejos y huevos de tortugas.

Cuadro 3. Producción Pesquera Artesanal, 1970-1976 (Kilos)

Año	Camarón	Langosta	Pescado	Otros	Total
1970	5,837	1,605	351,387	231,032	589,861
1971	15,788	6,927	351,269	86,509	460,493
1972	18,195	5,615	396,857	116,384	537,051
1973	70,045	8,135	618,695	122,107	818,982
1974	24,150	3,875	569,805	151,886	749,716
1975	22,096	9,126	842,595	240,734	1,114,551
1976	37,313	9,288	893,313	254,347	1,194,261

Cuadro 4. Exportación de Productos Pesqueros, 1971-1976 (Kilos - \$CA)

AÑO	Camarón		Langosta		Pescado		Otros		Total		Precio Promedio
	Kilos	Valores	Kilos	Valores	Kilos	Valores	Kilos	Valores	Kilos	Valores	
1971	1,977,969	2,613,903	222,308	673,802	11,274	5,545	5,765	2,687	2,217,316	3,295,937	1.49
1972	2,406,406	1,918,170	110,241	422,059	37,523	25,967	70	44	2,554,240	2,365,970	0.93
1973	2,185,142	1,706,617	121,111	523,539	52,862	36,471	3,182	1,892	2,362,297	2,268,519	0.96
1974	1,345,120	2,598,023	260,353	1,471,066	145,306	75,851	4,721	925	1,755,500	4,145,865	2.36
1975	1,678,333	5,070,253	831,774	5,219,476	33,701	18,169	73	60	2,543,881	10,307,958	4.05
1976	1,919,387	7,746,698	618,413	4,506,362	116,400	50,740	4,399	925	2,658,599	12,304,725	4.63

Cuadro 5. Importación de Productos Pesqueros, 1971-1976 (kilos - \$CA)

AÑO	Camarón y Langosta		Pescado		Otros*		Total		Precio Promedio
	Kilos	Valores	Kilos	Valores	Kilos	Valores	Kilos	Valores	
1971	1,153	3,458	102,879	52,424	418,802	209,837	522,834	265,719	0.51
1972	27,925	16,924	155,959	48,398	830,340	389,431	1,014,224	454,753	0.45
1973	3,877	7,615	125,904	57,546	445,159	237,432	574,940	302,593	0.53
1974	10,980	24,834	58,193	26,294	902,833	696,569	972,006	747,697	0.77
1975	7,425	19,077	226,750	153,283	574,080	457,409	808,255	629,769	0.78
1976	8,880	22,375	171,329	250,181	6,787	16,086	186,996	288,642	1.54

* Productos pesqueros envasados.

La Balanza Comercial de estos productos ha mostrado un mejoramiento bastante significativo en los dos últimos años, como se observa en el Cuadro 6.

Esta situación se debe al mejoramiento en los sistemas de valorización de los productos exportables, ya que actualmente se toma en consideración los precios internacionales; anteriormente se valoraba en base a la factura proforma de venta presentada por el comerciante.

Los crustáceos tienen un gravamen de exportación SCA 0.085 el kilo, estando libre la exportación de pescado; en tanto que la importación tiene diferentes gravámenes según el producto de que se trate y su grado de elaboración.

Factores que Frenan el Desarrollo Pesquero

Varios son los factores que comúnmente se señalan como causantes del lento desarrollo de la pesca, los que se pueden clasificar así:

1) Falta de investigaciones biológicas y oceanográficas. El desconocimiento de la riqueza del recurso, su distribución, balance ecológico y la dinámica de las poblaciones origina una mala programación de las inversiones tanto en la flota como en plantas de procesamiento. Asimismo, se puede originar una subutilización de los recursos o un agotamiento prematuro.

2) Falta de capacidad técnica en la captura y en la fase de procesamiento, lo que limita la captura y aprovechamiento de todas las especies, o lograr mayor valor agregado en especies de manejo tradicional.

3) Deficiencia en la mercadería provocando una baja calidad en los productos ofrecidos, deficientes estructuras de distribución, altos márgenes de comercialización, falta de hábitos de consumo, etc.

4) Falta de financiamiento adecuado, especialmente para aprovechar las especies menos rentables, o para abrir nuevos mercados.

5) Falta de un programa efectivo de educación al consumidor a fin de motivar la demanda de productos pesqueros, los que en nuestro medio necesitan una fuerte promoción.

Problemas de Mercadeo Pesquero Artesanal

En la pesca artesanal los problemas de captura, procesamiento, distribución, y mercadeo en general son sumamente graves.

Por lo general el pescado se comercializa entero, incluso con las vísceras, ya que así lo exigen muchas amas de casa, con la idea de que ello les permite detectar el buen o mal estado del producto. El único procesamiento que efectúan los artesanales es el salado, llamado comúnmente "saleado", aplicando directamente al pescado sal después de abrir longitudinalmente su carne, luego lo ponen a secar bajo el sol; esto se acostumbra durante la Semana Santa, en que se consume esta forma de preparación debido a principios religiosos.

Los canales de distribución son simples y limitados, la mayoría de los pescadores venden su producto en el punto de desembarque donde los esperan uno o dos intermediarios, los cuales adquieren la mayor parte de su pesca; los pescadores se ven obligados a efectuar la venta en forma rápida, pues no cuentan con medios de conservación, ni siquiera hielo, como sucede en la mayoría de las comunidades.

Cuadro 6. Saldo Balanza Comercial de Productos Pesqueros (Kilos-SCA)

Año	Cantidad	Valor
1971	1,694,482	3,030,218
1972	1,540,016	1,911,217
1973	1,787,357	1,965,926
1974	783,494	3,398,169
1975	1,735,626	9,678,190
1976	2,471,603	12,016,084

La venta del pescado en la comunidad la realiza el mismo pescador o algún familiar cercano; la venta se efectúa por sartas² dependiendo su precio de los tamaños y especies.

En el transporte entre los puntos de desembarque y las ciudades se utilizan cajas de madera o tinas de láminas, donde se coloca el pescado con hielo en pedazos distribuidos uniformemente sobre el producto; después que se cubre con sacos de mezcal, se transporta en vehículos con pailas e incluso en carros de transporte interurbano, ya que no existen vehículos con cámaras isotérmicas.

En las ciudades existen dos medios de ventas: el puesto fijo, en mercados, supermercados, locales especializados; y en forma ambulante (bicicletas, carretillas, canastos). El producto se ofrece entero, eviscerado y fileteado. Los supermercados y puestos especializados mantienen una presentación bastante aceptable, pero los puestos de los mercados populares y los ambulantes dejan mucho que desear por la falta de condiciones higiénicas.

De los precios presentados en el cuadro 7 se han deducido los márgenes de comercialización interna, los cuales aparecen en el cuadro 8; dichos datos fueron suministrados por el Departamento de Pesca de la DIGERENARE. Puede observarse que en la capital (zona central), el margen es de 220% en el filete de primera clase.

El consumo aparente se presenta en el cuadro 9 que refleja que en 1976 el consumo de todos los productos pesqueros fue de 1,473,900 kilos, con un consumo anual per cápita de 0.51 Kg.

El consumo de pescado, excluyendo el pescado envasado, fue de 705,100 kilos, igual a un consumo de 0.24 Kg por persona, para ese mismo año.

A fin de conocer mejor la situación del consumo de pescado, se presenta una comparación con el consumo de otras carnes (en el cuadro 10); dichas cifras fueron suministradas por el Banco Central de Honduras.

Aunque los precios promedios anuales del pescado, la carne de pollo y la de res son iguales, el pescado presenta la seria desventaja de la mala presentación, dudosa calidad, abastecimiento irregular y falta de conocimientos del pueblo para elaborar una variedad de platos, lo que disminuye considerablemente su demanda.

² Sartas: Varios pescados enteros, metidos en un hilo.

Cuadro 7. Precios Promedios de Venta (SCA) por Kilo (Enero-Septiembre 1977)

Precio Promedio de Venta del Pescador				
Zona	Pescado Fresco *		Filete	
	1a. clase	2a. clase	1a. clase	2a. clase
Sur	0.61	0.30	0.88	0.88
Norte	0.65	0.43	0.99	0.90
Central	0.66	0.44	0.44	0.99

Precio Promedio de Compra del Consumidor				
Zona	Pescado Fresco *		Filete	
	1a. clase	2a. clase	1a. clase	2a. clase
Sur	1.08	0.59	1.82	1.13
Norte	1.45	1.09	2.28	2.28
Central	1.73	0.99	3.17	2.20

Pescado Seco Salado

(En Semana Santa)

Precio de Venta del Pescador	\$CA 1.65
Precio de Compra del Consumidor	\$CA 3.85

* Eviscerado

Cuadro 8. Márgenes de Comercialización

Zona	Pescado Fresco		Filete	
	1a. clase	2a. clase	1a. clase	2a. clase
Sur	\$CA0.47 = 77%	SCA0.29 = 97%	\$CA0.94 = 107%	SCA0.25 = 28%
Norte	0.80 = 123%	0.66 = 153%	1.29 = 130%	1.38 = 153%
Central	1.70 = 162%	0.55 = 125%	2.18 = 220%	1.21 = 122%
Pescado seco salado SCA 2.20 = 133%				

Cuadro 9. Consumo Aparente de Productos Pesqueros, 1976 (Miles de kilos)

Producción	1974	1975	1976
Camarón	1,611.4	1,637.4	1,598.5
Langosta	297.6	696.5	653.5
Pescado	516.0	679.8	651.5
Otros	114.3	183.0	183.4
Sub-Total	2,539.3	3,196.7	3,086.9
<u>Importación</u>			
Camarón y langosta	11.0	7.4	10.5
Pescado	58.2	226.8	170.0
Otros *	902.8	574.1	865.1
Sub-Total	972.0	808.3	1,045.6
<u>Exportación</u>			
Camarón	1,345.1	1,678.3	1,919.4
Langosta	260.4	831.8	618.4
Pescado	145.3	33.7	116.4
Otros	4.7	0.1	4.4
Sub-Total	1,755.5	2,543.9	2,658.6
Consumo Aparente:	1,755.8	1,461.1	1,473.9

* Productos envasados (pescado, camarones, ostras, etc.)

Cuadro 10. Consumo Comparativo de Carnes, 1976

Producto	Kilos	Precio al consumidor Kilo (\$CA)
Carne de res	21,655,636	1.29
Tajo de res	—	1.64
Carne de cerdo	9,513,136	1.80
Pollo limpio	1,296,273	1.39
Pescado	922,273	1.29

Opportunities and Problems in Processing and Marketing Fish in Honduras

SUMMARY

The artisanal fisheries of Honduras are conducted along both the Atlantic and Pacific coasts and in freshwater. Artisanal fishing communities are characterized by a high rate of illiteracy, emigration of young people between the ages of 16 and 30 years, and the lack of medical care, potable water and electrical power.

Two privately operated aquaculture enterprises are on the verge of commercial production, one for penaeid shrimp and one for the freshwater prawn (*Macrobrachium rosenbergii*). Additionally, the Honduranian Government is sponsoring freshwater prawn and tilapia culture projects with advice and assistance from the Taiwan Government, the U.S. Agency for International Development and the U.S. Peace Corps.

Total Honduranian fish production contributes 0.9% of the Gross National Product (PIB). Annual per capita consumption of fisheries products was 0.51 kg. in 1976. Exports of fishery products, principally shrimp and lobster, produced from the Caribbean, have increased 30% from 1971 to 1976. Imports have been maintained at approximately one-quarter of a million Centroamerican pesos. Artisanal fisheries production has increased 12.5% from 1970 to 1976.

Factors which have impeded fisheries development have been: (1) lack of biological and oceanographic research; (2) lack of technical capability concerned with the capture and processing of fishery products; (3) marketing deficiencies; (4) lack of adequate financing; and (5) lack of an effective educational program to promote consumption of fishery products.

Marketing of production from artisanal fisheries has especially been hampered because of the lack of methods of preservation.

BIBLIOGRAFIA

Centro Américas en Cifras

1973-1975 Publicación anual del Banco Central Americano de Integración Económica (BCIE).

Informe Económico

1976 Departamento de Estudios Económicos, Banco Central de Honduras.

Imagen del Sector Pesquero de Honduras y Boletín Estadístico Pesquero

Documentos del Departamento de Pesca de la Dirección General de Recursos Naturales Renovables (DIGERENARE).

Anuarios Estadísticos

1970-1976 Dirección General de Estadísticas y Censos.

Informe

1976 Documento Presentado a la Dirección General de Recursos Naturales Renovables por el Biólogo Pesquero Don Carmelo García Cabrera del Instituto Español de Oceanografía, resultado de sus investigaciones en mares hondureños en 1976.

Processing, Distribution and Marketing Constraints in Small-Scale Fisheries Development

ROWENA M. LAWSON
Department of Economics and Commerce
University of Hull
Hull HM6 7RX
England

A wide range of fish and fishing techniques and even fishermen exist in the Caribbean, the latter extending from the wealthy foreign game fishermen to the small-scale subsistence fishermen in the artisanal fisheries sector. This paper will concern the latter, many of whom continue to use traditional techniques in fisheries with declining yields and diminishing returns.

The fundamental economic problem in the exploitation of fish resources arises because maximum sustainable yield is reached before commercial profitability begins to fall. Continued fisheries exploitation continues as long as variable costs are covered. This creates an economic environment of over-investment and over-employment and over-exploitation of fisheries which very soon will lead to a doom-watch situation.

This is true not only for internationally exploited distant water fisheries, but also for inshore small scale and artisanal fisheries. As far as preventive and remedial action is concerned, the main difference between these two is that, whereas the former will involve concerted international action, the latter is within the ability of maritime countries to control. This is the main reason why there should be some national monitoring and management of resources within the fishing zones of individual countries. The development of fish processing and marketing must be made within these perspectives.

Falling per capita productivity combined with increasing population growth has, in many countries, produced a fisheries economy characterized by under-employment and unemployment both seasonal and chronic. Because of this, targets in fisheries development policies are frequently not merely directed to raising production but also to increasing employment. A strategy with such dual objectives must prefer labor-intensive methods over a more capital-intensive technology. Attempts to transfer sophisticated technology have often proved counter-productive. It is thus important to consider, before embarking on a strategy of development, what technology is appropriate for each individual country and this will differ between individual states in the Caribbean.

The application of an appropriate level of technology is not only important in fishing methods but also in processing and marketing. Traditional marketing is generally small in scale and highly suitable for the small-scale fishery it serves. But when increased landings occur, attempts to handle them by introducing freezer technology which may be successful and viable when the product, such as lobster or shrimp, is for an export market (since the wealthier foreign consumer can bear the cost), often far too expensive for products destined for a

local, low-income consumer. Such a modern processing technology also involves the use of ice plants and cold stores which are necessary to complement it in the distribution chain. These are additionally inappropriate because they are high in capital cost, low in labor cost, high in foreign exchange input and low in local material input.

The introduction of new processing technologies is sometimes undertaken without considering consumer needs. Tastes in food consumption are amongst the most conservative of human characteristics. If fish is customarily eaten as dried or smoked fish, consumers will not easily adapt their taste to fish processed in another form. So before discarding traditional processing methods, attempts should be made to improve them by using local materials and labor and low energy inputs, such as the sun and wind, and by improving storage in order to reduce wastage and upgrade the product. Improvements on local methods may even yield some economies of scale; for instance, in areas where landing points are highly dispersed, curing yards and smoke ovens can be established to service a number of villages. These can be better managed and controlled so there is less infestation loss and their construction and use has a linkage which increases the local level of employment.

Processing is an activity not usually undertaken by fishermen but by those engaged in the fish trade and in all fisheries development schemes it is essential to secure the cooperation of fish traders. Since fish traders are usually also the main money lenders to fishermen, they have considerable power in the community. Any scheme which increases fish landings will affect fish trade and traders may well turn this to greater advantage to themselves than to the fishermen. As long as indebtedness exists this situation may persist. It is to avoid this that loans schemes have been devised to give cheap money to fishermen for the purchase of gear. However, it would be a mistake to consider that the introduction of a fisheries loans scheme to enable fishermen to purchase new gear and equipment would ultimately relieve them of their indebtedness to traders.

A key feature of the relationship between fishermen and fish traders is the credit system whereby the trader acts as a general money-lender, not only financing fishermen for their seasonal fishing requirements, but also providing consumption credit and money for festivities and funerals. This relationship between fishermen and the fish trader/financier is often regarded as pernicious and capable of constraining any efforts which fishermen may make to improve their livelihood. If this is the case, then it is important that traders should also see that some gain will come to them from a fisheries development scheme. However, in most fishing communities the relationship between fishermen and fish traders is symbiotic and provides a well established working relationship with a great deal of give and take on both sides and thus should not be lightly discarded. Generally speaking, in countries where attempts have been made to bypass the traditional trader by the rapid introduction of more modern marketing methods, such as by formally organized auctions or wholesale markets, the innovation has failed and the traditional system has prevailed, because the trader is still needed

to play a significant role in the socio-economic environment in which small-scale fisheries exist.

In Ghana in the 1960s the government built large fish warehouses in an attempt to provide a system of sale by weighing, and to improve the hygiene of handling, but traders completely boycotted the scheme. Sale by weight was not understood by the trade, and traders were afraid of subsequent government interference.

In Malaysia, where an attempt was made to improve fishermen's earnings by introducing fish auctions at the beach, it was observed that only five to seven traders operated in the fish auction and collusion between them seemed evident. Fishermen certainly did not benefit.

All over the developing world fish traders have the reputation of exploiting fishermen, but where calculations have been made, the earnings of small-scale fishermen have been found to be around 30-40% of the final retail price and this is a very reasonable return for a primary product.

The strategy for improving marketing must be one in which the benefits of increased landings are shared between traders and fishermen. It is easier to introduce innovations in a situation when both have rising per capita incomes than in a situation when traders are afraid that their livelihood is being threatened, and unfortunately this is the environment which often surrounds fisheries improvement schemes. Only when fishing incomes have risen sufficiently and fishermen have learned to save, will they be free from the shackles of the trader/financiers. In a fishery which yields rising incomes, fishermen can be encouraged to be thrifty by enforcing a loans repayment scheme which provides an excess portion from which they can build up a savings account.

The leap from a traditional small-scale fishery and the traditional systems of processing and marketing which accompany it, to a high-capital-cost technology of processing, distribution, and marketing is frequently too great and too fast to be easily assimilated. The socio-cultural framework in which the economic system exists must also change simultaneously, but it cannot make a sudden leap forward and cannot keep pace, and is always a laggard in a period of rapid technological change. For example, it is commonly supposed that traditional small-scale fishermen who, for decades, have been dependent on others can, given sufficient capital, i.e. improved gear and vessels, quickly turn into dynamic fishing entrepreneurs on their own account, taking on the risk-bearing functions of capital ownership, of marketing, and business organization. Further, it is frequently assumed that fishermen will, given the need for larger scale fishing units, readily form co-operatives which will, amongst other things, undertake fish marketing. In many communities these are false assumptions to make since people do not easily change from their long-established traditional roles in society. Thus the rate of change of technology must be appropriate, not only to the economic resource endowment of the country, its plentiful supplies of labor, its scarce supplies of capital and skill, but also to the cultural and social structure of society.

Dificultades para la Elaboración, Distribución y Mercadeo en la Industria Pesquera en Pequeña Escala

RESUMEN

Este trabajo expone la semejanza entre los problemas confrontados en la región del Caribe en el desarrollo de pesquerías en pequeña escala, con aquellos experimentados en Africa y Asia. La tasa de cambio en la tecnología debe ser apropiada, no sólo a los recursos económicos del país, la abundancia de su mano de obra, el escaso abastecimiento de capital y destreza, sino también a la estructura socio-cultural de dicha sociedad.

Frecuentemente, una disminución de la productividad per cápita y un aumento en la población provocan el desempleo en la economía pesquera del país. Como respuesta, la política pesquera trata de aumentar tanto la productividad como el número de empleos. En estos casos, la estrategia seguida se basa más bien en la práctica del trabajo intensivo que en el empleo intensivo de capital para desarrollo tecnológico, por lo que los esfuerzos para encontrar la solución en la tecnología sofisticada están destinados al fracaso.

Los gustos y costumbres del consumidor, la relación simbiótica entre el pescador y el vendedor de pescado, el papel tradicional del pescador, y la capacidad socio-cultural de la sociedad de asimilar los cambios tecnológicos, son aspectos de las pesquerías que han impedido el desarrollo pesquero en el pasado, debido a que, o bien han sido ignorados o mal entendidos. Se dan ejemplos sobre este aspecto.

Small Scale Fisheries Management and Administration

G. WINSTON MILLER

*Ministry of Trade and Industry,
Cooperatives and Consumer Protection
Belmopan, Belize, C.A.*

Even though fishery resources are generally accepted as being renewable they are by no means inexhaustible, as the numerous cases of stock depletion in many parts of the world clearly show. The primary aim of management of any fishery should be to utilize the particular stocks so that, while attempting to derive maximum benefits, adequate conservation measures are observed and the future of the resource assured. However, before any meaningful attempts at formulating a management plan for a particular fishery can be made, a certain amount of basic information, which provides a basis for managerial thinking and decision making, is needed. Earliest efforts should be geared towards obtaining, at least, some rough determinations of, *inter alia*: (1) abundance and distribution of the stock; (2) size (or age) composition; (3) age at sexual maturity – reproductive age; and (4) economic and cultural value of the fishery.

For descriptive purposes, management decisions can very conveniently be divided into three categories: (1) those aimed at allocating and conserving the fishery resource; (2) those aimed at maximizing the benefits derived from utilizing the resource; and (3) those aimed at maintaining the resources for the future.

Allocation and Conservation

Generally, the relationship between effort and catch (or value) for a fishery can be simply shown (Fig. 1).

One of the fundamental decisions to be made by the fishery manager involves the establishment of objective priorities; that is, should the management of a particular fishery seek principally conservation, economic, or social goals. Indeed, the whole pattern of management is influenced in large measure by this decision. If conservation is the prime goal, then the margin of effort should be limited to the E_2 level so that overfishing and consequent stock depletion may be avoided. If the primary goal is to maximize economic returns the level of effort should be limited to E_1 . In many uncontrolled fisheries the level of effort may well increase beyond the E_3 level.

The question now arises as to what factors influence this decision making in dealing with a small-scale fishery? If maximum benefits are to be obtained, factors other than conservation and economic returns must be considered. The fisheries manager is forced to think in terms of optimum rather than maximum benefits. This in turn necessitates the development of criteria for these optimums. However, these criteria can only be determined on the basis of available biological, economic, and cultural information. It follows, therefore,

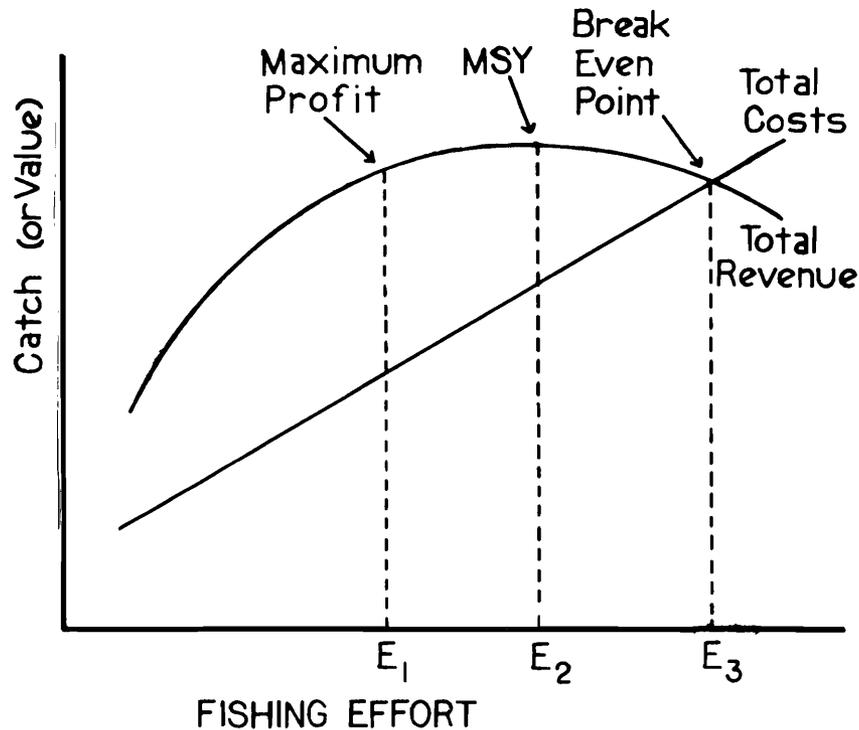


Fig. 1 Relationship between effort and catch (or value) for a fishery.

that the maintenance of an up-to-date data base of these various types of information is necessary for effective fishery management.

Determinations of allowable catch or level of fishing effort are among the first steps in formulating any fisheries management program. A brief look at some of the fisheries of Belize may clarify some of the problems with which a fishery manager may be faced and suggest possible solutions to such problems.

The spiny lobster fishery of Belize is very lucrative. Since 1965, despite cyclical fluctuations, annual landings have remained fairly constant at approximately 640 metric tons of whole lobsters. Most of the commercial lobster fishermen (more than 95%) are members of one of five fishermen cooperative societies.

Information collected from tagging and statistics collecting programs initiated in 1965 have enabled the optimum level of fishing effort to be determined permitting the establishment of: (1) an export quota for each cooperative; (2) an annual 4-month closed season; and (3) a minimum legal size which has served to regulate effort at a level which closely approximates the MSY. Incidentally, the statistical programs in addition to providing information on gear used and catch-per-unit-of-effort gave much useful information on fishing habits and cultural patterns in different parts of the country.

Exploitation of many fin fisheries of Belize is still at a level well below MSY. As a result, currently enforced conservation methods limiting mesh size allow the escapement of younger year classes.

For many small-scale fishery operations in highly localized areas, cultural factors could exert a significantly greater influence on decision making. In remote areas where economic and other factors have forced most residents to depend on catches of fish for the animal protein, it would probably be in order to limit commercial fishing to levels well below the MSY so that residents may obtain supplies with relative ease and fairly simple gear.

In many underdeveloped regions the classical biological assessments may be difficult to carry out because of limitations of trained personnel, the high costs involved, or other reasons. Here the amount of fishing effort may be determined by reviewing records of past catches. Thus, the permitted level of effort may be that which was applied to the smallest annual stock or run without detrimental effects on the stock. Generally this method achieves an effort below MSY and thus ensures stock continuity.

Decisions once made should be carried out. Fisheries regulations should be promulgated and effective means of enforcing them determined. In many countries of the Caribbean area, and indeed in many developing countries throughout the world, where the emphasis is on small-scale fisheries, the fisheries department is without a law enforcement division. The fisheries manager or administrator working in close coordination with the recognized enforcement agencies such as police, customs and supplies control would be able to effectively enforce the fisheries regulations.

Both the fisheries regulations and the methods of enforcing them should constantly be reviewed in the light of changing conditions within the fishery and the community in general.

Utilization

For the exploitation of a fishery resource, boats, gear for harvesting the target species, and equipment for processing the catch are primary needs. As simple as these needs may appear to be, very often financing could be a problem. An effective administrator should take steps to investigate possible sources of financing and bring these to the attention of the fishermen involved. Here again, the most economical methods of harvesting and processing should be determined and efforts made to finance the equipment necessary. Managers of the fishery should be aware of the dangers of over-capitalization, which tends to lead to gear congestion and overfishing.

Often it has been found that organizing the fishermen into fishing cooperatives leads to a very effective way of exploiting a fishery resource. Indeed, fishing cooperatives have had very good success in Belize. However, before attempting to organize a fishing cooperative a thorough investigation of not only the stocks to be exploited, processing to be done, market potential and other related matters, but also cultural patterns and way of life of the community should be undertaken. A look at the distribution of fishing cooperatives in Belize reveals that four of the five successful ones are in the northern half of the

country. The only successful one in the southern half of the country is in the village of Placencia, whose residents have a long tradition of fishing and of being excellent skin divers. Attempts at organizing a fishing cooperative in Punta Gorda have resulted in failure. Here residents are traditionally subsistence farmers-fishermen-odd job workers and generally contribute very little to the general economy. The attempted organizations of a fresh water fishermen's cooperative in the Rancho Dolores area also failed, partly because of the unwillingness of the residents to devote the time fully to fishing. Assuming that fishery resources are available for exploitation, it seems that fishing cooperatives have a better chance of proving successful in communities where residents tend to engage in a single occupation, for example fishing or farming, and there is no division of effort among competing occupations.

The fishery manager should also concern himself with gear efficiency. In order to maximize the returns from a particular fishery resource the most efficient harvesting and processing methods must be used. It has been found, for example, that handlining for fish on the outer "edge" of the Belize Barrier Reef has proved a lot more efficient than trapping or longlining.

The handling and processing of the product are as important as the harvesting. The fishery manager should determine and seek to enforce suitable quality standards for boats, processing plants, and market outlets thus assuring a product of optimum quality.

Efforts should also be directed towards utilizing as fully as possible the entire catch. In many fin fisheries, only a few species are generally regarded as being desirable. Snappers, king mackerels, and some groupers are totally acceptable in Belize, while porgies, grunts, and mullets are often little esteemed. Greater utilization of hitherto under- or unutilized species may be effected by: (1) a consumer education program showing alternative methods of preparation and ways of turning these underutilized species into acceptable dishes; and (2) the finding of alternative markets generally outside the country.

In a small-scale shrimp operation, the additional income derived from the utilization of the by-catch could make all the difference between success and failure. Although, the lobster fishery of Belize is a very lucrative one, until recently only the tails were utilized. Ways of utilizing the lobster head meat are currently being investigated with a view to maximizing the returns to the fishery.

A good working relationship between the fishermen and the fisheries administrative personnel assists in making the small-scale fishery a successful one. The administrator gets the benefit of the fishermen's first-hand observations and in turn is able to pass to the fishermen in simple terms the results of biological investigations, thus giving information on the spatial and temporal location and life cycle characteristics of target species.

Managerial decisions about the harvesting of a fishery resource can be implemented only by the fishermen. An effective method of obtaining this cooperation is to involve fishermen in decision making.

In Belize, representatives of the fishermen's cooperatives are appointed to the National Fisheries Advisory Board, which discusses all matters pertaining to the welfare of the fishing industry. Fishermen are generally willing to carry out a fishing policy if they know that they were a part of the decision making process.

Maintaining the Resource

Many countries in the Caribbean have expanding tourist industries and a number of coastal development projects have been, and are currently being, undertaken. Estuaries and mangrove areas which are vitally necessary for maintaining ecosystem productivity are being destroyed with a resultant decrease in fish stocks. The fishery manager should attempt to establish standards or guidelines for maintaining ecosystem productivity and recommend the necessary safeguard action to the responsible agencies. Indeed, within the limits of his resources, the fishery manager should attempt to obtain as often as possible information on ecosystem status and requirements.

Fishery managers, however, must realize that many coastal development projects are necessary for a country's economic growth. The emphasis here should therefore be on attempting to minimize the damage to fish habitats by the proposed projects. It does the fishery no good to discover the harmful effects after the project has been completed. An effective means of evaluating anticipated or potential damage to essential habitats should be sought.

SUMMARY AND CONCLUSIONS

- (1) For the effective management of a small-scale fishery, basic biological, economic and cultural information are necessary for providing a basis for decision making.
- (2) A management plan should attempt to focus on the following: (a) allocation and conservation; (b) utilization, including determination of allowable catch; and (c) maintaining productivity of habitats.
- (3) Alternative methods may be used in the determinations of allowable catch.
- (4) Fishery regulations should be promulgated and the most effective way of enforcing them should be sought.
- (5) The fishery manager should aim at maximizing the benefits derived from fishing operations through optimum utilization.
- (6) The cooperation of fishermen is necessary for the implementation of management decisions.
- (7) The maintenance of aquatic ecosystem productivity depends, in large measure, on the protection of essential fish habitats such as estuaries and mangroves.

Dirección y Administración de la Industria Pesquera en Pequeña Escala

RESUMEN

Para una administración pesquera eficaz, proporcionando la mejor decisión a tomar, se necesita una información básica biológica, económica y cultural.

Un plan administrativo debe atender los siguientes puntos:

- 1) **Asignación y Conservación.**
- 2) **Utilización, incluyendo la determinación de la reglamentación pesquera.**
- 3) **Fomentar la productividad en lugares de reproducción de vida marina.**
- 4) **Emplear métodos alternativos en la determinación de la reglamentación pesquera.**
- 5) **La reglamentación pesquera debe ser promulgada, y la forma más efectiva de ponerla en vigencia debe ser buscada.**
- 6) **El director de la oficina de pesca debe tener el propósito de lograr el máximo de beneficios derivados de las operaciones pesqueras mediante la utilización óptima.**
- 7) **La cooperación de los pescadores es necesaria para la implementación de estos reglamentos.**
- 8) **El mantenimiento de un sistema ecológico acuático depende de la protección de los lugares de reproducción, lo cual es esencial para la pesca.**

Formacion y Capacitacion Pesquera

JORGE CARRANZA
Departamento de Pesca
Dirección General de Instituto Nacional de Pesca
México 7 D. F. México

INTRODUCCION

El desarrollo pesquero de una zona o de un país es un problema complejo que requiere, además de la existencia de recursos bióticos adecuados, recursos económicos para el desarrollo de la industria, mercados actuales o potenciales para la producción y recursos humanos capaces de hacerse cargo de las diversas fases de la captura, conservación, industrialización, distribución y mercadeo de los productos. A pesar de que es difícil dar prioridades a unos aspectos sobre los otros, ya que están íntimamente relacionados, es indudable que el elemento humano es de una gran importancia, tanto por su actividad como productor, como por ser el extremo final de la cadena de aprovechamiento del recurso que es el consumo.

En la mayor parte de los casos, la pesca se ha desarrollado como una actividad empírica en que los pescadores aprenden lentamente su oficio, heredando los conocimientos de sus antepasados o mejorando sus técnicas de captura a través de pruebas y errores. Aunque este procedimiento ha sido el normal, el estado de desarrollo de la industria a nivel mundial exige una aceleración en el proceso que solo puede obtenerse a través de programas específicos de educación y capacitación.

La formación de recursos humanos, debe comprender el complejo conjunto de enseñanzas que requiere un individuo para mejorar, por una parte su educación básica y por otra, la adquisición de conocimientos prácticos que le permitan la aplicación eficiente de una tecnología. En muchos países, la formación de sus recursos humanos se hace solo a través del adiestramiento del individuo, sin intervenir en su educación básica. Tal es el caso de la mayor parte de los países altamente industrializados en los que la escolaridad de los candidatos es de por sí relativamente alta.

En el caso de los países en proceso de desarrollo, la escolaridad es muy baja y a pesar de ello generalmente los programas de capacitación de pescadores se orientan exclusivamente a los aspectos prácticos de la pesca. El promedio de escolaridad en los países del área del Caribe, incluyendo a México, por lo general no llega a 3 años. Esto quiere decir que un sector muy amplio de la población, especialmente en el sector de la pesca y la agricultura, escasamente saben leer y escribir y apenas conocen las operaciones aritméticas elementales.

Es por ello que la formación de pescadores a nivel de patronos y motoristas en un país en desarrollo debe considerar, tanto la educación como el mismo entrenamiento, puesto que ambos se complementan. Lograr el equilibrio es desde luego difícil y depende de las condiciones socioeconómicas de cada país. En opinión del que escribe si una nación en desarrollo escoge el camino más fácil y rápido del adiestramiento, no estará resolviendo un problema sino solo aplicando un paliativo temporal. La pesca moderna, inclusive la que se efectúa a corta distancia de la costa con embarcaciones pequeñas, requiere personal cuya educación fundamental le permita operar con eficiencia los modernos equipos e instrumentos de que se dispone, para la localización y captura eficiente de los recursos.

Tipo de personal requerido

El personal que requiere la industria pesquera puede dividirse en dos áreas: (a) personal del mar; (b) personal de tierra.

En ambos casos los niveles de formación varían y en líneas generales la problemática de su capacitación tiene diferencias substanciales. El personal de mar es difícil de formar por el hecho de que las condiciones de trabajo a bordo de un barco requieren de características físicas que no cualquier persona tiene. Los conocimientos que se proporcionen deben quedar englobados en tres disciplinas: náutica y navegación; máquinas y mecánica; capturas. El nivel y amplitud con que se impartan será función del estado de desarrollo de la pesca y de las metas que se hayan fijado para ella. Por ejemplo, en un país con una industria pesquera incipiente los conocimientos de náutica quedarían limitados a navegación costera o por estima y a prácticas marineras; la capacitación sobre máquinas y mecánica se limitaría al conocimiento de la operación, mantenimiento y reparación de motores fuera de borda, estacionarios de gasolina y motores diesel de caballaje reducido; y en el caso de capturas, se enseñaría la construcción, reparación y operación de artes de pesca menores según el tipo de recursos disponibles en la zona.

Con respecto al personal de tierra, la pesca requiere del apoyo de instalaciones como plantas de hielo, congeladoras, enlatadoras, fábricas de harina y subproductos, astilleros y varaderos, talleres mecánicos y de electrónica, etc., para cuya operación se precisa disponer de personal técnico debidamente capacitado. Para la preparación de este personal se necesita contar con talleres debidamente equipados pero aún más importante que los propios talleres son los instructores y profesores con amplia experiencia práctica, conocimientos teóricos fundamentales y capacidad para transmitir sus conocimientos, cuya existencia es muy escasa en los países en desarrollo.

EL CASO DE MEXICO

En la década de 1960 se crearon en México cuatro escuelas prácticas de pesca dependientes del sector gubernamental responsable de la pesca. En estas escuelas,

con régimen de internado, se impartían cursos prácticos durante 2 años y al cabo de ese tiempo se otorgaba a los egresados diploma y libreta de mar como aspirantes a patrones o motoristas de pesca, para barcos hasta de 200 tons., de desplazamiento. No se impartía educación básica salvo algunas materias de apoyo como matemáticas elementales, geografía o español. Al hacerse un análisis del resultado de ellas al cabo de varios años de operar se encontró que no habían cumplido con su finalidad debido a planes de estudio inadecuados, profesores o instructores impreparados y falta de medios físicos y económicos para la enseñanza. Por otra parte, ya que las escuelas no eran preopedeúicas sino terminales, el egresado con alto nivel intelectual o que por alguna razón no se incorporaba a la pesca, no podía continuar sus estudios por no habersele impartido la escolaridad necesaria.

En consecuencia en 1972 se reestructuró completamente la capacitación pesquera creándose 30 Escuelas Tecnológicas Pesqueras dependientes de la Secretaría de Educación Pública pero con la asesoría de la Subsecretaría de Pesca. Las Escuelas Tecnológicas Pesqueras, de las que hay 32 en operación, 19 internas y 13 externas, imparten la educación secundaria y simultáneamente proporcionan capacitación tecnológica en los diversos aspectos de la pesca litoral, de alta mar o de acuicultura.

La mayor parte de ellas tienen régimen de internado y el alumno cuenta con dormitorios, comedor, uniformes, libros, equipo de mar y una pequeña cantidad adicional para sus gastos personales. Los estudiantes se seleccionarán rigurosamente del sector pesquero o campesino del país y es requisito indispensable para ingresar a un internado demostrar que no se dispone de medios económicos adecuados para su sostenimiento. En cambio, el ingreso a las escuelas externas está condicionado exclusivamente a pasar un examen general de conocimientos pero la condición socioeconómica del candidato carece de importancia.

En cuanto a la ubicación de los planteles, se tuvo en cuenta fundamentalmente consideraciones de tipo pesqueras. Así fue como la mayor parte de ellos se orientaron a la formación de patrones y motoristas de barcos de pesca hasta de 200 toneladas de desplazamiento y en consecuencia están localizadas en la mayor parte de los puertos pesqueros del país; otras escuelas dan formación sobre pesca litoral y al mismo tiempo imparten conocimientos teórico-prácticos sobre acuicultura de zonas estuarinas. Estos planteles se encuentran localizados en lagunas litorales, en áreas de poco desarrollo pesquero donde la producción estuarina es más importante que la de alta mar; finalmente dos de las escuelas se localizan en los lagos más importantes o de mayor tradición pesquera de México y en ellas se prepara personal práctico sobre acuicultura de agua dulce. El Plan de Estudios es uniforme en todas las escuelas en lo referente a las materias académicas, pero en los aspectos tecnológicos hay tres modalidades diferentes según las orientaciones antes mencionadas (cuadro 1).

De su análisis se obtiene la impresión de que se da mucho peso al elemento formativo de las materias de educación media básica. Sin embargo, aunque esto es cierto en parte, debe aclararse que algunas de las materias como ciencias sociales, ciencias naturales o matemáticas están orientadas hacia ejemplos de tipo marino y complementan o refuerzan a tecnológicas.

Cuadro 1. Plan de Estudios de las Escuelas Tecnológicas Pesqueras.

Áreas	Sesiones por semana		
	1er. grado	2do. grado	3er. grado
Español	4	4	4
Matemáticas	4	4	4
Ciencias Naturales	5	5	5
Ciencias Sociales	5	5	5
Lengua Extranjera		4	5
Educación Artística	2	2	2
Total	20	24	25
Materias Tecnológicas			
ESCUELAS MARINAS			
Tecnología y Práctica de Pesca	6	6	6
Tecnología y Práctica de Máquinas	6	5	5
Tecnología y Práctica de Náutica	4	5	5
Educación Física	2	2	2
Total	18	18	18
ESCUELAS ESTUARINAS			
Tecnología y Práctica de Acuicultura	4	4	4
Tecnología y Práctica de Pesca	4	3	3
Tecnología y Práctica de Máquinas	4	3	3
Tecnología y Práctica de Náutica	4	3	3
Tecnol. y Práct. de Conservación de Productos Pesqueros		3	3
Educación Física	2	2	2
Total	18	18	18
ESCUELAS CONTINENTALES			
Tecnología y Práctica de Acuicultura	6	6	6
Tecnología y Práctica de Pesca	4	4	4
Tecnología y Práctica de Conservación de Productos Pesqueros	2	4	4
Tecnología y Práctica de Máquinas	4	2	2
Educación Física	2	2	2
Total	18	18	18

Las áreas de tecnología se complementan con prácticas extramuros cuya valoración en horas no puede hacerse por su variabilidad y adicionalmente se exige a los alumnos la realización de viajes de práctica en los barcos-escuela de los planteles y en los de pesca comercial.

Para el desarrollo de los aspectos prácticos de la enseñanza, se dispone de laboratorios de biología, física y química, talleres de navegación, de motores de combustión interna y mecánica, de procesamiento de productos pesqueros, salas de acuarios y en las de aguas interiores se están construyendo estanques para prácticas de acuicultura. Complementa la infraestructura técnica de las escuelas una flota compuesta por las siguientes unidades: 18 arrastreros de 11 a 13 m de eslora, 28 barcos de ferrocemento de 19 m/c, 6 barcos de pesca múltiple de 22 m/c, 1 arrastrero de 20 m/c, y 200 lanchas con motor fuera de borda.

El sistema educativo pesquero de México comprende además seis escuelas de educación media superior, llamados Centros de Ciencias y Tecnologías del Mar y un Instituto Tecnológico Pesquero de nivel profesional. En esta forma, el alumno que termina sus estudios de secundaria y tiene capacidad intelectual e interés para continuar sus estudios superiores puede hacerlo en el mismo campo de las ciencias marinas hasta llegar al nivel profesional, si así lo desea.

Fisheries Education and Training

SUMMARY

In developing countries, if the scholastic level is low, basic education as well as training of the fishermen must be attempted.

Educational levels required by the fishing industry vary according to the job to be performed; sea-going personnel require knowledge of navigation, mechanics, and fishing techniques; personnel ashore need well equipped workshops but also capable supervision.

In Mexico, the four practical fishery schools, founded during the 1960s, did not accomplish their purpose because basic education was omitted. Consequently, when in 1972 the Board of Education founded 30 Fishery Technological Schools on the advice of the Fishery Department, they included secondary education along with training in aquaculture and in littoral or high seas fisheries.

There are three kinds of schools that offer these programs: marine, estuarine, and freshwater schools. Mexico also has six Marine Science and Technology Centers at the medium superior educational level, and a Fishery Technology Institute, which enable the students to continue higher education in order to reach professional level.

Technological education is enhanced with extra curricular activities including field trips aboard school and commercial fishing vessels, and laboratory and workshop training.

This Mexican program probably could not be applied in other countries without modifications, because characteristics and needs differ among countries and cultures; consequently, individual solutions must be developed for different circumstances in different countries.

Financial Assistance to Small-Scale Fisheries in the Commonwealth Caribbean Countries

SYDNEY KIRWAN and AUDLEY ESPEUT

Caribbean Development Bank

St. Michael, Barbados, W.I.

BACKGROUND INFORMATION

The fisheries of the Commonwealth Caribbean Countries are in the main small-scale fisheries, exceptions being the export oriented, vertically integrated, crustacean fisheries for shrimps (*Penaeus* spp.) in Guyana and Trinidad and for spiny lobsters (*Panulirus argus*) in Belize and Turks and Caicos Islands. There is an estimated 22,500 full and part-time fishermen involved in the small-scale fisheries of these countries, whose combined annual production has been conservatively placed at 45,000 tons (Table 1).

The fisheries are characterized by low productivity which arises primarily from the low level of effort expended, limited access to the resources because of unsuitable gear and equipment and the application of inadequate technology. Boats tend to be small comprising canoes, pirogues and open double-enders ranging from 3.5 to 9.0 m (12'-30') long and powered by outboard motors. They usually fish inshore for an average of six (6) hours per day. Exceptions are the 10.5 to 15.5 m (35'-50') long fishing sloops and snapper boats with inboard engines used in the Leeward and Virgin Islands, which have wider operating ranges and the capability of remaining at sea for several days. Ironically, these boats too are used in one-day fishing operations for reef fish employing traps and handlines and as a consequence are uneconomical, except where lobsters make up the major portion of the catch. Fishing for the seasonally migrating pelagic resource is also constrained by the small size of boats, low levels of technology, and the absence of adequate shore facilities to store, market, and distribute incidental large catches.

Annual earnings range from EC\$1,500 for a fisherman/deck-hand to EC\$15,000¹ for a boat owner/captain, with an average of approximately EC\$3,500. Many fishermen as a result are involved in other forms of employment on a part-time basis such as taxi driving and agriculture in order to increase their incomes.

WHY FINANCIAL ASSISTANCE?

Fishing like other types of production, requires the basic elements of production, *namely* physical resources, labor, and capital. Assuming that the fisheries resources are presently not optimally exploited and labor is abundant in the Region, lack of capital for financing fishery development is a limiting factor.

¹ EC \$1.00 = US\$0.37

Table 1. Data on small-scale fisheries in Commonwealth Caribbean Countries

Country	No. of Fishermen	No. of Boats	Estimated Annual Production – Tons *
Antigua	800	250	900
Barbados	1,200	500	4,000
British Virgin Islands	300	125	150
Cayman Islands	60	30	100
Dominica	1,200	600	800
Grenada	1,400	830	1,200
Guyana	1,400	700	10,700
Jamaica	7,200	3,500	14,000
Montserrat	200	75	70
St. Kitts/Nevis/Anguilla	700	350	900
St. Lucia	1,800	600	1,500
St. Vincent	2,500	730	1,200
Trinidad & Tobago	4,000	1,800	10,000

Source: Unpublished data collected by CDB's Fisheries Personnel, 1976 - 1977.

* 1 ton = 1,000 kg = 2,200 lb.

The traditional problems of low production and consequently low earnings and standard of living, which affect small-scale fishermen the world over, typify those of the Region.

Capital is required for the acquisition of boats, gear and equipment, shore facilities, and infrastructure including marketing and distribution systems as well as for improved technology. The objectives of capital input are to improve the efficiency of the individual operation and the industry in general, to increase the availability of a valuable protein food, to provide employment directly to fishermen and through linkages to other sections of the economy and to improve the general standard of living of fishermen.

SOURCES OF FINANCING

Sources of capital financing that have been and continue to be available to small-scale fishermen in the Region are: government; private sector; and financial institutions.

Government

Considered in this category is the role played by Governments in providing facilities and equipment for fishing, fish handling, and marketing infrastructure, which fishermen or the industry in general cannot afford, and grants and/or loans to individual fishermen and fishermen's organizations.

Provision of Shore Facilities and Marketing Infrastructure

Large capital investments are required for berthing, boat haul-up and launching facilities and for marketing and distribution systems, which up to now have been borne by government or quasi-government authorities. These facilities may be regarded either as a service exclusively for the benefit of the fishing industry, or as a service in the general public's interest, or are normally paid for wholly or in part from general revenue, since it is unlikely that these costs can be recovered from the industry. Such facilities are lacking in many countries of the Region and where present they are usually inadequate.

Grants and Loans

These forms of assistance, which are the most common in both developed and developing countries, are usually provided for the acquisition or improvement of fishing vessels, gear, and equipment. The programs are generally administered by a government department, although other agencies such as development corporations, loan boards, and approved co-operative societies may also be charged with the responsibility. The administering authority may have an important bearing on the effectiveness of the program especially in view of the need for close liaison with, and even supervision of, the beneficiaries. Usually, the fisheries departments are most able and likely to achieve this; however, many of the departments in the Region are understaffed or do not have the experience to conduct banking operations.

Funds may be made available by lump sum appropriations, annual appropriations and as revolving funds. Grants in conjunction with loans are frequently used; nevertheless, loans are by far the most typical form of assistance and may range from 20%-80% of the cost of equipment to be acquired. Since the introduction of the Caribbean Development Bank's Farm Improvement Credit Scheme, which includes assistance to small-scale fishermen, the governments in the Less Developed Countries (LDCs) of the Windward and Leeward Islands have reduced considerably the quantity and size of loan financing to fishermen, although short-term loans of up to \$3,000 are still available in some countries. Other forms of government assistance include exemptions from import duty on all fishing gear and equipment and subsidies on fuel and lubricants.

Government financing is derived from loans and/or grants from bilateral or multilateral external agencies such as – The United Kingdom Ministry of Overseas Development (ODM), the Canadian International Development Agency (CIDA), United States Agency for International Development (USAID) and the European Development Fund (EDF). The Caribbean Development Bank (CDB), in addition to financing individual fishermen directly or indirectly through its intermediaries, is currently appraising three (3) Regional Joint-Venture Projects involving several Caribbean Community and Common Market (CARICOM) Countries. The Inter-American Development Bank (IDB) is also currently appraising fishery development proposals in at least two of the larger countries in the Region. Among the principles applied by the Banks in financing projects are that the investment must contribute effectively to the economic development of the countries or Region and the Projects must be financially viable.

Private Sector

In some developing countries, informal private lending is as important a source of funds to farmers and fishermen as is credit from public institutions. In addition, household savings is probably a very important source of financing for new investment, thus some fishermen have been able to expand or improve their operations without access to public institutional financing.

Given that a lack of credit can be a constraint on fishing output, it should be recognized that a good many of the existing credit financial institutions lend a small portion of their funds to small producers. Institutions are subject to various pressures which cause them to lend disproportionately to the larger producers, such as keeping administrative costs down, avoiding default and using credit to increase production, since it is true that administrative costs are proportionally higher for smaller loans especially when loan supervision is undertaken. Because ability to cover costs and low default rates are considered the hallmarks of a successfully administered credit program, loans to small producers are kept to a minimum in order to meet the criteria by which they are judged.

Interest charged on public sector credit is well below the high rates charged by private unlicensed money lenders, though above the rates charged by friends and relatives in most societies. Aside from interest rates other terms offered by public sector agencies tend to be less attractive than those offered by the private lenders. Timeliness, absence of red tape, duration of loans, flexibility in repayment, and absence of collateral requirements are often some of the advantages cited in favor of private loans.

Detailed information on private sector lending in terms of its structure, sources, recipients, rates, uses, and impact on the fisheries sector is lacking or fragmentary. This form of financing is recognizable and is purported to work with varying measures of success, especially for short-term financing.

Financial Institutions

Commercial Banks

Credit to small farmers and fishermen is available from all commercial banks in the Region; however, for reasons such as lack of adequate security and high interest rates, most small-scale fishermen and farmers have not been able to use these sources of funds.

CDB's Farm Improvement Credit Program

In the More Developed Countries (MDCs) of Barbados, Guyana, Jamaica, and Trinidad and Tobago, financial intermediaries, variously known as agricultural development banks or national development banks, etc., administer credit programs for small-scale farmers and fishermen. These, which may or may not be funded wholly or in part by the Caribbean Development Bank, are not a part of its Farm Improvement Credit Program. The Farm Improvement Credit Program (FIC) was introduced in 1971 by the Caribbean Development Bank (CDB) to make available to small farmers and fishermen financial assistance on a medium

and long-term basis that otherwise would have been difficult to obtain particularly from the commercial sector. The money is generally lent by CDB to the Government-owned financial intermediaries of the LDCs, which on-lend to sub-borrowers.

The maximum size of loans which can be approved by the intermediaries under this program is EC\$270,000 for individuals and EC\$405,000 for Cooperatives. Interest rates are lower than those charged by commercial banks and do not exceed 8%. There is usually a moratorium on repayments of up to twelve (12) months and the credit is usually supervised.

A review of the FIC program, as is shown in Table 2, reveals that since its inception, a total of 347 loans have been approved by the various financial intermediaries, of which 63 (or 18%) were for fisheries. Total commitments have amounted to \$9,000,000 with EC\$2,000,000 (22%) going to fisheries and disbursements have reached a figure of EC\$8,000,000 with only \$1,000,000 (13%) for fishing. Loans range from EC\$2,500 to about EC\$90,000.

It is evident that serious efforts must be made from both a technical and financial standpoint to give greater attention to this neglected section of the Region's development. Many governments are delinquent in preparing fisheries sector plans and loans are being made on an *ad hoc* basis with little or no thought to the overall planned development of the fisheries.

The size and types of loan applications made by fishermen may account for the low level of approvals and disbursements. Most of the applications have been for relatively medium size capital expenditures, such as boats, including trawlers, engines, and equipment for amounts of up to EC\$90,000 which are often considered over-capitalizations by the evaluating officers.

Loan repayment performance has been poor in some countries due to one or more of the following factors: (1) over-capitalization in relation to the borrower's productive capability; (2) the seasonal nature of some fisheries and the fact that repayments are usually scheduled for monthly remittances; (3) inadequate supervision and extension services; and (4) an apparent reluctance by some borrowers to make payments.

In many cases it was difficult to distinguish interest from principal in arrears as they were often combined. Although the evidence is not conclusive because of the relatively small number of loans, it would appear that in the long run the majority of loans were eventually repaid, but the arrears rate was prone to be seasonally high.

Proper loan appraisals for small loans to fishermen is as vital and necessary as the appraisal of a large fishing project. A random sampling of fisheries loans, which were evaluated and financed by some of the intermediaries, has revealed that in appraising some of the earlier loans, current prices were used with no provision in the investment costings for price escalations. Consequently, by the time the projects were implemented, in many cases up to twelve (12) months after the appraisal had been completed, more financing was needed, which meant either obtaining an additional loan, increasing the borrower's capital contribution, scaling down the project or even scrapping it.

Table 2. Activities of the Farm Improvement Credit Program as it relates to the fisheries industry in the less developed countries (June, 1972-1977)

	No. of Approvals	Committed EC\$000s	Disbursed EC\$000s
FIC Program	347	9,000	8,000
Fisheries Sub-Program	63	2,000	1,000
Fisheries Activities as a percentage of FIC Program	18	22	13

Most of the appraisals have used net cash flows rather than the Financial Rate of Return (FRR) as indicators of viability. It should be of interest to the financial intermediaries to ascertain whether the interest rate charged is above or below the opportunity cost of capital, and to what extent. This will also indicate whether interest rates to the small fishermen should be subsidized or not since at first glance, this appears to be one way of assisting them financially on a short-term basis. However, interest subsidies should not perpetuate if an efficient credit scheme including loan appraisal and credit supervision is in operation.

The intermediaries should not merely be lending institutions, but in order to minimize poor risks they should possess fishery technical expertise and be able to advise on the most suitable boat and equipment to suit the individual fisherman's needs, as too often, loans have been based on what the fisherman wanted rather than what he was capable of coping with. A fisherman may want a certain type of engine, but unknown to him spares and parts may be difficult to obtain, or the engine may be over-powered for his boat and type of operation, hence his operating and capital costs may exceed his earnings. Alternatively, the engine may be too small causing a great deal of breakdown, a loss of fishing time and consequently a loss of revenue.

DISCUSSION

Unlike small farmers most of whom have land, many small-scale fishermen lack capital assets which can be used as security or as equity, hence it is difficult for them to obtain a loan either from the FIC program or from commercial banks to acquire their own boats. They are, therefore, obliged to work as crew members on other people's boats or find alternative employment for which they may be less suited. This tends to suppress any enterprising desires they may possess.

For some small-scale fishermen who own boats, obtaining working capital may be a problem. It is true that artisanal fishing is basically a day-to-day cash transactional operation and should, therefore, generate its own working capital;

however, because of the uncertainties of fishing, there are times when the catch is not large enough to gross sufficient revenue to cover operating expenses. Since costs for food, fuel, oil, repairs, etc., are incurred regardless of the size of the catch, it is important that provision be made to accommodate fishermen in the form of short-term credit programs specifically to provide working capital. One of the pitfalls of this proposal, however, may be the difficulty of recovering loans. It may be advisable for fishermen to form marketing associations, such as cooperatives, which would market all of their products and be responsible for repaying loans through standard deduction from sales.

At least one commercial bank in the Leeward Islands has introduced a revolving credit scheme through which the small-scale fishermen may obtain from EC\$50 to EC\$500 for their working capital needs. Beneficiaries of the program have welcomed this type of assistance and it is hoped that it will be expanded to include other banks and countries in the Region.

As in the case of the small farmer for whom farm models are generally prepared to indicate the benefit of loans in terms of net revenue to borrowers, so too should models for small-scale fishermen be provided. A model may reveal that the fishermen will not be better off financially by incurring additional debts but rather than advice in management and technical assistance are all that may be required. Most small-scale fishermen practice inshore fishing only and do not have the expertise to do deep sea fishing, so that becoming involved in large capital outlays, which could only be repayed through the realization of larger catches, may only worsen their situation and be defeatist since, in the final analysis, the aim of loans is to increase productivity and raise the fishermen's standard of living.

SUMMARY AND CONCLUSION

Financial assistance in the form of credit is often a key element in the modernization of agriculture and fisheries since, not only can it remove a financial constraint, but it can accelerate the adoption of new technologies. Since these primary producers suffer most from poverty in the developing world, improving their productivity and income should be matters of high priority. Unfortunately, they are often rated very low by some development practitioners and seen as the main representatives of the backwardness which developing countries appear to be rejecting in their efforts to emulate advanced industrial countries.

Evidence demonstrates that credit stands little chance of being successfully utilized unless it is accompanied by certain other elements including: clear opportunities for economic gain from the adoption of new technology; widespread recognition and acceptance of such opportunities along with access to training and demonstration of necessary skills; and a dependable delivery system which makes the required inputs readily available.

These conditions do not often prevail in developing countries. To be successful in expanding production, each of the constraints, whether financial or non-financial, must be relaxed. These may involve establishing basic facilities such as

docks, over-night cold storage units, organized marketing arrangements, reliable provision of inputs, price policies, duty free concessions, adequately staffed Departments of Fisheries, including extension services, and others.

Financial resources, therefore, are only a part of the answer. Not only funds, but a number of other factors are needed, the more important of which are the actual availability of new technologies, inputs and favorable product marketing environments. In the absence of these, funds are useless.

Asistencia Técnica y Económica a la Industria Pesquera en Pequeña Escala en la Comunidad de Países del Caribe

RESUMEN

Habiéndose determinado la necesidad de asistencia financiera, se han examinado minuciosamente los distintos programas y fuentes disponibles de financiamiento incluyendo el Proyecto de Crédito para el Mejoramiento Agrícola del Banco de Desarrollo del Caribe.

No se ha percibido la ayuda financiera como remedio de las dificultades de los pescadores artesanales.

REFERENCES

- FAO/UN
1965. Report on the Seminar on Fisheries Development Planning and Administration for Selected English Speaking Countries in Africa, Accra, 8-27 July 1963: FAO Fisheries Report (30) 117 pp.
- FAO/UN
1967. Report of the Conference on Fishery Administration and Services, Rome, 21-25, November, 1966. Proceedings and Basic Working Papers FAO Fisheries Report: (43). 116 pp.
- FAO/UN
1971. New Approach to Agricultural Credit, FAO Agriculture Development Paper (77): 93 pp.
- World Bank
1974. Agricultural Credit. World Bank Paper – Rural Development Series.
- World Bank
1975. Agricultural Sector Policy Paper.
- Donald, G.
1976. Credit for Small Farmers in Developing Countries. Westview Special Studies in Social, Political and Economic Development.
- Caribbean Development Bank
1976. Annual Review Meeting for Farm Improvement and Field Officers – Unpublished.

**Technical Assistance To Small-Scale Fisheries
in the Western Central Atlantic through
the UNDP/FAO WECAF Project**

WILBERT F. DOUCET
WECAF PROJECT, P.O. Box 6-4392, EL DORADO
Panama, Republic of Panama

THE WECAF PROJECT

The WECAF Project (INT/77/016) is an outgrowth of the WECAF Commission established by the FAO Council in November 1973 for the development of fisheries in the Western Central Atlantic and which held its first meeting in Trinidad in October 1975.

The area of this Project covers all the marine waters of the Gulf of Mexico, the Caribbean, and a large part of the Atlantic down to 10° S Latitude, which roughly corresponds to fishing area number 31 established by FAO for the compilation of fishery statistics (Fig. 1). Countries with seaboard in the area include the U.S.A., Mexico, Central America (except El Salvador), Colombia, Venezuela, Guyana, Surinam, French Guiana, Brazil, and all the islands of the Caribbean.

The participants in the WECAF Project are largely members of the WECAF Commission, although participation is open to non-member countries who either utilize the living resources of the region or who assist countries of the region with the development of their fisheries. At present there are 23 participating countries, all of which are situated in the area. In time, it is expected that 30 countries in all will participate.

OBJECTIVES

Long-term Objectives

The purpose of the Project in the long run is to bring about the most effective use of the fishery resources of the WECAF area through: the development of fisheries of under-exploited stocks, especially those accessible to small-scale fishermen; the promotion of the better use of existing catches and of appropriate management actions for stocks that are heavily exploited.

Immediate Objectives

To act as a coordinating mechanism, to advise on the development of appropriate fishery policies and their harmonization at all levels, from the national to the inter-regional, and to facilitate international assistance for the attainment of these aims. In particular, these objectives are:

- 1) Resource exploitation and utilization: (a.) To assist in the identification and formulation of national and/or regional projects for the development of fisheries of under-exploited stocks, especially those that can support increased

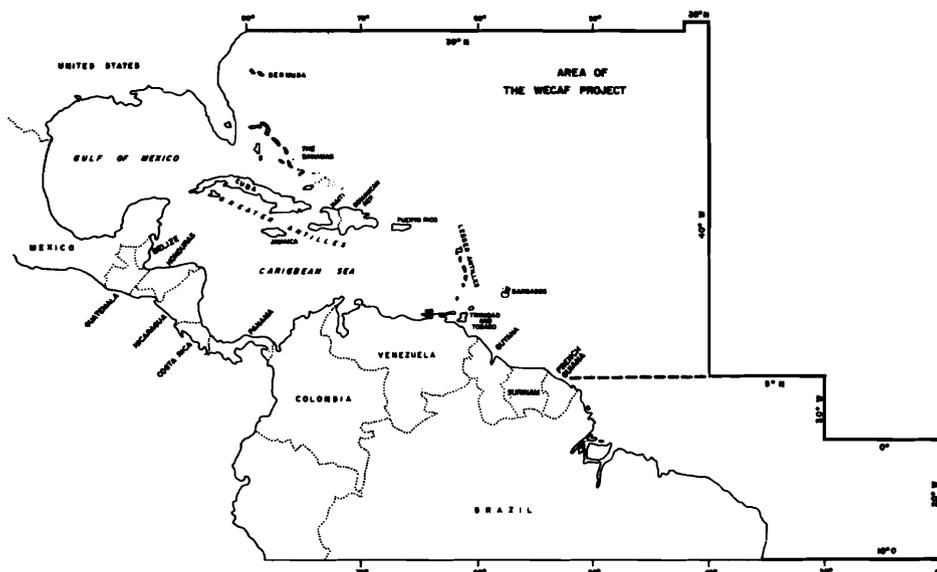


Figure 1. The WECAF Commission area covers the waters of the Project area lying north of 5° North latitude (see dotted line).

catches by small-scale fishermen, and to advise governments on appropriate measures to be adopted for the development of these fisheries. (b.) To assist small-scale fishermen to increase and improve the quality of their catches through the introduction and demonstration of improved or new fishing methods, vessels, gear, and equipment, to the extent that the resources can withstand an increase in production, and to improve post-harvesting techniques both on board fishing vessels and ashore. (c.) To assist governments and the private fishery sector in identifying opportunities for the improvement and development of all sectors of the industry and to seek sources of assistance for feasibility studies and investment. Particular items to receive attention include the development of new or improved fishing vessels and gear, planning better harbors and other shore infrastructure, and assistance in processing and marketing. (d.) To assist in the identification and formulation of coastal aquaculture projects. (e.) To provide member countries with improved statistics of fish processing, exports, imports, domestic distribution, and consumption, prices, and cost and earnings in fishing and aquaculture operations. (f.) To assist countries in formulating plans for the development and management of fisheries that take into account the limits set by the resources and the constraints arising from the exploitation of the same resource by more than one country. (g.) To advise and assist in the formulation of principles and techniques for the management of shrimp fisheries to be implemented under appropriate national and multi-national arrangements.

- 2) Resource monitoring: (a.) To provide assistance to coastal countries concerned with the improvement of fishery statistics, e.g., by training biologists and statisticians, and in introducing appropriate and effective techniques for data collection and compilation. (b.) To collaborate with non-coastal countries fishing in the area, as well as with intergovernmental bodies such as, for example, the International Commission for the Conservation of Atlantic Tuna (ICCAT), in assembling the data necessary for the evaluation of the stocks of the area. (c.) To ensure the regional compilation, analysis and publication of the data referred to in (a) and (b). (d.) To assist in the promotion, organization and coordination of regional research activities, especially (i) To survey and appraise demersal and pelagic stocks and identify possibilities for development (ii) To assess and monitor the populations of shrimp and other heavily fished stocks.
- 3) Fishery Administration and Legislation: (a.) To assist in the strengthening of fishery administration in general and, in particular, national fishery research and development institutions. (b.) To assist in the formulation of fishery legislation designed to ensure the most effective use of existing fishery resources.
- 4) Training: To support directly or through bilateral or other arrangements training at all levels in all fishery sectors.

Project Activities

The activities to be carried out by the Project for the realization of the objectives described above, fall into three categories: (a.) area-wide inter-regional programs designed to deal with problems concerned with the entire WECAF area; (b.) sub-regional programs for particular groups of countries having common problems; and (c.) activities directed to individual countries related to sub-regional or regional development in the area.

The first two categories, namely, those covering area-wide inter-regional programs and sub-regional or group country programs, will include the following activities: the evaluation and monitoring of fishery resources, particularly in cooperation with other research entities in the region, for example, fishery institutes, universities, intergovernmental and international organizations, etc.; the improvement of fishery statistics and their compilation and distribution throughout the region; research on fish processing and utilization, e.g., the utilization of fish discards, especially the shrimp by-catches; seminars, training centers and workshops on a variety of subjects such as have been developed in other regional projects like the International Indian Ocean Fishery Survey and Development Program (IOFP), the Development of Fisheries in the Eastern Central Atlantic (CECAF) and the South China Sea Fisheries Development and Coordinating Program (SCSP), in particular: management of fishery enterprises; government policies for stimulating fishery developments; resource evaluation; fishery management and legislation; fishery cooperatives and their management; consumer education and promotion; training of fishermen, extension workers and administrators.

With respect to Project activities directed at individual countries, these will consist of advice to governments, institutions and fishery enterprises on fishery development programs including in particular: choice of fishing gear, equipment, and vessels; fish processing and handling, including quality control; marketing; training and education; management of private and public fishery enterprises; improvement of fishery statistics; formulation of fishery legislation and policies; and the development of adequate fishery extension services.

SMALL SCALE FISHERY DEVELOPMENT PROGRAM

In view of the importance of small-scale or artisanal type fisheries in the WECAF area, both in terms of fish supply and employment, the Project has accorded high priority to the development of this sector of the industry. Special efforts will therefore be made to overcome the existing constraints to development presented by inefficient fishing operations and the scattered and ineffective nature of landing facilities and marketing systems, by introducing improved fishing vessels, gear and equipment and better handling, processing, distribution, and marketing facilities.

In view of the across-the-board needs of this sector of the industry and considering the ineffectiveness of past attempts at uplifting the level of efficiency of small-scale fisheries by piecemeal, *ad hoc* and often uncoordinated programs, an integrated approach to the solution of these problems is to be implemented by the Project. Considering as well the size of the WECAF area, and the fact that the problems cannot be tackled effectively everywhere at the same time, a pilot project approach will be employed concentrating on carefully selected countries or states having a potential for development, and the results applied in other areas having similar fishery situations. Furthermore, in order to avoid duplication of effort in an area where many agencies and entities are involved in fishery development activities – often appearing to be in competition with each other – special efforts will be made to develop the small-scale fishery program in cooperation with all other entities involved in providing assistance to this sector of the industry.

The program to be implemented and, in fact, which is in advanced stage of preparation, is being developed with the Canadian International Development Agency (CIDA). It is envisaged that it will be financed wholly by this agency but executed by FAO through the framework of the WECAF Project.

The program is considered a sub-project of WECAF entitled, "The Development and Demonstration of Advanced Small-Scale Fishing." In brief, the objectives are the following:

Long-Term Objectives

To improve the socio-economic level of small-scale fishermen by increasing their catches and improving the quality of fish landed for local consumption and export, through the introduction and demonstration of improved or new fishing methods, vessels, gear, and equipment, and improved post-harvesting techniques at sea and on shore.

Immediate Objectives

- 1) To demonstrate and introduce modern fishing techniques for harvesting known stocks of snappers, groupers, inshore pelagic species and others.
- 2) To identify and demonstrate opportunities for expanding fishing operations to under-exploited resources.
- 3) To improve fish handling on board vessels as well as after landing.
- 4) To improve fish distribution and marketing practices.
- 5) To provide on-the-job training, and through workshops, on fishing methods and gear, fishing boat and engine maintenance, and fish handling and processing.
- 6) To establish the basis for a long-range development policy and program which can ensure the improvement and expansion of small-scale fisheries in the WECAF area.

The first step in the realization of these objectives is the selection of suitable sites for the implementation of the program envisaged. This will be the task of a project formulation mission which is to be fielded as early as possible in 1978. Two or more sites will be selected, primarily on the basis of resource availability, suitable natural facilities, and availability of support staff.

The Sub-Project Work Plan

The sub-project will have a preparatory phase of about 1 year to be followed by an operational phase of 2 to 4 years, depending on the success of the undertaking.

During the preparatory phase the sites of the pilot demonstration units will be selected, the boats and auxiliary equipment of a type suitable for ready adoption by local fishermen will be procured, and improvements and innovations of local fishing methods and gear will be identified and tested.

This will be followed by the operational phase during which increasing emphasis will be placed on the practical demonstration of improved and new fishing methods and gear at the sites of the units and, as appropriate, at other localities in the Project area. In particular the activities will include: (a) Initiate tests on the improvement of local fishing methods and gear; (b) Carry out practical demonstrations of the benefits to be derived from these innovations; (c) Provide *ad hoc* technical assistance at the request of participating governments; (d) Investigate and demonstrate opportunities for expanding fishing operations to under-exploited areas; (e) Carry out studies of the economics of the new types of fishing operations introduced; (f) Accelerate development by training counterparts to initiate extension activities in their countries; (g) Disseminate new technology and the results of project activities through a series of workshops and other suitable systems to be established by the WECAF Project as appropriate.

Sub-Project Staff

INTERNATIONAL – At each demonstration unit to be selected an international staff will be recruited consisting of two masterfishermen, one engine operator/mechanic and one fish handling and distribution specialist. The master-

fishermen will be experienced in operating small multi-purpose boats utilizing small-scale fishing techniques. They will also have teaching and training experience. The engine operators/mechanics will have broad experience in the operation, maintenance, and repair of outboard and inboard marine engines and will also be capable of installing marine engines and related equipment. They will have teaching and training experience. The fish handling and distribution specialists will be competent to assist in the setting up of a pilot demonstration plant (at each site) for handling, storing, grading, and distribution of fresh fish and simply preserved fishery products, advise on their efficient operation and provide training for fishermen, processors, and other personnel in this field of competence.

The above experts will be supported by the staff and consultants of the WECAF Project, especially in the fields of fishery economics, marketing, and processing technology.

NATIONAL AND REGIONAL – The host governments will be called upon to provide liaison officers to work directly with the Program Leader of WECAF and the leaders of the demonstration units concerning the local operation of the pilot projects. Local crews and other supporting staff will also be supplied by the host governments.

It will also be incumbent upon the host governments to provide counterpart staff in the fields of fishing gear and methods, engine operation and maintenance, and fish handling. Each international specialist should have at least two counterparts during the entire life of the demonstration units. Counterparts would also be accepted from other WECAF member countries – and this will be encouraged – who would serve in rotation to provide the maximum diffusion of training and permit the dissemination of project ideas and results throughout the region. Appropriate criteria for the selection of counterparts and the duration of their training will be determined prior to the operational phase of the program.

Sub-Project Equipment

Each demonstration unit will be supplied with the following equipment from external sources of funding: two prototype motorized fishing boats, workshop equipment, fishing gear, material and equipment, fish processing materials and equipment, an ice plant with cold store, spares and replacement equipment, office materials and equipment, as well as fuel, lubricants and insurance.

Host Government Contribution

The host governments will be required to invoke all measures necessary to facilitate the operation of the demonstration units and assist their staff in obtaining such services and facilities as they may require to fulfil their tasks. These will specifically include: the use of docking facilities, workshops, store and office space, living accommodation for trainees and duty-free fuel. These contributions do not imply that any cash transactions will be necessary but, rather, that the necessary services and facilities will be made available within the budgets of the governmental agencies concerned.

Asistencia Inter-regional del PNUD/FAO a la Industria Pesquera del Caribe

RESUMEN

Se relata brevemente el origen, alcance, objetivo y plan de acción del Proyecto Inter-regional PNUD/FAO para el Desarrollo de la Pesca en el Atlántico Centro-Occidental (WECAF), junto con una descripción del programa especial o sub-proyecto que se está preparando para el desarrollo y la demostración de técnicas avanzadas de pesca en pequeña escala en la zona del Atlántico Centro-Occidental.

THURSDAY, NOVEMBER 17, 1977

EVALUATION AND PRIORITY NEEDS SESSION

Reports of Individual Evaluation Teams

Report of the Evaluation Team on Resources and Harvesting

Evaluation Team: leader, Rolf Juhl (USA); Harvey R. Bullis, Jr. (USA); T. Durkin (Peace Corps, Colombia); Gustavo F. Fajardo (Colombia); A. I. George (St. Kitts); W. Leonard (Virgin Is.); Arthur J. Lyons (USA); E. Ortgren (Sweden); J. A. Reyes (Puerto Rico); W. F. Royce (USA); K. Shirley (Colombia); J. Suarez Caabro (Puerto Rico); L. C. Villegas (FAO/WECAF); B. Wahle (Peace Corps, Colombia); G. Waugh (Bahamas).

It is currently believed that the overall productivity of the Caribbean Sea and part of the Gulf of Mexico is low, but that many underutilized stocks of fishes exist there which could be utilized. These include some large, widespread stocks of coastal and pelagic fishes such as sharks, mackerels, and sardine-like fishes, as well as hundreds of smaller, scattered stocks of coastal demersal fishes.

Based on this premise the Evaluation Team considers that possible development opportunities are as follows:

1. *Mackerels* – Three to four species exist throughout the region, however full exploitation is limited to a few areas. Development of fisheries is suggested using gear such as gillnets, trolling, and live bait.
2. *Sharks* – Sharks have economic value as food, hides, and as novelties for the tourist trade. The resource is considered extensive in coastal continental areas. Harvesting techniques could include longlines and handlines.
3. *Sea urchins* – This resource is common throughout the region and is considered valuable for human consumption and/or the pet food trade.
4. *Conch* – Conch stocks require urgent conservation measures. This species has very great potential value if stocks can be increased to harvestable levels. The reproductive capacity of this species is great, thus the period of rehabilitation of the stocks should be short.

For all available resources, opportunities for development should be evaluated with respect to factors needed for their effective utilization and management, including stock abundance estimates. Such estimates would be derived largely from catch and economic statistics in existing fisheries. It is strongly recommended that all countries give attention to improving such statistics and implement collection of such statistics where currently none exist.

The Evaluation Team also suggested that related topics should be addressed and recommendations made, especially as to effective development and management. These include:

1. Encourage host countries to participate fully in programs sponsored by external agencies.
2. Encourage education and demonstration of improved gear and technology, and marketing.
3. Evaluate pot (trap) fisheries in areas of heavy use so as to determine their effects on the resources.

It was noted that coastal zone management is of special concern to small-scale fisheries. Based on this, the team endorses a regional educational program. Emphasis should be placed on the Caribbean islands where the balance of nature is fragile and commercial and industrial development is greatest. Special impacts are the effects of pollution on coral reefs, stripping of mangroves, and extraction of beach sand.

The Hawksbill Turtle

It was the belief of the Evaluation Team that the current status of the western Atlantic hawksbill turtle warrants urgent conservation measures. Once stocks of this species have been re-established at acceptable levels, there is a high potential economic value for regional small-scale fisheries for this species, given proper management. The high reproductive capacity of hawksbill turtles suggests that stock rehabilitation could occur over a relatively short period of time. This, and the high potential value of the turtle, can provide a conservation incentive to fishermen now taking this species from steadily declining stocks. Such a program will require the active participation of all countries of the Caribbean region if it is to be successful. This could be accomplished by assigning a coordination role to some regional or international entity that would be charged with initiating communications with officials throughout the Caribbean region, act as a center for information and statistics, and would provide a forum for annual reviews of progress and accomplishments. We recommend that the Directors of the Gulf and Caribbean Fisheries Institute consider accepting this responsibility as one area of increased involvement in Gulf and Caribbean regional fisheries problems. Successful accomplishment of these conservation objectives and the rehabilitation of valuable stocks to levels of MSY would serve as a demonstration project for attacking future conservation and management problems in the Gulf and Caribbean area.

Reporte del Grupo de Evaluación sobre Recursos y Captura

Como se ha establecido, el Caribe y parte del Golfo de México tienen una productividad básica baja. Sin embargo, se conoce que existen muchas reservas que no están siendo utilizadas al máximo, las cuales pueden ser explotadas aun más. Estas incluyen algunas reservas grandes, diseminadas, de peces costeros y pelágicos, tales como tiburón, sierra y sardina; también existen cientos de pequeñas reservas de peces costeros de fondo, ampliamente distribuidas.

Basados en esta premisa, a continuación se indica una corta lista de posibles oportunidades de desarrollo:

1. *Sierras*. Existen de tres a cuatro especies en la región, sin embargo, su completa explotación está limitada a pocas áreas. Se sugiere el desarrollo de esta pesca con trasmallo, silga y carnada viva.
2. *Tiburones*. Se consideran de valor económico como alimento y por la utilización de su piel, mandíbulas y dientes. Este recurso es abundante en las aguas costeras. Las técnicas de captura incluyen, principalmente, palangre y pesca de cordel a mano.
3. *Erizo de Mar*. Este recurso es común en toda la región y se considera que tiene valor para consumo humano y/o animal.
4. *Carey de Concha*. Es nuestra opinión que la situación actual del carey de concha en el Atlántico Occidental necesita urgentemente medidas de conservación. Cuando en el futuro las reservas de estos animales sean rehabilitadas a un nivel aceptable, entonces esta especie tendrá un gran valor potencial. Su capacidad de reproducción es tal que la rehabilitación de su reserva se puede lograr dentro de un período de tiempo relativamente corto.

Este hecho, unido a su valor potencial alto, puede producir en el futuro un incentivo económico a los pescadores que actualmente no están explotando este recurso a plenitud. Para que sea un programa extenso requiere la participación de todas las naciones de la región. Este se podría realizar asignándole la coordinación a una entidad regional o internacional que estaría responsabilizada de proveer información inicial a los funcionarios de los países del Caribe, actuando como centro de datos y estadística, y como foro para progresos y logros del programa. Recomendamos que los directores del Gulf and Caribbean Fisheries Institute consideren aceptar esta responsabilidad aumentando su compromiso con los problemas de la región. De ser exitosas estas medidas de conservación y rehabilitación de esta valiosa reserva a niveles de producción máxima sostenida, serviría como ejemplo de proyecto piloto para iniciar otras medidas de conservación y administración en el área del Golfo y del Caribe.

Cada uno de los recursos con oportunidades de desarrollo debe evaluarse en cuanto a todos los factores que se requieren para una administración y utilización efectiva, incluyendo el estimado de la abundancia de las reservas. Estos estimados dependerían principalmente de los datos estadísticos de las pesquerías existentes. Se recomienda que cada país preste atención al mejoramiento de tales estadísticas e inicie proyectos en esta materia cuando no existan.

El grupo de trabajo también sugiere que temas afines deben considerarse, en especial relacionados con un desarrollo y administración efectivos de las pesquerías, lo cual incluiría:

1. Alentar a los países de la región a participar activamente en los programas auspiciados por las agencias extranjeras.
2. Alentar la educación y demostraciones sobre artes, tecnología y mercadeo.
3. Evaluar la pesca de nasa en áreas de pesca intensiva para determinar el esfuerzo pesquero sobre los recursos.

Se indica que la administración de la zona costera es de especial preocupación a la pesquería artesanal. Basado en esto el grupo de trabajo endosa un programa educacional regional. Se hace énfasis en las islas del Caribe donde el balance de la naturaleza es frágil y el desarrollo comercial e industrial es mayor. Es de preocupación especial el efecto de la contaminación de los arrecifes coralinos, destrucción de los manglares y extracción de la arena de las playas.

Report of the Evaluation Team on Demand Factors

Evaluation Team: leader, B. Wade (Jamaica); M. Calderon Rosa (El Salvador); H. C. Lampe (USA); D. A. Lintern (FAO/WECAF); R. J. Myers (USA); W. J. Rathjen (USA); F. Tercero (Guatemala); H. E. Wood (Trinidad & Tobago).

The principal concern of the Evaluation Team is for the effect changes in demand determinants will have on small-scale fisheries. There is need to question what are the principal demand determinants in developing nations, which apply to specific regions, and at what level these demand factors operate. It is also necessary to look at the sensitivity of the small-scale fisherman to changes in demand and his ability and desire to react to these changes.

The following important points were made during the deliberation of the group:

1. The Gulf and Caribbean region is a heterogeneous region with a great diversity of demand factors due to ethnic, cultural, economic, and geographic differences.
2. Lack of an adequate data base makes demand analysis impossible; there is, therefore, a need to compile reliable statistics on demand needs throughout the region.
3. The present marketing system is largely traditional and change is difficult, in particular when new species are introduced. What is needed in order to utilize the total catch available to the small-scale fisherman is to expand areas of demand beyond the traditional base. This can include exportation, infrastructure development, technology development, education, and improved communications. These factors are clearly beyond the abilities of the small-scale fisherman.

The discussions of the Evaluation Team resulted in the posing of these questions:

1. How can these demand determinants be expanded?
2. What part can the middleman play in this area?
3. How sensitive is the fisherman to changes in demand?
4. Will the fisherman in fact react in a positive manner to a higher demand or will he resist change?

The Team concluded that high priority research is warranted in the areas of:

1. Consumer demand.
2. Traditional markets.

3. New markets.
4. Small-scale fishermen's sensitivity to demand.

The Evaluation Team recommends that the Gulf and Caribbean Fisheries Institute sponsor studies in these areas and focus demand on a regional basis throughout the Caribbean area to see if inter-regional demand could open up new markets. Finally, it is recommended that the Gulf and Caribbean Fisheries Institute act as a clearing house for fishery information in the region.

Reporte del Grupo de Evaluación sobre Factores de la Demanda

El objetivo principal considerado por este equipo de evaluación fue estudiar los factores que influyen en la demanda y su efecto en las pesquerías en pequeña escala. Es necesario estudiar estos factores en las naciones en desarrollo, los que se aplican en regiones específicas, y determinar a qué nivel estos factores de demanda influyen. También tenemos que detectar la sensibilidad del pescador en pequeña escala a los cambios de la demanda y el deseo y habilidad de reaccionar a estos cambios.

Durante la discusión del equipo, los siguientes puntos se consideraron:

1. La región del Golfo y del Caribe es heterogénea con una gran diversidad de factores de demanda debido a diferencias étnicas, culturales, económicas y geográficas.
2. La falta de datos adecuados y orientados hacia este tipo de problema hace el análisis de demanda imposible. Por tanto, se necesita compilar estadísticas que reflejen las necesidades de la demanda en toda la región considerada.
3. El sistema presente de mercadeo es muy tradicional y el cambio es difícil, especialmente cuando se trata de introducir al mercado nuevas especies. Por tanto, es necesario para lograr la total utilización de la captura disponible al pescador artesanal que se aumente el área de demanda más allá de las bases tradicionales existentes, lo que incluiría el desarrollo de infraestructura, educación del consumidor, mejora en las comunicaciones, desarrollo de tecnologías, exportación, etc. Todos estos factores están obviamente fuera del control del pescador en pequeña escala.
4. De los puntos anteriores surgen una serie de preguntas:
 - a. ¿Cómo puede la determinante de la demanda desarrollarse?
 - b. ¿Qué papel debe jugar el intermediario en esta área?
 - c. ¿Hasta qué punto se adapta el pescador a los cambios de la demanda?
 - d. ¿Reaccionaría este pescador en forma positiva a un aumento en la demanda o se resistiría a ello?

Se concluye que hay mucho por conocer sobre los factores de la demanda, tales como:

1. Demanda del consumidor.
2. Mercados tradicionales.
3. Nuevos mercados.
4. Adaptabilidad del pescador artesanal al cambio de la demanda.

Por lo anterior se recomienda que el Gulf and Caribbean Fisheries Institute patrocine estudios en estas áreas y enfoque la demanda sobre bases regionales a través de toda el área considerada para que las demandas interregionales abran nuevos mercados. Finalmente se aconseja que el Gulf and Caribbean Fisheries Institute actúe como organismo de consulta para suministrar información a los países involucrados y/o interesados.

Report of the Evaluation Team on Processing, Distribution and Marketing

Evaluation Team: leader, R. Espinosa Grey (Colombia); M. O. Garcia O. (Mexico); R. Gomez F. (Colombia); W. B. Hannum (USA); W. Ludwig Ingram Jr. (Guatemala); A. Londono Garcia (Peru); H. Erasmo Martinez (Honduras); S. Martinez Casco (Nicaragua); H. H. Montesinos (Venezuela); L. Carlos Ortiz (Colombia); F. A. Peterkin (Guyana); J. A. Peters (USA); L. W. Strasburger (USA); Lisa Sullivan (USA); J. Urroz Escobar (Nicaragua).

The countries within the Gulf and Caribbean region range from developed countries to less developed countries, although they share common problems. There are particular methods and local situations which create specific problems that would take a very long time to solve. Only the common problems will be discussed here.

We recognize that there are discrepancies and difficulties with this system organized for the solution to the problems of the artisanal fisheries, but the Evaluation Team concluded that the system is valid nevertheless. Observed failures have been due to the lack of motivation, education, or dedication of those who have been appointed for administration and operation of the systems.

It is necessary through mass media, financed by the government, to create awareness of the high quality of fish. Information regarding prices and places where fishery products may be purchased should also be provided to the public.

There are two levels of artisanal fisheries: subsistence fisheries and small-scale fisheries. The subsistence fishery is conducted mainly in rather remote locations with no physical facilities, nor the possibility of obtaining them in the near future. They consist of communities of fishermen who fish mainly for their own consumption. They catch occasional surpluses which are wasted because minimal techniques for preservation are lacking.

It is necessary even in situations with minimal facilities, to introduce and/or improve methods of processing by the simple techniques of drying, smoking, or salting the fish. Furthermore, it is considered important to establish a clearing house which would distribute information among countries and interested regions, regarding these processing methods.

The Evaluation Team considered that, at the same time, research and studies should be undertaken to improve the traditional processing methods and to develop proper, simple technology, using local materials. Through these improvements increased economic benefits would accrue because catches could be marketed over a wider area.

The small-scale fishery is characterized by better boats and modest facilities located in communities with basic but limited structures. This permits not only fishing for individual consumption but also catching substantial surpluses which can be sold in nearby markets. This activity is commonly conducted in a disorganized and independent way, making technical assistance on an individual basis or through cooperatives and/or similar organizations a necessity. Such assistance should provide for the better processing of the catch, rapid transportation of the product and marketing under optimal sanitary and quality conditions. Basically the processing should range from care of the fresh fish to drying, salting, and smoking, which are the simplest and most economic ways the fishermen can reach the consumer. As in the previous case, a clearing house could supply information to the interested parties that might request it. The simplest procedures should be utilized in order to generate more jobs and to keep the price within the reach of people with low incomes.

To provide technical assistance in marketing and distribution is a difficult activity demanding a more complex organization. The Evaluation Team believed that consideration should be given to the possibility of channeling the product into the wholesale level by sales to reputable, established fishing companies and/or governmental distribution centers established for these purposes.

These market outlets guarantee a minimal subsistence price thus protecting the small-scale fishermen. Governmental distribution centers should be equipped with refrigerated transport and should establish a chain of cold storage facilities covering as large a territory as possible. Such a marketing scheme would gain sales in zones far from the centers of production and would supply areas needing protein.

Reporte del Grupo de Evaluación sobre Elaboración, Distribución, y Mercadeo

El territorio pesquero del Golfo de México y Mar Caribe incluye desde países desarrollados hasta países de menor desarrollo. Por estas circunstancias, aunque existan problemas similares en el área, hay métodos particulares y situaciones locales que crean problemas específicos por lo que sería extenso estructurar conclusiones que resolvieran detalladamente cada uno de tales problemas. Por tal motivo se trata de cubrir aquellos aspectos que podrían considerarse comunes.

Como consecuencia de lo anterior, se presentan dos grados de desarrollo en la pesca artesanal: la pesca de subsistencia y la pesca de menor escala.

La pesca de subsistencia es aquella que se realiza principalmente en lugares apartados los cuales no disponen de infraestructura alguna, ni medios apropiados, ni posibilidades de obtenerla en un futuro inmediato. Constituyen comunidades de pescadores que realizan esta actividad para consumo propio principalmente, logrando en ocasiones excedentes que se pierden por carecer de las técnicas elementales que les permitan su mejor preservación.

Es necesario, mientras se obtiene la infraestructura mínima en este sector, introducir y/o mejorar los métodos de procesamiento con técnicas sencillas para secar, ahumar o salar la captura.

Se considera conveniente por otra parte establecer una Bolsa de Compensación sobre estos métodos de procesamiento que distribuya información pertinente a los diferentes países y regiones interesadas.

Paralelamente se deben efectuar investigaciones y estudios tendientes a mejorar estos procesos tradicionales, así como el desarrollo de otras tecnologías apropiadas y sencillas con el empleo de materiales locales. A través de estas mejoras se lograrían también mejoras económicas, al estar en posibilidades de ampliar su radio de comercialización.

Por su parte la pesca en pequeña escala es aquella que dispone de buenas embarcaciones y de modestas facilidades, ubicadas en comunidades con limitadas estructuras básicas, lo que permite no sólo pescar para su propio consumo sino lograr apreciables excedentes que deben ser colocados en los mercados próximos. Esta actividad se desarrolla por lo general en forma desorganizada e independiente, lo que hace necesario una asistencia técnica integrada en forma individual o a través de cooperativas y/u organizaciones similares para el mejor procesamiento de la pesca y así llevarla a los centros de consumo en óptimas condiciones sanitarias.

Básicamente la elaboración debe incluir desde el pescado fresco, pasando, según el caso, por el secado, salado y ahumado, que son las formas más económicas y sencillas que puede desarrollar el pescador para llegar al consumidor; en este caso como en el anterior, la Bolsa de Compensación puede aportar información a las partes interesadas que lo soliciten.

Se deben conservar los procedimientos más sencillos, utilizando el mayor número de mano de obra, con el fin de generar empleo y mantener el precio al alcance de la capacidad adquisitiva de la población de menores ingresos.

Para evitar que estas organizaciones distraigan su atención de la parte productiva en el mercadeo y distribución, que es una actividad difícil y exige una organización más compleja, sería conveniente considerar la posibilidad de que el producto al por mayor sea vendido a través de compañías pesqueras que ya lo poseen, y/o centros de acopio gubernamentales establecidos para este propósito. Estos últimos deben servir para regular el mercado, garantizando un precio de subsistencia que proteja al pescador de menor escala. Estos centros de acopio deben ser complementados con transporte refrigerado para conformar "cadenas de frío" que abarquen la mayor extensión territorial posible y se logre la distribución y venta en zonas distantes a los centros de producción, que pueden ser las áreas, seguramente, de mayor necesidad de alimentos proteínicos.

Aunque se presentaron discrepancias en cuanto a las bondades de la organización del sistema cooperativo u organismos similares para la solución de los problemas de la pesca artesanal, el grupo de trabajo concluye que el sistema es aun vigente para este propósito y que las fallas observadas se deben a falta de

motivación, educación y apostolado de quienes han sido seleccionados para su administración y manejo directo.

Es necesario a través de los medios de comunicación, auspiciados por los gobiernos, el crear conciencia sobre la bondad del consumo de la pesca, añadiendo información sobre precios y lugares de compra.

Report of the Evaluation Team on Management and Administration

Evaluation Team: leader, H. Nanne Echandi (Costa Rica); G. Aguirre Serrano (Colombia); L. F. Arias Acuna (Costa Rica); George Babson (USA); H. Comacho Londinez (Colombia); R. S. Croker (USA); H. C. Girigorie (Netherlands Antilles); A. Hernandez (Colombia); J. Hiss (Peace Corps, Colombia); G. W. Miller (Belize); O. Mora (Colombia); M. Ratino Morris (Colombia); D. K. Stevenson (AID, Costa Rica); R. W. Thompson (Bahamas); H. D. Walters (St. Lucia).

Development of small-scale fisheries should be preceded by an evaluation of the current utilization of the resources conducted by whatever means are available, including national fisheries and other agencies, universities, international experts, information derived from fishermen, and published material.

The Evaluation Team recommends that the agency responsible for small-scale fisheries in a given country should:

1. Collect the basic biological and socioeconomic data on which to base sound management policies. The basic biological data should include catch and effort statistics and length frequencies by species. The socioeconomic data should include cost and earning information at all levels and the importance of the fisheries in providing food, employment, and foreign exchange.
2. Collect as much information as possible concerning fishing gear, harvesting, processing, and marketing techniques and the utilization of the resources, thus enabling the agency to fully advise the fishermen, fish processors, and vendors on ways of improving their methods and increasing their profits.
3. Evaluate the possible inter-relationships between small-scale fisheries and existing or potential industrial fisheries, both domestic and foreign.
4. Seek the most efficient ways of introducing decisions and fisheries regulations to the fishing community. Effective methods of enforcement should be implemented and special attention should be given to the policing of the industry in cases in which the fishing grounds are widely dispersed and the presence of numerous islands create additional problems.
5. In cooperation with other agencies, attempt to establish standards or guidelines for the protection of coastal ecosystems, especially in areas of heavy tourist or industrial development.

6. Monitor the fishery at all times to insure that the management plan is effective.
7. Promote training and education at all levels.

Reporte del Grupo de Evaluacion sobre Manejode y Administracion

El desarrollo de las pesquerías artesanales debe estar precedido por una evaluación de la utilización actual de los recursos pesqueros. Esta evaluación puede efectuarse a través de cualquier método disponible, incluyendo el uso del personal del sector público y/o universitario, de expertos internacionales y de la información obtenida de los pescadores y de la literatura disponible.

El administrador de pesquerías artesanales debe:

1. Encargarse de la recolección de datos básicos tanto biológicos como socioeconómicos en los cuales deben de basarse las políticas racionales de administración. Los datos biológicos básicos deben incluir estadísticas de captura y esfuerzo y de distribución de tamaños por especie.

Los datos socioeconómicos deberán incluir información sobre costos y salarios a todos los niveles y la importancia de las pesquerías como fuente de alimento, empleo y divisas.

2. Recolectar tanto datos como sean posibles sobre las artes de pesca y técnicas utilizadas en la captura, procesamiento, mercadeo y utilización de los recursos con el fin de poder aconsejar a los pescadores, procesadores y comerciantes acerca de los métodos que deben utilizar para incrementar sus ganancias.
3. Evaluar las posibles interrelaciones que existan o que puedan existir entre las pesquerías artesanales y las industriales.
4. Buscar el sistema o sistemas más eficientes de introducir decisiones y regulaciones en las comunidades pesqueras.
5. Establecer métodos efectivos para hacer cumplir las regulaciones dictadas, poniendo especial atención al control de las industrias en aquellos casos donde las áreas de pesca estén dispersas y la presencia de numerosas islas pudieran crear problemas adicionales.
6. En cooperación con otras agencias, intentar establecer patrones o guías para la protección de los ecosistemas costeros, especialmente en áreas de gran desarrollo turístico o industrial.
7. Revisar el estado de las pesquerías continuamente con el fin de asegurar que las medidas de manejo sean adecuadas.
8. Promover el entrenamiento y la educación en todos los niveles.

Report of the Evaluation Team on Education and Training

Evaluation Team: leader, W. G. Clarke (FAO); E. Angel C. (Colombia); C. Arellano L. (Panama); E. Baroque (Colombia); J. Carranza F. (Mexico); R. Charles (Guyana); C. F. Cole (USA); N. Das (Bahamas); C. Grant (Jamaica); C. R. Robins (USA); D. Troost (IOCARIBE); G. Waugh (Bahamas).

Several speakers at this Conference have noted that fishery development requires the coincidence of a number of favorable conditions, including an adequate physical resource, suitable means of harvesting, processing, and distributing the catch, trained personnel, sources of credit, a market for the product at an attractive price, and eventually sound management practices. Insofar as development can be planned at all, therefore, it calls for a comprehensive approach to assure that all the necessary conditions are satisfied.

Since requirements will differ from case to case, the Evaluation Team could not suggest any kinds of programs that are required generally or would be worthwhile generally. Instead, the team tried to identify what groups may need training, the type of training they may need, and how it should be accomplished, so as to provide a checklist to assist in comprehensive development planning.

The groups identified, and the kinds of training they may need, are as follows:

1. *Instructors and extension workers*—These must be competent in their subject and able to convey their knowledge effectively; in most cases they will also need an understanding of the people with whom they are working.
2. *Fishermen*—Training in practical skills (e.g. navigation, handling new gear), preservation of the catch, recordkeeping and simple business management, the need for resource conservation, and the hazards of contaminated fishing grounds and species. Although the practical skills would differ, the other subjects would apply to aquaculture as well as to fishing.
3. *Fish buyers, processors, and distributors*—Methods of preserving and processing the catch and handling the product.
4. *Retailers*—Handling and promoting the product.
5. *Consumers*—In many places they must be convinced that local fish is good food, superior in fact to other more common or traditional foods.
6. *Supporting technicians* (e.g. mechanics, engineers)—Training in practical skills only.
7. *Administrators*—They must understand, in a general way, all aspects of fisheries.
8. *Fishery scientists*—They must understand local conditions, practical problems, and economic circumstances of the fisheries they deal with, as well as general scientific methods.
9. *The general public* (This is one category where the kind of education needed does not depend on the characteristics of any particular fishery or market)—In many places there is a need to educate the public in principles of resource management so that citizens will support sound management measures and oppose unsound ones. This can best be done in the schools

and through extension services. A much more basic and important task of the schools, of course, is to teach literacy and other basic skills, without which other kinds of training later will be impossible.

The Evaluation Team agreed that practical demonstrations and practical experience, preferably at the actual place of work, are the most appropriate techniques for training fishermen, processors, distributors, and retailers. Demonstrations and free samples are helpful in educating consumers. Another way to change consumer habits would be for a government or private organization to subsidize the sale of certain fishery products for a fixed period of time. In the specialized training of professionals in fisheries, traditional academic instruction is useful. This could involve exchange programs between "sister institutions" in different countries, fellowships for individual work, study under experienced supervisors, and short courses at the national or regional level, in addition to established university programs. There is a need and an opportunity for a regional organization, such as the Gulf and Caribbean Fisheries Institute, to arrange activities of this kind.

The Evaluation Team noted that particularly in the case of professionals, but also fishermen in some places, it is common for trainees to leave the field of fisheries or to leave the region in order to obtain more rewarding work. Along with identifying the need for trained people and providing training, it is important to assure, therefore, that the trained people have an opportunity to do useful work in satisfactory conditions at competitive rates of pay, or the training effort will fail.

Reporte del Grupo de Evaluación sobre Instrucción y Adiestramiento

En la conferencia se nota que el desarrollo pesquero requiere la coincidencia de numerosas condiciones favorables, incluyendo un recurso físico adecuado, métodos apropiados de captura, procesamiento y distribución de productos pesqueros, personal adiestrado, fuentes de crédito, un mercado para el producto a precio razonable y eventualmente medidas adecuadas de administración. Si el desarrollo puede ser planeado en cualquiera forma, por tanto, exige una técnica integral de planificación para asegurar que todas las condiciones necesarias sean satisfactorias.

Ya que los requerimientos difieren en cada caso, este equipo de evaluación no pudo sugerir ninguna clase de programa que fuera requerido en general o que fuera útil en todos los casos. En cambio, nosotros tratamos de identificar qué grupos pueden necesitar adiestramiento, qué clase de adiestramiento pueden ellos necesitar y cómo debe llevarse a cabo, para proveer una lista que ayude en la planificación integral del desarrollo.

Los grupos que identificamos y las clases de adiestramiento que pueden necesitar son las siguientes:

1. *Instructores extensionistas*: éstos deben ser competentes en su materia y capaces de transmitir su conocimiento en forma efectiva, en muchos casos ellos necesitan también comprender al personal con quien trabajan.
2. *Pescadores*: trabajos prácticos (ex., navegación, manejo de nuevas artes), preservación y manejo de la captura, llevar registros y administración de negocios, la necesidad de conservar los recursos y los riesgos de contaminar las áreas pesqueras. Aunque los trabajos prácticos difieran, los otros tópicos se pudieran aplicar tanto a la pesca como a la acuicultura.
3. *Intermediarios, procesadores y distribuidores*: métodos de preservar y procesar la captura y manejo del producto.
4. *Detallistas*: Manejo y promoción del producto.
5. *Consumidores*: en muchos lugares deben ser convencidos de que los peces alimenticios locales son alimenticios y aun superiores a otros alimentos más comunes o tradicionales.
6. *Técnicos de apoyo*: (ex., mecánicos, ingenieros): solamente trabajos prácticos.
7. *Administradores*: deben conocer, en forma general, todos los aspectos de la pesquería.
8. *Científicos pesqueros*: condiciones locales, problemas prácticos y circunstancias económicas de las pesquerías en que están implicados, así como los métodos científicos generales.
9. *El público* (en esta categoría el tipo de educación necesaria no depende de las características de la pesquería o del mercado en particular): en muchos lugares existe la necesidad de educar al público en el manejo del recurso, para que aprueben las mejores medidas y se opongan a las que no lo son. Esto se realiza mucho mejor en las escuelas. Una misión mucho más básica e importante de las escuelas es, por supuesto, alfabetizar y enseñar otras materias, sin las cuales otros tipos de adiestramiento posteriores serían casi imposibles.

Con respecto a los métodos de enseñanza, el equipo acordó que las demostraciones prácticas y experiencias de campo, preferiblemente en el mismo lugar de trabajo, son las técnicas más apropiadas para entrenar a los pescadores, procesadores, distribuidores y detallistas. Demostraciones y muestras gratis son efectivas para educar a los consumidores. Otra forma de variar los hábitos de los consumidores sería que una organización privada o gubernamental subsidiara la venta de algunos productos pesqueros durante un tiempo fijo.

En el entrenamiento especializado de profesionales (instructores, extensionistas, administradores y científicos pesqueros), la educación académica tradicional es útil. Esta podría incluir programas de intercambio entre instituciones hermanas en diferentes países, becas para trabajo y estudio individual bajo

supervisores experimentados, y cursos cortos a nivel nacional o regional, además de programas universitarios establecidos. Existe la necesidad y la oportunidad para una organización regional, Gulf and Caribbean Fisheries Institute o alguna otra, de llevar a cabo actividades de este tipo.

El equipo notó que, en el caso de los pescadores de algunas regiones y sobre todo en el de los profesionales, es común que los adiestrados abandonen el área en busca de mejores trabajos. Por tanto, además de identificar la necesidad de adiestrar el personal y de proveer entrenamiento, es importante asegurarse de que los adiestrados tengan la oportunidad de realizar un trabajo útil en condiciones satisfactorias y tasas de pago de competencia o de lo contrario el esfuerzo del entrenamiento fracasaría.

Report of the Evaluation Team on Financial and Technical Assistance

Evaluation Team: leader, M. Castro (Dominican Republic); J. Burnett-Herkes (Bermuda); K. Cox (USA); W. F. Doucet (FAO/WECAF); S. Kirwan (Caribbean Development Bank); R. M. Lawson (UK).

This Conference has heard of the need for improvements in small-scale fishing industries in the Caribbean region. It has been stated that there *is* potential for improvement by increasing catches and improving the quality of products; that financial assistance *is* available from a variety of sources and that technical assistance is also available in the form of regional and individual national programs. Given these conditions, the evaluation team posed the question, therefore, as to what are the problems, if any, in the field of financial and technical assistance.

The Evaluation Team believes that, although assistance has been available for sometime, small-scale fishing interests have not made use of it because fishermen are collectively conservative, and because the majority of Caribbean countries lack the infrastructure to administer the assistance that could be obtained. In addition, many governments have not been committed to fisheries development and some still look upon fisheries as a form of recreation engaged in by a sector of their populations that are not ambitious enough to be farmers, industrial workers, or to service tourists.

With the spread of unilateral declarations of extended jurisdiction and exclusive fisheries economic zones throughout the region, governmental developmental policies must change. Thus, implicit in the proclamation of an Extended Fisheries Economic Zone is the responsibility of the Government to manage and utilize the resources of the zone. The exclusive fisheries zones throughout the Caribbean region overlap considerably and the available resources are shared by many neighboring countries, who all have similar development and management problems with their industries. These factors should serve to bring nations of the region together to tackle mutual problems. With the addition of the distant-water fleets of Japan, Korea, and Taiwan there is a catalyst which should result in collaboration and cooperation developing rapidly amongst nations in the region.

The Evaluation Team considered that it is initially important, therefore, that some central organization identify the needs of the entire region and initiate practical financial and technical assistance programs. The consensus of the group was that the WECAF would be most suited to be this umbrella organization for coordination and implementation of assistance programs with financial backing from available sources. The Gulf and Caribbean Fisheries Institute might be an alternative to the WECAF but its role as the contact organization for the region is also important.

The Evaluation Team wished to emphasize the necessity for resource and labor assessment to prevent overcapitalization in relation to the borrowers' producing capability. It was stressed that the goals of development need not lead to intense capitalization but must carefully consider socioeconomic factors leading to high levels of employment. The team notes that technical assistance, and particularly technical training, should *not* be institutionalized but should be carried out in context with industry and within the immediate area of application.

Reporte del Grupo de Evaluación sobre Asistencia Técnica y Económica

Hemos visto en esta conferencia la necesidad de mejorar la industria pesquera en pequeña escala de la región del Caribe, además del potencial existente en lo que se refiere al aumento en las capturas y en la mejora en la calidad de los productos pesqueros; se dispone de ayuda económica proveniente de diferentes orígenes, y se recibe asistencia técnica a través de programas regionales y nacionales.

Aunque se ha dispuesto de ayuda por algún tiempo los intereses pesqueros artesanales no han hecho uso de la misma debido a que los pescadores son colectivamente conservadores y porque la mayoría de los países del Caribe carece de la habilidad técnica necesaria para poner en práctica la asistencia que pudiera ser obtenida. Además, los gobiernos no se han preocupado del desarrollo pesquero, siendo las pesquerías consideradas por muchos como una forma de recreación de aquellos que no son suficientemente ambiciosos como para ser granjeros, trabajar en la industria o en el servicio turístico.

Con la divulgación de las declaraciones unilaterales de la ampliación de las exclusivas zonas pesqueras, a través de la región, la situación pudiera cambiar. Así, en la proclamación de la ampliación de las zonas pesqueras, se infiere la responsabilidad de los gobiernos de administrar y utilizar los recursos de la zona. Las exclusivas zonas pesqueras, a través de la región del Caribe, coinciden considerablemente unas sobre otras. Los recursos de la región son compartidos por muchos países vecinos que tienen problemas similares de administración y desarrollo de sus industrias. Estos factores debieran servir para que se unieran los países de la región para resolver los problemas comunes. Si consideramos además las flotas de aguas remotas del Japón, Korea y China, se tendría el agente

catalítico que traería rápidamente la colaboración y el desarrollo cooperativo entre los países de la región.

Por lo tanto, es de suma importancia que un organismo central se identifique con las necesidades de toda la región y que inicie programas técnicos y económicos. Los miembros de nuestro equipo coincidieron en que el WECAF sería el organismo más apropiado para coordinar y poner en práctica los programas de asistencia con el respaldo económico de los recursos disponibles. El Gulf and Caribbean Fisheries Institute pudiera ser escogido en lugar del WECAF pero su función como organizador de las relaciones de la región es también importante.

Nuestro equipo desea enfatizar la necesidad de que se amillaren los recursos y la mano de obra para prevenir la excesiva capitalización en relación a la capacidad productiva de los prestatarios. Las metas del desarrollo no necesitan una capitalización intensiva, sino que debe considerar cuidadosamente los factores socio-económicos para lograr altos niveles de empleo. Nuestro equipo señala que la ayuda técnica y particularmente el entrenamiento tecnológico no debiera ser institucionalizado sino llevado a cabo en convenio con la industria y dentro del área inmediata de aplicación.

Summary of the Conference

JAMES A. STORER

*Director for International Marine Policy
National Oceanic and Atmospheric Administration
Rockville, Maryland*

In some ways the job of summarizer is an easy one, because he has the last word and has some license to say whatever pleases him. In fact, one might decide to write the summary before arriving and I have been accused of that already. Actually, if one tries to summarize in a meaningful way what has been said, it's not so easy; indeed it's rather difficult. However, in this case, I am not going to make any effort to itemize all that was said or to review in any chronological fashion what has taken place. Rather I shall try to select a few themes and ideas that have recurred during the course of the discussions and see if they can be put together in some meaningful fashion. I should also like to consider these themes in terms of our collective and individual responsibilities.

I think there is one simple classification that might be applied to almost all of the information, problems, projects, and solutions that have been of concern to us. That simple classification is on one hand, a generalized and overall view of the small-scale fisheries, and on the other hand, a highly specific approach to such fisheries. The economist might say that this is the macro-approach or the aggregate, as contrasted with the micro-approach. This contrast in the presentation of material during the meeting can clearly be seen in the description of the situation we face, both with respect to the resources themselves and the entire institutional infrastructure relating to fisheries. There also was discussion of a much more micro-sort dealing with particular fisheries and with individual and highly particularized fishing communities. This contrast between the general approach and the specific approach seemed to be pervasive also when we talked about the programs to improve the situation of small scale fisheries. On the one hand, we talked about an overall need for data on the resources as well as, other informational needs, which have to be handled on an aggregative approach at the national level, if not beyond that. We also talked about other broad programs of a comprehensive sort. On the other hand, as you all well know, there was much feeling that the "real" work was going to be done on the beach, dealing individually with specific cases. Actually, we must combine both approaches, the general and the specific, the macro and the micro into some reasonably balanced program.

Most of us, in our own work, will have a very particular niche and role to play and will seldom be operating over the whole range of the spectrum. It is important for us to realize that though we may be dealing with only one particular little niche, whatever we do may have a considerable impact on other related aspects of the total situation. Harvey Bullis, in his discussion of the hawksbill turtle spoke about *ad hoc* actions and surely one of the unfortunate aspects of an excess of such actions is their piecemeal nature, undertaken in an isolated fashion without being aware of the interrelationships of all phenomena. The

same theme of interconnection was addressed in earlier sessions of the Gulf and Caribbean Fisheries Institute in opening remarks by George Allen, who used very appropriately the analogy of the web. Also Verda Horn used very poetic and felicitous phrasing in speaking about the fact that every aspect of the universe is related to every other aspect, and certainly this applies to fisheries development and management, as well as to the broader problems of marine resources, in general.

I certainly do not wish to imply by emphasizing the network of interrelationships that we have to proceed in a great and grand plan for everything all at once, on all fronts. We simply cannot do that. Nor would I say that we have to do everything in terms of some highly organized form of planning. Clearly there has to be a fair amount of flexibility and in some cases, for instance, adequate response to market opportunities. But whatever we do, whether as a business man, as a fisherman, as a credit man in the bank, as a government extension worker, or as a central planner, we must be aware that what we are doing may have serious repercussions on others.

Let me pursue this a bit further, if you will, by looking at some more specific aspects of management and development of fisheries resources which are, in a way, but reverse sides of the same coin. We surely want these two elements of management and development to proceed with compatibility and yet, we know that all this is not necessarily going to be accomplished and certainly not very easily.

We know that any satisfactory management scheme must be based on an adequate amount of knowledge, on a good deal of scientific capability, and on competency in national and local administrations. Furthermore, and particularly in the Caribbean area, we realize that management to be successful must be carried out within a context of regional cooperation. While it is easy for us to recognize that much of this knowledge and capability is a national responsibility, and indeed that the management system has to be put into a context of regional and international cooperation, we sometimes neglect the fact that a management system to be effective must be understood, accepted, and, of course, enforced at the lowest level of organization, namely the individual fisherman.

I was struck by some of the remarks of Winston Miller in his discussion of the management scheme for spiny lobster in Belize. He spoke about the total allowable catch having been determined, at the national level, by establishing export quotas for the lobster. These export quotas were then allocated to the separate cooperatives. In turn, there had to be a system for allocating the catch among the individual fishermen within the cooperative. And at this point, there had to be some mechanism to make sure that the fishermen understood what the management system was all about if they were to respect it. In this context, Mr. Miller mentioned the usefulness of having a National Fisheries Advisory Board as an important instrument of communication. Not only, therefore, do you have to have adequate institutional mechanisms and capabilities all the way along in the vertical chain, but you also have to have an effective system of communication, as well as a mutual respect among the individual participants and organizations involved in the process.

In the first GCFI session, Harris Stewart and Roland Smith spoke about coastal zone management and the United States Fisheries Management and Conservation Act of 1976. Both indicated that in the implementation of these programs, new techniques of organization had to be devised. A new sense of federalism had to be established, making sure that there was an adequate degree of communication and interaction between the local levels and the national levels. In the coastal zone management arena, this was being exercised through the development of state plans, which then made their way through the national bureaucracy. In the case of the fisheries management effort, a new mechanism of regional councils has been set up. These councils are charged with the responsibility of developing, at the regional or local level, fisheries plans for management and conservation. Channels of cooperation and communication had to be established between these councils and the Federal Government, a process that has been to some extent uneasy and not fully worked out at the present time.

Let me now look at the development side of fisheries. As in the case of management, development cannot be satisfactorily achieved either by concentrating only on grand national plans or by dealing exclusively with problems of village fishermen on the beach. Successful development must achieve some kind of an integration between these two extremes. Let me refer again to Harvey Bullis' remarks in which he indicated that the development effort on behalf of the individual fishermen on the island beach, of which he so eloquently spoke, was not very successful. It didn't work because development, even in that very localized arena, must be taken in the context of a broader picture of interacting elements of a biological, political, social, and economic nature. Furthermore, the example given by Mr. Bullis illustrates that a successful effort must be a continuing one, an *ad hoc* effort does not work, for successful development is not a matter of a discrete phenomenon. Another interesting example was presented by a discussion of the local shrimp fishery in Trinidad in which the introduction of better gear was extremely successful. But that development also took place, in a sense on the beach. To be permanently successful, consideration also had to be given to the related problems of handling, marketing, and distribution.

Apart from being concerned with the vertical sequence in fisheries development, we must also be concerned with the fact that the fishermen are often competing for use of the same resource or for resources that are biologically dependent upon one another. In the Caribbean Fisheries Session of GCFI, Dick Robins spoke about the potential of the Gulf of Uraba, making the point that there was a very adequate resource there for a small scale fishery and that it could be developed in a limited fashion, though very economically. But he also indicated that one had to be mindful of the fact that large-scale fishing, even as a random and occasional occurrence, could utterly destroy the resource for the small fisherman. In such a case, the small fisherman may very well require some degree of protection for that resource. Protection to enable that development to take place involves a whole panoply of government management efforts, including enforcement measures.

If we begin to think about reserving certain fish species for particular kinds of fishermen, not to mention restricting the total amount of effort that might be applied to any one species, we have clearly fully crossed the bridge between

management and development. We find that any intelligent and rational utilization as well as management of our fisheries resources requires joint consideration of management and development aspects.

I think we all agree that this meeting of the Gulf of Caribbean Fisheries Institute has been most interesting and constitutes a very worthwhile beginning in an exploration of the problems and potential for small scale fisheries development and their proper management in the region. It was the right topic, at the right time, the right people have been here and surely this has been the right and most pleasant place to carry on this discussion. But one does hope that this is not going to be one little grain of sand on the beach that will get swept away in the tide. All of us have been to too many conferences where all the good papers read, and all the good things said, were promptly forgotten as we hastened to the next conference. It seems to me that in this case, we might have a little more hope for a continuing development of the ideas that have been discussed in these last few days. The Gulf and Caribbean Fisheries Institute has a real and unique opportunity to keep alive the subject of small-scale fisheries management and development in the Caribbean. I would hope that it would continue to do this in an organized, substantive, scientific, intellectual, and yet practical basis. It has every reason for doing this for there is at its disposal all of the needed and varied talent of the whole region. Furthermore, the Institute in its recent program of activities, has clearly been more and more establishing itself as being in the center of the Caribbean rather than on the circumference.

All of us concerned with the Caribbean need some answers with respect to development and management of fisheries as Phil Roedel mentioned in his introduction. We need these answers no matter what particular niche we occupy in terms of our professional or business responsibilities. The Gulf and Caribbean Fisheries Institute is alone in the area in terms of its international membership as well as in terms of the broad range of skills and disciplines that are represented at this meeting and in its membership. It seems to me the Gulf and Caribbean Fisheries Institute has an advantage over such an organization as WECAF, or any other agency of an international intergovernmental sort, because the Institute is independent and has none of the political ramifications nor restraints that must necessarily be attached to such organizations as WECAF or IOCARIBE, despite the great competency and the effectiveness of these organizations. I do not see WECAF or IOCARIBE or for that matter FAO or the IOC, who are the parent bodies, exercising the kind of intellectual, broad evaluative kind of analysis for fisheries management and development in this region that the Institute can apply. In this respect the Institute can establish a useful precedent. It may be the first time that a particular region has been well served by a broadly disciplined, intellectually capable, but practically minded group that would look at the problems and provide recommendations for their solution, insuring a continuing and objective leadership that is not otherwise available.

CLOSING REMARKS

P.M. Roedel *Co-Chairman*

We are now at the end of this two-day conference on small-scale fisheries. When the Conference opened, I think Frank Williams and I both expressed the hope that all of us, conveners and participants alike, could leave here with a sense of accomplishment and with the knowledge that we had in fact reached our stated goal. We suggested yesterday that, as co-chairmen, what we hoped for was your collective judgement as to the opportunities for small-scale fisheries development in the Caribbean, the nature of the problems that need to be solved, priorities, and suggestions for institutions both public and private which might contribute to this end.

Thanks to the excellent job done by everybody, the principal speakers in setting the tone of the meeting, the Evaluation Teams, who have given us such excellent reports this afternoon despite very severe time limitations, and now by our Conference Summarizer, there really isn't much more to say. I had listed several items earlier in the day that I wanted to mention if they did not come out in the remarks of the Summarizer or the team reports, but I think most of the things I had in mind have either been said or implied. Let me mention several of them just to re-emphasize what I regard as their importance in the scheme of things. One is the point that Dr. Storer brought up last; that is the potential for GCFI developing into a much stronger and more useful entity in Caribbean fisheries affairs. This in no way negates the importance of the role of governmental and international organizations, but it does seem to me that a private group with strong academic ties can do many things which the public sector can not; as I said earlier, I would endorse Dr. Storer's hope that GCFI becomes that organization in this part of the world.

I think that perhaps the overriding concept that came through to me, so far as small-scale fisheries development is concerned, is something that Dr. Storer discussed at some length and which was alluded to in several of the reports of the Evaluation Teams. That is a need for an integrated interdisciplinary approach with attention to all aspects of the problem from broad scale conceptualization down to the micro-level "doer" projects on the beach. The key word in my thinking is "integrated"; further there must indeed be a continuum of effort. This runs from stock assessment at one end of the spectrum to ultimate consumption or non-consumption of the product at the other end, and obviously requires contributions from a wide variety of social, political, biological, and physical scientists. Continuity also means assuring for the future an adequate cadre of fisheries scientists, administrators and paraprofessionals trained through appropriate educational programs, all this coupled with viable extension networks. Too many times we have seen good programs put into operation and be quite successful until the expatriate experts left. Then within a few years the programs fell apart completely because nobody had provided for training of people at the local level to carry on the work. This is a mistake which I think every bilateral or a multilateral donor agency has made.

The final point I would like to emphasize or re-emphasize is the nature of the impact of extended jurisdiction on fisheries. It seems certain to me that the best

conceived marine fisheries programs and conservation measures can not in most cases succeed without recognition of, and accommodation to, the realities of extended jurisdiction and the national responsibilities inherent with the exclusive economic zones. This, of course, is a particularly critical problem in the Caribbean.

Finally, on a more personal note, and also on behalf of the Agency for International Development, I can say that I believe this Conference has far surpassed the perhaps too modest hopes the Agency had for it. It has certainly been most useful to me, and I hope it has been equally useful to you. The ideas that have been expressed here are going to be extremely valuable to AID in its fisheries planning efforts not just in the Caribbean, but throughout the developing world. Finally, I would like to express my appreciation to all of you for your excellent help and participation.

F. Williams *Co-Chairman*

I am not going to repeat remarks made previously, as I think the most important of them were made in a cogent manner. At this time though, I must comment on two things arising from our deliberations.

First, I believe we have achieved at least one thing that is extremely useful to us all. We, and here I am talking as a member of the Steering Committee, posed several questions and we invited groups of you to sit down together to discuss them last evening and again this morning. I do not mean to be disparaging about the written statements you have produced, but I believe that the opportunities you had to fully discuss problems relating to the development of small-scale fisheries in the region were probably more valuable than anything else at this Conference. You have got to know each other and you have got to know each other's problems, and that goes a long way to finding the solutions to those problems. Certainly, GCFI is not going to miss the opportunity to use the working group approach at future meetings. Secondly, I would say to you, we hear the messages that have been coming from the Evaluation Teams. There are some very significant questions you have posed, and comments you have made. Those of us on the Board of Directors of the Institute will try to answer those questions and utilize the ideas that you have advanced at this Conference.

I wish to close this Conference with some very special thanks to several groups of people. Firstly, for many of us, thanks go to the United States Agency for International Development and to the University of Miami for their financial support of this two-day Conference. Secondly, grateful thanks go to our good colleagues Rafael Espinosa Gray, President of Vikingos de Colombia, and especially to Sergio Martinez of Vikingos, who was the Chairman of the local organizing committee, for the outstanding job that they and others at Vikingos have done to make this such a successful meeting. Thirdly, I offer my own thanks to our travel agencies in Cartagena and Miami and to our local secretarial staff. This is also an appropriate time to express our appreciation for the work of two of my own Miami staff, Norka Munilla and Jane Palmer; they have done a very fine job over the last few months and even though these last two days you have bombarded them with questions regarding pesos and per diem I think you will

go away satisfied. Fourthly, we certainly could not have achieved anything without the excellent service of our interpreters Juanita de Durana and Margarita de Fischer, and Sr. Pedro, of Philips, Bogota who is responsible for the audio record of the Conference. Fifthly, the Steering Committee wishes to thank the invited speakers, the evaluation team leaders, and you, the participants in this meeting, which I believe has been most successful. Finally, on behalf of myself, Phil Roedel and all of you, I would like to say to our local friends, Cartagenos in all walks of life, we have thoroughly enjoyed your hospitality and welcome to the historic city of Cartagena and offer our sincere thanis. With that the Conference on the Development of Small-Scale Fisheries in the Caribbean Region is adjourned and at this time I will hand the general GCFI meeting back to our local Chairman Sergio Martinez.