

EXTENSION TRAINING OF ARTISANAL FISHERMEN AND OTHER FISHERIES PERSONNEL IN THE WECAF REGION



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Interregional Project for the Development of Fisheries
in the Western Central Atlantic

Extension Training of Artisanal Fishermen
and Other Fisheries Personnel in the WECAF Region

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DEVELOPMENT OF FISHERIES IN THE WESTERN CENTRAL ATLANTIC

The Interregional Project for the Development of Fisheries in the Western Central Atlantic (WECAF), which was initiated in March 1975, entered its second phase on 1 January 1977. Its objectives are to assist in ensuring the full rational utilization of the fishery resources in the Western Central Atlantic through the development of fisheries on under-exploited stocks and the promotion of appropriate management actions for stocks that are heavily exploited. Its activities are coordinated by the Western Central Atlantic Fishery Commission (WECAFC) established by FAO in 1973. The Project is supported by the United Nations Development Programme (UNDP) and the Food and Agriculture Organization of the United Nations as the Executing Agency.

As in the initial phase, two series of documents will be prepared during the second phase of the Project to provide information on activities and/or studies carried out. This document is the nineteenth of the series WECAF Reports. The other series of documents is entitled WECAF Studies.

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1. Conclusions and Recommendations

(a) Conclusions

Fisheries training in the WECAF region, with the exception of Cuba, is at present virtually non-existent. A few reasonably good programmes have been carried out in the industrial sector, mainly for skippers, but they have generally been too theoretical, too insensitive to cultural realities and too poorly designed to solve existing production, processing, and marketing problems.

The limited training exercises that have been carried out in fish handling and processing technology, navigation, management of cooperatives, marine mechanics, and safety at sea have been somewhat more successful because they often were carried out with an extension (on-the-job) approach, plus the fact that the techniques to be learned were more objective and easily defined.

In many cases it is difficult to determine the degree to which extension and other development assistance should be carried out because so little is known about the resources and the possible sustainable yields of target species. In some cases, such as with the deep-water shelf slope snapper stocks and the open sea migratory pelagic fish resources in some areas, it is feasible to predict by extrapolation or guess estimate a certain increase in production as a result of increased effort. But such predictions must be made with caution, and no great increases in production should be sought until the strength of the fishery can be analysed through comparative catch/effort data gathered over a rather long period of time on commercial fishing boats. Of the presently most heavily exploited Caribbean fisheries (conch, turtle, reef fishes and lobster), only the lobster is more or less holding up against strong fishing pressure, and most experts predict that the lobsters, too, will soon drastically decrease unless some sounder management and enforcement practices are established.

There is a very obvious lack of young people involved in commercial fishing around the Caribbean. Unless some real efforts are made at all levels to modernize the small-scale fisheries, to improve working conditions at sea and increase incomes from fishing, young men will continue to drive taxis or emigrate, and the fishermen will slowly die off.

The true fishermen of the Caribbean know their trade well. They have a high level of understanding of the sea, the behaviour of fishes and the tools of their trade. Generally, they are greatly limited by financial constraints, and their boats and gear are too small, worn out and inefficient in function. But they are quick to learn anything new about fishing and seafaring techniques that are shown to them through example by a fellow fisherman or other practical seaman, and any such valid new approach is quickly transferred from fisherman to fisherman.

There also exists a large number of highly skilled traditional wooden boatbuilders around the Caribbean. Most of them are capable of building very functional and seaworthy fishing boats in the 9-13 m range out of local and imported timber. Very few such boats are currently being built because most small-scale fishermen cannot afford them, even though they normally

cost less than half the price of a comparable fibreglass boat imported to operate with some fishery development project. Fishermen understand these locally-made boats and know how to maintain them; on the contrary, they quickly discard the imported boats as soon as a project ends, or the boats start to fall apart due to poor maintenance. This traditional Caribbean cottage industry could play a major role in future fishery development.

(b) Recommendations

Concentrated extension training efforts should be carried out by experienced expert fishermen in fishing communities throughout the region, helping local fishermen to resolve their particular problems concerning how most effectively to go after unexploited stocks of fish that are available to them, and how to improve their gear and fishing techniques for greater yield and efficiency of the fisheries in which they are already involved. Local fisheries officials, the fishermen themselves and visiting fisheries advisers must work together to define the areas of greatest need for such assistance in each country, and to arrange for the appropriate extension programme to get started. Several such efforts are suggested in the individual country sections of this report, and draft proposals for specific activities have been prepared for Belize and Trinidad and Tobago.

A regional fishing technology unit should be established for direct transfer of expertise in the deployment of all types of fishing boats, gear and methods that are applicable in the Caribbean. This unit should be staffed by experienced fishermen whose duties would be to carry out extension work with artisanal fishermen at sea, to develop optimum fishing techniques (requiring a minimum of investment) for each practically exploitable fishery in the region, and to assist Government in establishing fishery services that will give the proper support to efforts aimed at improving production methods and yield.

Fishery extension services should be set up in each country, even if this means only one active field agent and a minimum budget, principally to provide a liaison between fishermen and the government. A country having such a service would be much better equipped to take advantage of direct assistance available to the fishing industry through WECAF, a regional technology unit, or any other development group. The extension agent(s) could receive field training through participation in the activities carried out by visiting experts, and could continue and expand the efforts realized by these experts after they leave. Local extension people should be generalists with a broad understanding of their country's fisheries. They should be particularly aware of all the cultural forces at work in their country, have organizational ability and capable of mediating disputes and resolving misunderstandings.

United Nations Volunteers should be utilized to support and enhance the efforts of both fisheries department staff and visiting experts to cope with particular fisheries problems. They could live in progressive fishing communities and would be "animateurs" (motivators)-to organize and assist in the management of fishermen's groups, help set up support services such as better markets, loan systems, repairs, and gear procurement, and assist with the work of local and outside expert extensionists.

Particularly productive fishermen from the Caribbean region should be recruited to work as extension agents for short periods of time in neighbouring countries, to demonstrate effective fishing techniques that they have developed for the greater utilization of a given fishery (species and habitat type).

Any fishery extension effort should include the practical training of fishermen in the fabrication of the least expensive gear possible, considering the high cost of importing any kind of fishing equipment. Some examples of this are the use of home-made chicken wire, roseau cane, and bamboo for fish pots, balsa-type wood for net floats and buoys, and home weaving of monofilament nets.

Simple improvements in equipment used in the artisanal fishery, such as portable echosounders, small capstan haulers, snapper reels and ship-to-shore radios, should be made as soon as the fishermen are trained in their proper use and maintenance, and provided that their boats are appropriate.

Any viable fishery development proposal under consideration in the WECAF region should be supported, wherever indicated and/or desired, by technical assistance through extension programmes. The appropriate programmes could be recommended, organized and carried out by WECAF or other entities.

Regional training and special courses in over-developed countries should generally be eliminated. Occasionally, a regional course could be useful in the training of fisheries officers or extension agents, or managers of cooperatives. However, unless highly motivated fisheries people can be found to receive such training, it should not be offered.

To enhance the probability of success in any extension programme with fishermen to introduce new gear and methods, the local government should devise a way in which fishermen could procure any gear that is found to be particularly effective. This could be done by (a) setting it at the supply store for purchasing the needed gear in bulk and selling it at the lowest possible cost to fishermen, and (b) by creating a revolving fund or some other small loan system appropriate to the country (the government assuming the risks and supervising repayment).

2. Introduction

During the process of evaluating the needs for artisanal fisheries extension programmes in the WECAF region, the consultant became aware of one outstanding problem that is common to all of the countries visited. Even though most of these countries have had several fisheries assistance programmes sponsored by various industrialized nations and international organizations, there has never been adequate field training of artisanal fishermen and very little appropriate practical training of other fishing industry personnel.

In all of the past fishery projects carried out in the WECAF region, training of fishermen and fish handlers has consisted of one or more of the following activities with a few notable exceptions in cases where master-fishermen have spent short periods of time training local fishermen in new methods on their own boats out at sea:

- (1) Exploratory-demonstration fishing with a few local fishermen on

large project vessels that sometimes employ appropriate methods (such as handlining, mechanical reels, long lines and pots for deep-water bottom fishing), but often utilize methods that would never be put into practice by the fishermen; but whatever gear is used, the technology transfer from the expensive project vessels to traditional (or slightly enlarged and modified), relatively cheap wooden boats is usually impossible (and often inappropriate).

(2) Theoretical training in classrooms or on boats tied up at the pier, with little or no practical exercises.

(3) Special visits and training courses in other countries, usually with equipment and methods that are unrelated to requirements in the countries of the participants, and carried out in a cultural context that is totally foreign to them.

(4) Provision of manuals and other descriptive materials that are only rarely read by fishermen, even if they do know how to read.

(5) Introduction of sophisticated gear-hauling, fish-finding and navigational equipment, imported boats made of unfamiliar materials and gadgets that fishermen would never use properly, even if they were adequately trained in their use and maintenance.

(6) Presentation of training activities in an inappropriate cultural context. Technical experts often do not fully understand the reasons why people do things in a given way in a certain place; they try to change patterns that will not or should not be changed; and they too frequently do not understand important nuances of local language (for instance, even most non-West Indian fluent English speakers have a very difficult time explaining the real objectives of a project to an English-speaking West Indian fishermen, and have even more trouble comprehending the fisherman's doubts and the points of misunderstanding that continually arise). In many cases the expert does not even speak the basic textbook version of the language very well, and does not have either knowledge or concern about the general interest, objectives and feelings of the trainees.

In a number of instances, boats and equipment have been donated, markets and landing places have been built and cooperatives have been organized with virtually no training of the individuals who would be using and maintaining them. The problem is often exacerbated when projects conceived by foreigners do not fit in with the real development needs of the country and, thus, the existing government infrastructure, social institutions and fishermen themselves do not give the support needed to assure the success of the endeavours.

Of the countries visited, only Belize, St. Lucia, Trinidad and Tobago and Brazil have fisheries extension services. These services are basically set up to provide some social and organizational assistance to fishermen and their families and, occasionally, to help them secure loans for boats and gear or to develop some better handling and processing techniques. None of the existing extension agents is, or has been, a fisherman. Only a few of them have ever been at sea on a fishing boat and, if so, very rarely. Their training has been very general (most commonly a university degree in biology) and they do not even know the most basic principles concerning

appropriate boat types for specific fishing operations, engine maintenance, simple fish processing, handling of fresh fish, marketing, loans, cooperative management, or the selection and purchasing of appropriate fishing gear.

The only real service currently provided by local extension agents in the four countries just mentioned is that of liaison between the fishermen and the Government. In this function, they often quite effectively communicate fishermen's grievances to the appropriate authorities and interpret Government programmes, regulations and desires to the fishermen. In St. Lucia and Brazil, they help set up and manage fishermen's groups (cooperatives and colonies) and motivate the members.

If any real improvements are to be made in the artisanal fishing industry in the WECAF region, from the fisherman to the retailer and the money lender, the whole emphasis of the assistance provided must be shifted. Effective training at all of the most basic levels of production must be the new focus. These best approach to get fishermen to "discard the old and accept the new" is to show them that the new way is better. Boats, motors, gear, and physical plant improvements should be provided only in support of extension programmes that can get the potential forces of production in motion.

A number of fishery development projects in the WECAF region in the past had little results, and any new project is looked upon by some Government officials and fishermen as simply another chance to get more free equipment and loans that do not have to be paid back. This trend must be reversed.

As described by Cole (1976), regional courses covering a variety of technical training requirements, for groups of countries that share the same language and have similar cultural backgrounds and fishery development needs, would be the most efficient way to increase the effectiveness of workers in the fishing industry. Practical training could be carried out on 9-13 m boats, as well as at the most successful processing plants, landing facilities, market centres and cooperatives. Extension workers and fishery officers could be trained in all appropriate aspects of fisheries technology and management, while fishermen and shore-based fishery workers could participate in comprehensive technical courses in their specific areas of competence.

Unfortunately, the idea of regional training centres is very much out of favour among most of the WECAF countries. All of the fisheries officials questioned by the consultant about regional training were basically negative about the idea, except, in some cases, if the centre were to be set up in their own country.

The objections to regional training are based on the following:

- (1) Past training programmes in the Caribbean have been on too high a level, concentrated too much on classroom studies, have focused on the wrong kinds of fishing activity (long trips on big, highly-mechanized vessels in unfamiliar waters), and have provided no follow-up to help graduates get started in the fishery activities for which they were trained.

(2) The Caribbean Fisheries Training and Development Institute (CFTDI) in Trinidad is considered to have failed to achieve its original purpose, and fisheries officials are reluctant to send their people to CFTDI or any other similar institute.

(3) The deep-seated lack of trust among nations, even within culturally compatible sub-regions, and the resentments that arise in all attempts at collaboration by two or more countries, especially where there are direct or indirect economic benefits and one nation feels that it is being deprived of its fair share in relation to what the others receive.

(4) The idea that the only effective training is that which is carried out in one's home territory, and where particular local problems can be dealt with as they arise.

Regional projects of many types have been attempted over the years and have had little or no success. Recently, an attempt by the Caribbean Development Bank to develop a fishery project in a very homogeneous area (Antigua, British Virgin Islands, Montserrat, St. Kitts - Nevis, Anguilla and Dominica) failed before it started, due to the inability of the participants to agree on conditions.

It also appears that training outside the region is, in general, not very beneficial, though in some cases it has proven to be very useful to the managers and bookkeepers of cooperatives, fish plant operators and technicians, and marine mechanics. In the case of fishermen (and often with other industry personnel), even if they receive practical training in the use of gear, methods, handling of the catch, navigational techniques, etc., that could be applied to their own fishing operations, they usually return home totally disoriented. They see systems elsewhere that work very effectively (dependable markets, adequate ice and cold storage facilities, big, seaworthy, well-equipped boats, workable systems for obtaining credit, etc.) and quickly become frustrated with the obstacles they face at home. They still cannot get financing for proper boats and gear, and they cannot secure employment in the types of advanced fishing operations for which they were trained. Most of them either return to the place where they were trained or wind up working at something other than fishing. This phenomenon even happens with training courses close to home, as in the case of the numerous Barbadian fishermen and skippers trained over the years on FAO Caribbean Fisheries Development Project (CFDP) vessels and in Trinidad (CFTDI). Only seven of these are actually working in the fishing industry in Barbados, and not one of them is a skipper in the shrimp fleet.

Cole (1976) also stresses the importance of starting right away to make use of fishery resources that are underutilized, not waiting for precise assessments to be made before exploitation is initiated. In this respect, he cites the need for the training of "technologists" (instructors, extension workers, and implementers), principally to stimulate the expansion of offshore pelagic and deep-water shelf slope fishing. Though some of this training could be done at home, by visiting experts through a variety of extension programmes, he considers that 1-4 technologists would need to be trained from most of the countries of the region through the medium of a regional centre.

In principle the regional training suggested is sound. However, in view of the great scarcity of good fishery officers, extension agents, and fishing industry technologists in the countries of the region, it is feared that such an effort would be disappointing in many respects. Usually, there is little or no money budgeted for these positions. When they do exist, they are usually filled by

people who prefer to work in offices and have no interest in working at the production level. If courses for such people are to be held, the participants should be selected on the basis of merit and motivation.

Ideally, a fisheries extension service should consist of field agents working at the village level. These agents should be generalists, with basic familiarity of the problems typical of fishing communities in their country, as well as some practical, first-hand knowledge of the sea, boats, and fishing. Beyond this, they should be able to "identify the need for a particular kind of expert assistance and know where this can be found" (Cole, 1976). Specialists could be called in by the extension agent whenever problems beyond his or her technical capability arise. Ideally, a regional fishing technology unit should be formed to provide specific technical assistance to fishermen and other fishery workers through practical exercises in the actual areas of production.

Efforts should be made to carry out, as soon as possible, the specific internationally-assisted extension activities recommended for each country in this report. The visiting experts would be training both production-level people and 1-3 extension agents (existing or newly-assigned). In this way, specific expertise covering the areas of greatest immediate need could be developed, and improvements could be continued through the efforts of the extensionists after the technical assistance came to an end.

Cole (1976) presents a comprehensive list of activities in which extensionists may be involved, and gives two alternatives for training programmes to prepare them for providing the advice and assistance needed. But, these programmes should be more general in nature and of shorter duration than he recommends, as we know now from experience that governments cannot attract highly qualified fisheries people to work as poorly-paid extension agents.

The following is an appraisal of the fisheries situation in six of the countries visited by the consultant, with an emphasis on the aspects that have a direct relationship to artisanal fisheries extension.

3. Countries Visited

(a) Antigua

Antigua has had a number of fishery development projects in the past but, unfortunately, there is little evidence of much benefit having been derived by fishermen. A number of sloops were provided with motors in the fifties but these are now largely worn out. A programme to equip ten sloops with modern mechanical gear failed because the fishermen lacked the necessary training in the maintenance and use of the equipment. Construction of a new fish market with cold storage and ice-making facilities initiated over two years ago is still not operational. Christian Action for Development in the Eastern Caribbean (CADEC) is endeavouring to organize fishing groups and provide them with simple gear and equipment but, so far, the results are not outstanding.

A fishery development programme has recently been proposed by the Caribbean Development Bank to help solve some of Antigua's fishery problems. This proposal has been under criticism for a variety reasons, such as: the recommendation of boats that are too expensive, too large and too complicated to fit in with the social structure and capabilities of Antiguan fishermen; the questionable reliability of the data on which calculations of increased catches and anticipated profits were based; uncertainty as to the adequacy of the

training component of the project (see Annex 1); and the difficulty of finding competent Antiguan managers and technicians, and securing the necessary local support for the effective operation of the landing and processing facilities to be put in place. It could very well be that this proposal will not be implemented, for the reasons just given and others, and the Government has no other plan and little prospect to improve the fishery situation.

Fishing in Antigua is relatively disorganized. Most of the boats and gear are in poor condition and prices for materials are excessive (it costs a fisherman EC\$ 1.20 to build one simple fish pot with rope and buoy). There is virtually no market structure, and some of the best fishermen find that they can make more money with less work by operating trading boats or taxis. Furthermore, loan funds are virtually exhausted, largely because of the poor repayment record of fishermen.

There are three ways in which fishermen can get loans for the purchase and repair of equipment and boats through local banks, primarily the Antigua-Barbuda Development Bank. The most commonly used system in the past has been the Group Guarantee Loan. Under this system, the fisherman can obtain up to EC\$ 400 at a time for the purchase of small amounts of fishing gear. He pays 20 percent of the value of the gear to be purchased and receives a voucher from the Government for the cost of the entire purchase. Once the loan has been repaid, he can obtain another. The present status of this programme shows EC\$ 25 000 in unpaid balances.

Another programme provides loans to fishermen of up to EC\$ 3 000 (US\$ 1 130 at current exchange) at 3-7 percent interest. Larger loans may be obtained under this plan through special approvals based on the fisherman's credit rating. Seventy percent of the applications for this type of loans are rejected due to inadequate collateral or guarantees. Presently, the amount outstanding from this fund is a quarter of a million EC\$.

Lastly, the Caribbean Investment Corporation (CIC) is prepared to offer loans to Antigua fishermen for improvement of boats and gear, but requires more substantial guarantees of repayment than the present situation offers.

Insufficient control over loans by the Government has fostered a great deal of irresponsibility on the part of the fishermen. At this point, it will take considerable time and effort to increase their consciousness concerning the whole process of borrowing money to improve one's fishing operations, and paying it back with some of the resulting increased receipts.

There is always a shortage of fresh fish in Antigua. Whenever small reef fishes (3-8 to the lb) are offered for sale at the Government-regulated price of EC\$ 1.00/lb at St. John's or at any landing place, they are sold out immediately. Fish is not available at any settlement other than where it is regularly landed by fishermen. A few years ago a test market was tried by the Fishery Officer at All Saints, the main town of the interior. Some local merchants were given an isothermic box, ice and 200 lbs of fish. The fish was immediately sold off and they were given more. However, as the fishermen never got paid for the fish, the project was dropped.

Currently, marketing is quite primitive. Fish is brought to St. John's in baskets by women from all over the island in taxis or buses. Sometimes buyers take it in small trucks or jeeps. Consumers must likewise come to St. John's to buy it. Very often there is no fish, or else it arrives after noon when most of the buyers have gone home, and it rots in the sun on the street

(the covered market is not used). Sometimes, no one is available to take a fisherman's catch to market - or there will be too much fish and the buyer will not want to take it all for fear of being left with some at the end of the day - so he must sell it very cheaply or give it away to his neighbours. The Government hopes that the new market will solve these problems, but this is not likely. There have already been problems with the cooling equipment; it has been difficult to find a capable manager; and nothing has been done to solve the problems of distribution (producer-market-consumer).

Fishermen prefer to fish for lobsters and big snappers and groupers because they bring high prices (lobster brings US\$ 1.50/lb locally and is wholesaled in Puerto Rico for US\$ 5.00; prime fish sells for EC\$ 1.50-2.00/lb to local hotels). There is a real danger that a large-scale development project providing big boats and sophisticated equipment would only result in less fish being available to Antiguans - the catch could be exported, and fewer fishermen could be involved in supplying local markets. Currently, lobster makes up about 10 percent (350 000 lbs, 158.9 t) of the estimated annual Antigua-Barbuda fishery production.

Another problem plaguing both the internal and the export aspects of the fishery is the lack of control over key species which are severely threatened by excessive fishing pressure, viz, turtle, conch, lobster and land crabs. Though a few regulations exist (no lobsters under 3.5 in carapace or 10 in overall, no berried or mutilated lobsters and no turtles allowed in the months of June through September), enforcement is lacking. Conch, land crab, and turtle are already very scarce around both islands.

It is considered that one of the priorities of fishery development in Antigua should be to provide an adequate supply of fish for local markets, by increasing the productive capacity of artisanal fishermen through on-the-job training, and by setting up a workable market structure. If such an objective were pursued by the Government, the WECAP Project could look into the ways and means of securing the technical assistance required for its realization.

However, the success of any programme designed to attain the objective just stated would require the Government to meet certain prerequisites. It should set up a more comprehensive set of fishery regulations and provide the basis for enforcement to be carried out. It should devise some system for gathering fishery statistics. It should control the exports of fishery products so that more of the benefits from increased production could be derived by the local economy. It should make a commitment to having a viable fishery department. It should also devise a plan for rescuing the fisheries loan system, solving the fish distribution problem, helping artisanal fishermen to fish more regularly and effectively in the open sea, and attempting to resolve the extreme difficulty of getting more than two fishermen to work together on a boat.

There is a good potential for increasing catches of pelagic and demersal fishes around the edges of the Antigua-Barbuda Bank, according to the following indications:

- (1) very good catches made by ALCYON (FAO/CFDP) exploratory fishing cruises;

(3) good catches reported by Antigua handline and pot fishermen in the deep water on the rare occasions that they go out that far in their small boats and sloops;

(4) very successful expeditions made by a 40 ft Government experimental longliner in the sixties; good catches of tuna were made in the open sea, and good results were also obtained with pot fishing and handlining in deep water.

It probably will never be possible to calculate accurate sustainable yields of the shelf edge fishery, but some measured increase in production by artisanal fishermen in that area is clearly feasible.

The CDB proposal has a great deal of merit, especially if it were to be attempted on a smaller scale, if the extremely capable local craftsmen were enlisted to build modified traditional wooden boats, and if enough practical training were provided for. Once the Government shows some willingness to improve its artisanal fisheries and the market system in ways which are compatible with the cultural and economic realities of Antigua, the CDB proposal could provide the base upon which practical development efforts could be carried out.

(b) Belize

The fisheries in Belize, including the structure of the Fisheries Department and the cooperatives, have been thoroughly described in previous reports by FAO and others.

In spite of being an extremely poor and isolated country, Belize has become a world leader in artisanal fisheries development, mainly through the following achievements:

(1) The organization of an extensive and effective system of fishery cooperatives, to which belong over 90 percent of the country's fishermen, providing the following services:

- provision of fishing gear and gasoline to fishermen at duty-free, bulk prices;
- a well-developed export market structure - mainly for conch, lobster, and whole fish, but also shrimp, fillets and salted fish - which signifies greater profits for the fishermen;
- a limited internal fish marketing structure but, within its area of influence, better than in most other Caribbean countries;
- extensive ice-making, cold storage and freezing capacity;
- high standards of quality control;
- greater ease in the procurement of loans through cooperative guarantees.

(2) A high degree of consciousness, especially on the part of the Fisheries Department, about management of stocks and the need to restrict fishing activities that destroy key marine resources. This has led to legislation enacting some of the most comprehensive fisheries regulations in the region.

(3) The development of an active, aware, and well-trained staff at the Fisheries Department, and involvement in sound licensing, research, enforcement, education and marketing programmes that accomplish a great deal in assisting fishermen, in spite of the department's very limited budget.

(4) A long standing tradition of accomplished Belizean mariners and fishermen and their effective utilization of the abundant coastal stocks of lobster, conch and reef fishes.

The Fisheries Department is particularly concerned about overexploitation of the readily catchable lobsters, conchs and turtles, and has placed closed-season and size controls on these species. It has also tentatively limited the number of shrimp boats fishing in territorial waters to eight.

There is no enforcement arm of the Fisheries Department, and the only way of getting people to observe regulations is through discussions of basic ecology and management principles with fishermen, confiscation of illegal catches (mainly by the Customs Office) and prosecution by the Fisheries Administrator himself.

The local fisheries staff realizes that the only effective way of controlling exploitation of threatened fishery resources is to enlist the support of the fishermen. One way of doing this is to help them diversify their efforts and develop other sources of income, such as:

(1) Fishing the shelf slope for underexploited snappers, groupers, and jacks.

(2) Offshore pelagic fishing with floating gill nets, long lines, live bait pole-and-line, and trolling (mainly a seasonal fishery for migratory species).

(3) Measured increases in inshore shark fishing and shrimp trawling.

(4) Mariculture of queen conchs.

(5) Better processing of third-class fishes and possible utilization of fish parts that are normally discarded (at cooperatives).

(6) Harvesting of Euchuma (carageenan-bearing algae).

(7) Increasing the involvement of fishermen in taking tourists out diving, fishing and sightseeing around the cayes.

The fisheries extension agent has already initiated activities to educate fishermen in the above-mentioned areas. She is assisted by the other staff members. Lately, however, the office has been understaffed (the extensionist herself has been out of the country for further training) and regular activities with the fishermen have been restricted to the licensing process and a few visits to fishing communities to explain conservation measures.

As much as possible, the staff uses audio-visual aids, but these are in short supply, and it is particularly difficult to get relevant films on loan from the United States or international agencies. Though the three principal staff members are very well trained in basic fisheries education, research and administration, in comparison to extension workers in other countries of the region, they have neither the time nor the expertise to provide needed technical training for developing the fisheries and related activities listed in the seven points above.

Belize offers excellent conditions for the development of a technically diversified fisheries extension service of three or four persons, supported by international assistance. These are:

(1) A well-organized fishery service that maintains contact with most of the country's fishing communities.

(2) A well-established tradition of relatively high production on the part of fishermen, an unusually strong interest on their part for improving their boats, equipment and methods, and a receptive attitude toward reasonable proposals for diversification.

(3) The infrastructure of five cooperatives.

(4) A large number of active fishermen and fishing industry personnel who have been trained abroad and have shared with their fellow workers many of the ideas and techniques that they learned.

However, because of the country's limited development budget, the salaries of the new local extensionists and expenses for equipment, added facilities, and outside experts, would largely have to be absorbed by the agency providing the assistance.

It is recommended that the emphasis of fishery development work in Belize henceforth be placed on the following extension programmes:

(1) Expansion of the existing extension service from one to four individuals, representing as far as possible expertise in the following fields:

- design and construction of appropriate boats for open-sea artisanal fishing;
- construction and proper deployment of fishing gear to help develop the new fisheries mentioned above;
- boat handling, safety and navigation;
- fishery ecology and mariculture, especially in conch raising;
- loan procurement for fishermen, organization and administration of funds, export marketing, effective purchasing of fishery supplies.

(2) A visit as soon as possible by the WECAF masterfisherman for four weeks to help the operators of the snapper boats of the Caribeña and Northern Cooperatives to improve their catch.

(3) A short visit by an international marketing expert to determine the most viable regional markets for finfish, determine if any improvements can be made in lobster and conch marketing, investigate if viable markets exist for new products (such as crabs, squid, fish meal), and provide some in-service training of the marketing people at the cooperatives.

(4) A project for field training of fishermen in new gear and methods (see UNDP draft project document, 1978 on Fishermen Training for Belize). Such a project could help initiate the new extension service.

(5) Periodic visits by experts to help train fishermen, fish handlers, processors, and managers in new techniques, as required by new developments.

(c) Barbados

The flying fish operation in Barbados remains one of the best organized fisheries in the Caribbean. The boats, methods and marketing system have become institutionalized after many years of development efforts and trial and error by fishermen. During the height of the flying fish season the price may go as low as BDS\$ 0.10 per fish, and the island is quite adequately supplied with fresh fish (April through June). The rest of the time, fish is scarce and prices are high.

Various efforts have been made to expand and diversify the Barbadian fishing industry in order to meet the protein needs of the country's substantial population, but only a few very minor improvements have been made. Unfortunately, Barbados does not have sufficient supplies of fishes within range of its artisanal fishermen (25 mi from shore) adequately to supply the local demand. Clearly, some increases in catch could be made with more sophisticated, more seaworthy, 40-42 ft boats (at a cost of about BDS\$ 90 000 as opposed to the BDS\$ 35 000 current cost of the typical 30 ft now in use). However, fishermen are not in a position to get loans for such expensive boats, are not used to fishing as frequently as would be required to pay off such a debt, do not like to stay out fishing for more than a day at a time (which would be required for the efficient operation of such boats), and do not readily assimilate the skills and attention required for proper operation of the fishing equipment that such boats would carry. These larger vessels could probably produce significantly greater catches of migratory pelagic and shelf-edge demersal fishes to justify their deployment, as long as there were not too many of them, and they were actively fishing throughout the year. But, it would be hard to find fishermen that would be willing to change their ways so drastically to work under such different conditions, and to give up their independence (these would require 3-5 men crews), even if they received substantial assistance to obtain the boats. It is felt that the only way this type of effort would work is to start off with just two or three boats with a masterfisherman who would work steadily for a full year with the captain and crew of each, covering all essential questions of operation and maintenance through extensive experimentation and practice.

Actually, there is a 40 ft wooden boat working out of Tent Bay, and the results of that boat's efforts should be evaluated before any others are tried. There have also been several experiments with larger boats (usually shrimpers) deploying a group of fishermen either to fish from the big boat or to carry out a mothership-type of operation. None of these has worked out because of the difficulties of fishermen working in groups.

Though the intermediate boat idea is the most reasonable way to increase catches, given the proper motivation and training of fishermen, it is considered that little constructive will result from this type of initiative unless some kind of comprehensive fisheries policy is also established. At present, though the Fisheries Department has wide responsibilities it has not the staff, the authority, nor the financial means to carry them out. CIDA has agreed to send a mission to Barbados to assist in the preparation of a national fisheries development plan and it would be desirable if this mission could be organized rather rapidly now, since it was first suggested over a year ago. Meanwhile, there is a natural tendency to postpone important decisions until after the plan has been prepared.

The proposed EEC-financed fishing port at Oistins should be a most useful development. Though it is not likely to stimulate increased production of fish from local waters, it could contribute greatly through organizing the systems of landing, handling and marketing of fish, and providing a proper repair facility for the boats. Perhaps as a result of such a project the Government will be stimulated to establish the appropriate fisheries infrastructure and to carry out the necessary supporting efforts that would increase the utility of the proposed port.

In recent years, there have been few requests for new boats, as fishermen do not have the collateral nor the guarantees necessary for financing. However, the Barbados Development Bank has recently made several loans for new boats of the normal 30 ft class. There are still several good naval carpenters on the island, but their methods are labour-intensive and wages are low, so they fail to attract youngsters into the trade. If the Government wishes to encourage the continuation of this key local industry and perhaps expand it into construction of the larger boats, if the idea proves feasible, some modernization of processes and tools will be required, as well as practical training of apprentices.

Thus, any evaluation of fisheries extension needs for Barbados must be postponed until the following questions can be answered:

(1) Will the Oistins port be built? If so, what will be its specific functions and in what areas will people need to be trained?

(2) Will the Government assign some priorities to fisheries development, will it come up with a workable plan of action (either on its own or together with CIDA), and will it create a viable fisheries department with qualified staff to coordinate all fisheries activities?

(3) Will some better market structures be set up (either through a new arrangement with the Government-owned International Seafoods, Ltd. or through the Oistins facility) and what types of marketing and distribution personnel would need to be trained?

(4) How feasible is the idea of an intermediate type of boat, considering all of the political and cultural stumbling blocks that must be worked out in order for the concept to succeed?

(5) Are there, indeed, sufficient stocks of under-exploited fishes in the waters around Barbados to warrant an increase of effort with the appropriate new fishing methods?

(6) Can the traditional boatbuilding industry be revitalized in the light of other probable developments in fisheries?

Given a clarification of these issues, extension activities in the following areas could be considered:

- (1) Fish handling, quality control, and processing.
- (2) Marketing and distribution of fish in the interior.
- (3) Construction of more wooden fishing boats (the 30 ft type, and possibly the proposed 40 ft).
- (4) Improved fishing techniques, including:
 - use of long lines, vertical long lines, shark lines and mechanical reels for dropoff fishing and possibly bottom gill netting in some areas;
 - techniques of manoeuvring the boat and setting gear on and near the shelf slope;
 - deep-sea methods for migratory pelagics such as drift netting, trolling, long lining;
 - maintenance and proper use of all equipment on board.
- (5) Marine inboard repair (the existing shop is short of trained mechanics).
- (6) Boat safety, including communications and range finder equipment, basic navigation, motor maintenance.
- (7) The training of at least two selected individuals in the above processes, to become the future fisheries extension agents (including training in how to help fishermen with loans and other financial matters).

The idea of deploying two or three wooden boats in the 40 ft range for a full year of experimental commercial fishing with a masterfisherman (supervising their activities) could be attempted before any of the organizational problems of the fishery are worked out. To initiate such an activity, a WECAF masterfisherman should first do a thorough appraisal of the possibilities. This would involve making some fishing trips with the 40 ft boat that is currently operating, talking with fishermen who fish on the shelf edge, and investigating the chances of obtaining suitable boats for the operation, either in Barbados or some nearby island.

(d) Dominica

Fisheries in Dominica are at a very primitive level. The industry cannot meet the existing demand for fish and substantial quantities are being imported, thus adding to the country's burden of a severely unfavourable balance of payments. The Government recognizes that an increase in the production of fish for local consumption would help to improve this situation and is anxious to try to develop the industry.

Another stated priority of the Government is dietary improvement, since the amount of animal protein in the average Dominican's diet is very low. Increased availability of fresh fish on the island would help to eliminate this deficiency.

In spite of the limited area of shelf available to Dominican fishermen, there are unexploited stocks of fish within easy access, given a few improvements in the boats and methods currently employed. According to fishermen, there are abundant supplies of high quality demersal fish all around the edges of the shelf (Caribbean red, queen, silk and blackfin snappers, plus assorted groupers). The "channel" fishery for tunas, dolphin and swordfish which migrate generally close to the shelf edges is active during the months of November to June, some resident Spanish mackerel also being caught during this time.

Neither of these fisheries is utilized very much by Dominicans, due to the unseaworthiness of their boats and the very elementary, worn, and inefficient gear they use. However, from all accounts fishermen from Guadeloupe (mainly Ile des Saintes and Marie Galante) and Martinique are regularly exploiting these stocks with large fast boats and sophisticated gear, such as trois maille (trammel nets), palangs (longlines), multi-hook handlines and mechanical reels, and big wire traps.

Other efforts carried out by the Dominican fishermen (with success primarily dependent upon conditions of the weather, the seas, and their gear) are:

(1) Banking - handlining (usually near the drop-off, but in only 10-25 fath of water; sometimes anchored but usually drifting) with three to five small hooks baited with sprat, titirí (fish larvae), fish flesh or fresh water shrimps - sites are chosen according to the taking of two marks (bearings) on shore, colour of the water, and sounding with the weighted line.

(2) Netting of flying fish (often done together with efforts to catch tuna, dolphin and mackerel) usually with nets of 5 cm mesh, one fath deep and under 40 fath long.

(3) Turtle netting (only a few fishermen on the island do this because turtles are getting scarce and nets are too expensive).

(4) Chumming for yellowtail snapper when they are present in schools around the reefs.

(5) Fishing with small bamboo traps (that last for three to five months) for small reef fishes.

(6) Spearfishing for small reef fishes and an occasional lobster.

(7) Trolling with spoons, lures or halfbeaks for pelagic fish.

(8) Fishing with a big, unbaited wire or bamboo fish trap often with palm thatching, set in water two to ten fathoms deep on open bottom for catching various schooling grunts (Haemulon), scad (Selar and Decapterus) and snapper (yellowtail, mahogany, lane and mutton).

(9) Fishing with wire traps on the shelf, baited with jacks, fresh water shrimp, flying fish, octopus. Most fishermen cannot afford the rope, buoys, and wire to make these traps which are also subject to loss by theft.

Dominicans complain that they cannot compete in their own waters with the French fishermen who have a well-organized fishery with Government support including a functional loan system, well-developed markets, good repair facilities, and well-stocked duty free supply stores. Whenever possible, the Dominicans sell their catch and purchase gear, spare parts and motors on the nearest neighbouring island.

During the first half of each year, when pelagic fishing is good, there are many times when the local markets around the landing areas become glutted and fishermen have to sell for very low prices. Meanwhile, people in villages away from the coast (and often even in Roseau) may go for weeks without being able to obtain any fish. There is no regular fish market on the island, except for a small, seldom used corner of the Roseau market, no ice plant, and no system for either wholesaling or retailing fish away from the landing area. Fish is grossly undersupplied most of the time and, although there are official maximum prices for fish, in these circumstances it is almost impossible to enforce them.

Some of the main existing constraints on fisheries development are:

(1) The high cost of gasoline at the principal landing areas. Currently, it must be taken by private transport at extra cost from Roseau or Portsmouth, and the rebate of EC\$ 0.25 on the price of EC\$ 2.74 per gal is not much of a benefit.

(2) The lack of safe landing places on the island. Many fishermen have lost their boats in storms, including seven that were hauled up on a new landing area at Vieille Case in 1976.

(3) The lack of Government assistance to provide protection for the fishermen in such important matters as insurance, social security, rescue at sea, theft of gear and the exclusion of foreign fishermen.

(4) The lack of a suitable system for providing loans to fishermen for boats, motors and gear.

(5) The lack of adequate facilities for the repair of outboard motors. At the Roseau repair shop they are poorly supplied with spare parts, poorly equipped with the proper tools, and the mechanics lack adequate training.

Given the current situation of impending independence in Dominica,

the preparation of a UNDP assisted development plan and the interest shown by senior Government officials in promoting artisanal fisheries, it seems that now would be the time to prepare an integrated programme of assistance and self-help for Dominica in fisheries. Although serious constraints on fisheries development exist, it must also be pointed out that there are certain other factors which indicate a rather more encouraging situation. The Dominica Fisheries Cooperative continues to struggle along, and could be a positive force if it had some support from the Government and some outside assistance. The CADEC Programme for forming fishing groups and financing small amounts of gear for members now has five small projects going - two in Portsmouth, one each in Anse de Mai, Bioche, and Grand Bay, for a total investment of about EC\$ 12 000 in grants and EC\$ 30 000 in loans - and has generated considerable enthusiasm among participating fishermen. There is a Peace Corps worker helping to set up outboard motor repair shops and train mechanics. There are also several good traditional plank boat craftsmen left (such as Nestor at Anse de Mai) who are eager to build more seaworthy boats rather than canoes (which cost less than half as much).

Meetings held by the consultant with fishermen in two villages on the east coast were well-attended and the participants demonstrated confidence that they could solve the problems if they had some assistance. Thus, taking all of these elements into account, it is considered, that a development programme of three to four years aimed at rejuvenating the artisanal fishery could yield some very positive results in Dominica. But, in order for this to happen, the Government would have to make a clear demonstration of interest, and show how it would commit some of its energies to the fisheries sector to support its own fishermen and the project's efforts.

The following is a rough outline of the personnel required and the activities that should be carried out, with an emphasis on fisheries extension and the organization of support systems:

(1) The participation of two WECAF consultants in fishery economics and practical artisanal fisheries development for one month each in the UNDP planning project (late 1978).

(2) A boatbuilder to work with existing local craftsmen in training young carpenters in the construction of 8-9 m plank boats for deep sea fishing; organization of the production of these boats at several shops around the island; and arrangements for the proper kinds of local timbers to be used.

(3) An expert in the economic and social organization of fishing groups, to help fishermen set up viable organizations in key communities and to support new cooperative programmes; to help the national cooperative to improve its services through bi-weekly delivery of discount gasoline, fishing supplies, repaired motors, ice, etc.; and to set up a workable organizational and accounting system on whatever level(s) required.

(4) A masterfisherman to train fishermen in the use of surface and bottom gill nets, surrounding nets, long lines (bottom, vertical and surface), hand crank reels, and general techniques of fishing the dropoff and the surface migratory species.

(5) A master outboard mechanic and repair shop organizer to carry out further training and organization of repair shops at Roseau, Saint Saveur and Calibishie.

(6) An expert in anchorage and beaching facilities to determine how to solve the problem of landing and protection of boats, especially at Vieille Case, Marigot, and Grand Bay.

(7) A marketing expert to determine the best system for distributing fish around the island; when, where and how much ice will be needed; what to do with excess catches during the flying fish season; how to retail fish in communities; and to set up a workable system and train the people to make it work.

(8) An assistant marketing expert to assist (7) above and to work out the best import procurement systems for fishing gear, supplies, gasoline, spare parts, motors, etc., for the fishing groups.

In all of these activities, emphasis should be placed on the practical training of local people in the field to carry out the desired activities. Dominicans are generally fast learners and good workers, if they are shown how to do a job properly and are provided with the infrastructure under which they can function effectively. Obviously, a definite commitment on the part of the Government is necessary before such an integrated and ambitious development effort can be carried out. The details of the programme could be laid out in the national plan now being prepared.

(e) Grenada

The fishermen of Grenada are highly skilled in a variety of artisanal methods, especially beach seines, circle netting for small schooling fishes, trolling, trapping (with pots generally made of roseau cane), handlining and diving. They work the shelf slopes more than any other fishermen of the Lesser Antilles using boats of less than 10 m, and catch both pelagic and deep-water demersal fishes with regularity, except when the seas are excessively rough. Though no accurate catch data is available, it appears that catch per effort in Grenada is high in comparison to other islands. This is due to the skill of the fishermen, the extensive areas of bottom habitat suitable for sustaining commercial species, and possibly higher primary productivity.

Also in contrast to most other islands, fresh fish is readily available, and the prices in retail markets all over Grenada average EC\$ 1.25-1.50/lb for quality fish, and EC\$ 0.10 apiece for flying fish. Grenada has traditionally exported fish in a sporadic and disorganized manner to Barbados, Martinique and Trinidad, primarily conch and lobster, plus some finfish, turtle and oysters. This trade has diminished in recent years due to increasing import duties in the other islands, the lack of proper holding and icing facilities in Grenada, and the depletion of the stocks of conch and lobster.

In April-June 1976, an exploratory fishing effort by Korean boats of 1.5 and 2.8 t in Grenadian waters produced some favourable results with overnight, bottom-set trammel nets, indicating that this might be a

method that could increase the catches of local fishermen. Though the Koreans caught as much as 378 lbs of commercial fishes in a set of six nets, and 320 lbs in one set of three nets, many of their 23 sets yielded considerably less. Grenadian fishermen could probably do quite well with monofilament gill nets set on the bottom in key areas (once the most productive places for this type of fishing are determined), although this much cheaper type of net is far beyond the means of most Grenadians. As in most other artisanal fishing areas in the WECAF region, Grenada could greatly benefit from extension training of fishermen at sea. However, to be effective, it must be accompanied with a Government scheme enabling fishermen to obtain loans for the purchase of requisite gear, and possibly slightly larger or better boats. At present, about the only tangible help the fisherman receives from the Government is the privilege of importing duty-free any kind of gear or motor for a fishing boat. It is almost impossible for him to get even a small loan.

The most promising activity at present on the fisheries scene in Grenada is the formation of several safety and rescue groups among the fishermen in various communities. Don Ives, the fishery officer (and a US Peace Corpsman) together with his three assistants have helped to organize meetings to set up these groups, and hope that some will lead to cooperatives that will provide economic and technical services as well. However, it seems difficult for fishermen's organizations to get the needed economic and legal support from the Government. The cooperatives' expert from ILO/DANIDA spent one full year trying to help organize various types of cooperatives in Grenada, but they all failed to get off the ground.

Many similar social and economic development initiatives in the artisanal fisheries sector have failed in Grenada in recent years. Since it is doubtful that the Government will be able to build the needed fisheries facilities, arrange for the financing of proper boats and equipment, organize the market system, or support the formation of fishermen's groups in the foreseeable future, it is not opportune to recommend an extension programme for Grenada. However, if a favourable climate for development occurs, there is much that could be done. Grenadian fishermen are good seamen and are very eager to learn ways to break away from their antiquated methods. The resources available to them probably could yield larger harvests without overfishing. Both local and regional markets could easily be developed at favourable prices for any conceivable increase in catch.

On the marketing side, the consultant discussed some interesting prospects with Messrs. Henry and Campbell of the FAO/CARDATS regional agricultural development project. It would seem feasible to establish some joint efforts for the marketing of fisheries and agricultural products produced by Grenada and/or some neighbouring countries, especially on a regional basis, aiming at increasing self-sufficiency in meats and agricultural produce through better-organized trade within the region. Such efforts might include a central planning and coordination agency, with facilities for handling and preserving produce. It is recommended that the WECAF economist discuss this idea further with the CARDATS staff in Grenada.

(f) St. Lucia

St. Lucia has an active artisanal fishery for both demersal and pelagic fishes. Nearly all of the fishermen operate out of 5-7 m narrow plank

canoes, and they go to sea in all kinds of weather, though activity is limited during parts of July through September, when the seas are very rough. They are skilled in the use of most basic artisanal fishing methods that have proven to work in the Caribbean. The main problems of the fishery are:

(1) the inadequacy of the traditional boats for open-sea fishing, resulting in losses of fishermen at sea, loss of time in waiting out bad weather in port, and inefficiency of effort at sea;

(2) the lack of a workable landing, marketing and distribution system for supplying the hungry local markets;

(3) difficulties in getting the fishery cooperatives off to a good start.

In spite of these problems, St. Lucia supplies its people with more fresh fish per caput than any other island in the Lesser Antilles, has one of the most active and effective fisheries departments, has the beginnings of a viable fishermen's organization through which numerous services could be provided, and is working on many practical developments for the future.

The Fisheries Management Unit, consisting of the fisheries officer, assistant fisheries officer, two extension agents, a Peace Corps marine biologist and nine data collectors based at the principal landing centres, provides more than adequate infrastructure and support for the carrying out of practical fishery development programmes. The staff works closely with other departments of the Ministry of Agriculture, Lands and Fisheries.

The Fisheries Unit is currently trying to improve the fishermen's working conditions at sea through the introduction of new boat types, safety devices, and loan schemes. The boat types being considered are the Barbadian flying fish boats with 15-20 HP inboard motors, the Trinidad pirogues with outboard motors, and a 40 ft fibreglass Prince Edward Island lobster boat.

A large fish handling and processing facility for Castries is now under final consideration by the Canadian International Development Agency (CIDA), and could be functional by 1980 if all works out as planned. The 40 ft boat mentioned above would be provided as part of this project. This facility would be the focal point around which the island's fish marketing and distribution could be organized, and could assure that no fish would be wasted or sold at unfair prices during periods of high production. Some examples of normal versus glut prices in EC\$ are:

<u>Species</u>	<u>Normal Price</u>	<u>Glut Price</u>
dolphin	1.50/lb	0.40/lb
kingfish	1.50/lb	0.30/lb
flying fish	3 for 1.00	30 for 1.00

Likewise, the new complex and the cooperatives could work together to effect an adequate supply of fish in all communities during lean times, by distributing fresh fish from one village to another, and by making available fish that was frozen or salt-dried when catches were excessive.

It has been suggested that a study should be carried out to appraise the needs for internal marketing improvements, and to determine how the proper communication, exchanges, and distribution could be carried out. Once the internal forces of production and marketing are organized through these proposed efforts, St. Lucia may even be in a position to sell some fish to neighbouring islands.

St. Lucia has the most extensive network of fishery cooperatives of the Caribbean islands. There are currently nine registered cooperatives, all belonging to the National Association of Fishermen's Cooperatives (NAFCOOP). However, most of them so far function only due to the fact that all members receive a rebate of EC\$ 0.57 - 0.42 in cash and 0.15 into a special emergency fund - on each gallon of gasoline purchased (23 percent of the normal price). Though the fisheries officer, his assistant, and the two extension agents spend a lot of their time organizing the fishermen and attending meetings, it is hard to build up interest on the part of fishermen. They feel that the cooperative is of no use to them, except in getting the cheaper gasoline. Generally, they do not yet understand the principles of collective purchasing, borrowing and marketing, and each is afraid that he will not get as much out of it as he puts in. Since about 90 percent of St. Lucia fishermen are illiterate, it is difficult to find appropriate individuals to handle the business end of the cooperative. Currently, most managerial duties are being handled by trusted volunteer professionals (primarily school teachers) of the communities.

Further assistance to the development of fishing cooperatives is provided through the office of the Registrar of Cooperatives. There are three Field Cooperative Officers as well as a cooperative expert from ILO-DANIDA (due to leave in February 1979). These people actually spend most of their time working with agricultural and credit cooperatives.

The Vieux Fort Co-op is the only one actually providing regular services to fishermen. There are two 4 t freezers, a retail store, a cold storage room, an ice-making plant, a fishing supplies store and an outboard motor repair shop. There is an isothermic truck that takes fresh fish to the Castries market during the principal fishing season (January-July). A new landing and filleting facility is planned there. The most difficult cooperative to get under way is the one in the capital, Castries. Fishermen there are divided into highly polarized small groups, and their social structure suffers many of the problems typical of urban areas.

St. Lucia has already done considerable thinking and acting about fisheries training. The Fisheries Officer has studied economics, fisheries, and business administration in Canada for five years. Three people have been trained in special international courses on the management of cooperatives. Three women flying fish cutters recently went over from Barbados to show St. Lucia women how to make fillets from flying fish for better marketing during the glut period. The Fisheries Unit plans to send three local boatbuilders to Trinidad to learn by practice how to build the more seaworthy Trinidad pirogues. On 9-10 August 1978, a local fisherman and three members of the Fisheries Unit participated in some fisheries explorations of the R/V OREGON II in local waters. It is hoped that several fishermen and the two extension workers will have some opportunities for training in modern fishing methods, fish finding, and basic stock assessment if the WECAF/CIDA sub-project becomes a reality.

The biggest training plans, which apparently will have an extension orientation, are associated with the proposed handling-processing complex to be financed by CIDA. Masterfishermen are intended to come from Canada with the new boats to train local fishermen at sea. Then a few local boatbuilders will go to Canada for specific training in the construction and repair of these boats, and three fishermen will be sent to learn more about their maintenance and the various fishing capabilities. There will also be on-the-job training of technicians and workers at the complex itself.

The only other type of fisheries extension activity that is needed at this time in St. Lucia is some assistance with the development of the cooperatives. The people responsables for the daily functioning of the local co-ops have virtually no experience (except the one at Vieux Fort). They require specific training in fish marketing and distribution, proper handling, accounting and bookkeeping, mediation of disputes, loan procurement and servicing, etc.

Two or three experts, with collective experience in the above-mentioned areas, should be provided to work for 3-6 months each in the field with the local cooperatives. In the process, they should also be training the two fisheries extensionists and two of the field agents from the Department of Cooperatives, for follow-up work and assistance in resolving specific problems in the future. The experts should review the NAFCOOP system with the Fisheries Unit and the Registrar of Cooperatives, to appraise its effectiveness and determine how it could improve its services. The Vieux Fort Co-op should also be appraised, and its strong points should be used as models, wherever applicable for other fishery cooperatives in the country.

(g) Trinidad and Tobago

The consultant spent only two days in Trinidad, primarily to look into the shark fishery. The result of this investigation is discussed in a separate report on shark fishing in the WECAF area and in a draft proposal for shark fishing assistance in Trinidad and Tobago. At the same time, the following general observations were made:

(1) Marketing

There is only one well-organized retail market in Trinidad (at Port of Spain). Fish is taken there in every type of vehicle imaginable, from all over the island, by buyers (intermediaries) or owners of fishing boats. Fishermen are hardly ever involved in the marketing process. August retail prices in \$TT were: shark meat 2.00, spanish mackerel 2.50, sea bass and croaker 1.00, snapper and kingfish 3.00, small fishes from shrimp trawls 0.75, small shrimps 1.00-1.50 and lean beef 2.50-3.00. A market engineering study of proposed wholesale and processing facilities was recently carried out by an FAO consultant.

(2) Landing Facilities

Much money has been invested by the Government throughout the country for the construction of landing facilities and storage lockers for fishermen. Most of these do not function adequately due to organizational problems. The typical pirogue boat used by most fishermen is well-constructed, easily

beached, seaworthy, and relatively inexpensive. This boat could contribute to the improvement of artisanal fisheries in several other countries in the region.

(3) Non-Government Institutes

IOCARIBE is concluding its activities in Trinidad and will probably be moving to Costa Rica soon.

The new Marine Institute, under Cruz Matos and Doon Ramsaroop has not started any fisheries research as yet. It soon will be functioning under the National Institute for Higher Education.

The Fisheries Training Institute is struggling to stay alive, but has very little local or regional support. The principal, Mr. Jordan, considers that the facilities and staff of the school would be appropriate for almost any type of small-scale fisheries training to be undertaken in the region. He says that all five of the project boats could be made available for such an effort, although they all have been poorly maintained and are currently in advanced states of disrepair. Mr. Jordan could set up decentralized training, with short courses on practical fisheries matters with an emphasis on applied work in the field, doing test production fishing and development of better artisanal gear at sea. It does not appear that the Institute is capable of offering such a practical course on the artisanal level. Other countries would most likely refuse to participate, even if the courses were tailored to their needs, because of their negative attitude toward the Institute and regional training in general.

Annex 1

CARIBBEAN DEVELOPMENT BANK - ANTIGUA PROPOSAL

Personnel Requirements and Management Proposal

The Project is expected to provide for the mobilization of technical support and management from within and outside the region for its implementation. Even though it may be desirable to have management of the Project under the control of nationals of Antigua, it may be necessary to depend on expertise from outside to supplement this at the outset. Management contracts, consultancy services and/or overseas technical assistance will, in all probability, be required during the first five (5) years of operation and have been budgeted for in the operation statement.

Skilled and semi-skilled labour will be required for operating, servicing and maintaining the plant and equipment, and unskilled labour for stevedoring and general portering. In an Appendix to the project are detailed the proposed functional organization of the company, job descriptions of administrative staff and the proposed salary and wage scale for all categories of employees.

Provision is made for employing a fisheries biologist to monitor and assess catches on a continuing basis, provide information on the status of the resource and make resource management recommendations as the need arises. However, this position could be waived if the Government of Antigua were to employ a Biologist in the Division of Fisheries.

Manpower Training

Trained personnel for servicing and operating the type of equipment that will be used on the project are not likely to be readily available in Antigua. It is expected that the technical schools in the region will produce increasing numbers of suitable graduates each year; also, that the suppliers of the equipment and machinery will train company personnel to operate and maintain them, that on-the-job training will be provided for plant workers and that there will be an on-going programme for training and upgrading of boat crews. Possible avenues for training are the Regional Fisheries Training and Development Institute, (Trinidad), Overseas Technical Assistance and a recruitment/apprenticeship programme that allows for on-the-job training. A system of promoting from within will also encourage young people to find employment in the Project.

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