

luxury or semi-luxury trade with the United States or Great Britain, particularly in view of the present considerable imports of protein food into the Caribbean area. Where the demand exists, however, its satisfaction provides undeniable dollar credits. It would also seem advisable to encourage in every way possible the domestic manufacture of costume jewelry and ornaments and the decoration of toilet accessories with turtle-shell, rather than shipping the raw shell; thus retaining a larger share of the revenue for the country of origin. This should appeal to foreign importers because of the lower cost of handicraft labor.

Potentialities of the Caribbean Fisheries and Recommendations for their Realization

CLARENCE P. IDYLL, *Marine Laboratory, University of Miami*
R. T. WHITELEATHER, *Branch of Commercial Fisheries,*
U.S. Fish and Wildlife Service

AND

GERALD V. HOWARD, *Food and Agriculture Organization of the United Nations*

THE FISHERIES RESOURCES of the Caribbean region are capable of being exploited to a greater extent. Larger landings can be made by opening new grounds, making a greater range of species available to the consumer, and taking better advantage of seasonal abundances of certain migratory species.

For the island areas of the Caribbean, such as the West Indies, where local fish production is below the level of demand, the problem of increasing the supply falls into two parts, those of production and distribution. In the Central American states, the problem of absorbing larger catches involves the creation of a demand for fish. Attention is focused on the problems of production and distribution in the areas which are in need of increased landings.

In areas where the level of production is too low to satisfy consumer demand, certain methods may be applied to increase production. The most practical way is the moderate improvement of existing fishing gear and methods, together with the gradual introduction of motors for the present fishing craft. The introduction of complex mechanized gear from other regions is not practical in most cases, but the use of simple inexpensive gears from other regions should increase production in many instances. Examples of such gears are the unjang,* used in conjunction with a seine, the tuck seine, trammel nets, lampara nets, various trolling lures, and long lines.

Before new fishing methods can be introduced and present gear improved, arrangements will have to be made to instruct the fishermen in the use of such gear. It is suggested that local fishermen should be employed by the governments as fishery officers to teach their fellows in the use of these improved methods. In each region there are fishermen whose level of industry and intelligence is sufficiently high that they would be suitable as instructors.

It is particularly desirable that local men with an intimate knowledge of the language and customs be employed for instruction work, rather than outside "experts" whose influence is transient. It is considered that the success of such a scheme of education depends largely on what might be termed "follow-up." Many schemes for increasing fisheries production in the Caribbean region have started with promise but have ultimately failed because native fishermen have

*An anchored clump of coconut leaves marked by a float, which serves to attract fish.

been allowed to drift back to their traditional and relatively inefficient methods when the "expert" who instructed them has left. Simple difficulties in handling of new or improved gear arise which could be solved immediately by those familiar with the gear but which often prove insurmountable to the local fishermen. A permanent adviser is necessary to act as trouble shooter and to travel between the fishing areas to keep alive the initial enthusiasm for the new methods. It is this follow-up which is considered to be the key to the success of such ventures.

The training of local fishery officers to carry on this instruction work is the first problem. There are two agencies who might assist in organizing and obtaining personnel to set up such training programs, the Caribbean Commission and the Food and Agriculture Organization of the United Nations (FAO). It is suggested that the governments concerned should approach these organizations, requesting such assistance.

With respect to the training requirements, these programs do not appear to require large amounts of money, and the individual governments concerned should not have difficulty in financing them. The international organizations suggested could assist in obtaining trained personnel to instruct the selected native fishermen to be trained as fishery officers and in organizing training centers in the region or in an outside country.

An additional recommendation toward increasing production is that the governments should be prepared to grant loans or credits to individual fishermen or groups to finance the purchase of gear and equipment. The introduction of better craft and gear involves an outlay of capital beyond the means of most ordinary fishermen, and some assistance in this connection appears necessary.

In order to absorb larger catches, even in the areas where there is a demand for increased amounts of fish, there are problems associated with marketing and distribution which must be solved. The greatest difficulty is encountered in getting fishery products to the consumer in a condition suitable for consumption and at a price that he can afford to pay. This is particularly true for inland communities. In addition, at times of seasonal abundances of certain species, it is often impossible to dispose of the increased catches.

Landing centers are required which are provided with wharves, sanitary markets and moderate storage facilities. Government assistance is needed to secure these.

In order to facilitate distribution, simple and inexpensive methods of preservation are required. Traditionally, the people of the island areas of the Caribbean have consumed large quantities of imported salted fish. The existing demand for saltfish products, and the simplicity and inexpensive nature of preserving fish by salting, suggests this method should be more widely employed. Technological research has shown methods which can be employed for cheap and easy production of good saltfish products. Many local species such as sharks, sardines and jewfish are suitable for salting. With proper handling, these products could replace, or at least supplement, salt cod which is now imported at great cost.

The problem is to instruct the people in the practice of suitable methods of salting fish. Again, it is suggested that local men especially trained for this purpose be employed to train others. Once more, a continuous follow-up is emphasized for the success of such a project, since experience has shown that new methods will be abandoned if continuous assistance and encouragement is not provided.

As local men will first have to be trained in salting practices before they

are able to instruct their fellows, it is again suggested that the governments request the assistance of the Food and Agriculture Organization or the Caribbean Commission in establishing the initial training programs. These organizations could probably secure or provide the initial personnel to put such projects into effect. The training of the fisheries officers should preferably take place in the Caribbean area itself.

Other preservation methods, such as smoking and drying, should be given consideration. Freezing has also been suggested, but it is not considered practical at the present time as most Caribbean countries are not capable of supplying the capital necessary for elaborate refrigeration plants. However, additional ice making plants should be constructed in order that ice may be more widely used, both in the storage and transportation of fish.

Since the main fisheries problems involve the training of practical fishermen and fishery technologists, it is suggested that biological research should be limited, for the present, to the collection of catch statistics to evaluate productivity and to detect trends of abundance. Formal fishery research involving studies of life histories and ecological relationships, as well as the exploration and development of offshore fisheries for tuna and other pelagic species, might best be entrusted to international organizations or private institutes or laboratories who could undertake to do this type of work for all the countries jointly. It is not felt that the fisheries resources justify individual governments each conducting such work. Once again, such organizations as FAO and the Caribbean Commission or competently staffed private laboratories are indicated as agencies best able to initiate and coordinate such programs. The governments concerned should consider approaching such organizations for assistance.

In summary, it is suggested that the development of the fisheries resources of the Caribbean can best be accomplished by simple and practical methods which involve the use of local people trained for the purpose, rather than foreign experts whose influence is transient. The importance of follow-up in all phases is emphasized as being essential to success. Government support is necessary to provide capital both for loans to individual fishermen or groups to finance the purchase of gear and equipment, and for the payment of specialists to train local fishery officers in the initial phases.

The original technical assistance might be provided by the Food and Agriculture Organization, the Caribbean Commission, or through cooperative agreements between governments concerned in the Caribbean region.

Potentialities of the Gulf of Mexico Fisheries and Recommendations for their Realization

J. L. BAUGHMAN

Chief Marine Biologist, Texas Game, Fish and Oyster Commission

THE FISHERIES of the Gulf of Mexico fall into two classes, the littoral or shore fisheries, generally carried on in the territorial waters of the various states, and the offshore fishery, most of which is in international waters.

The most important species of the littoral zone and their relative poundage for the last year of complete record (1945) are shown in Table 1.