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Fisheries Problems in the West Indies

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THE GENERAL DEVELOPMENT of the fisheries in the Caribbean has been discussed by the Institute at previous sessions. At the Ninth Annual Session (1956) Wiles presented a paper on this subject and at the Tenth Annual Session (1957), the progress during the decade 1948-1957 was reviewed in four special papers, covering the fields of fisheries technology, economics, education and biology. More recently, the General Secretariat of the Caribbean Commission prepared a review of "Caribbean Fisheries Development, 1955-1959," as Document No. 1 of the Third Caribbean Fisheries Seminar, which was held under the auspices of the Commission in St. Martin, Netherlands Antilles, from 3-9 July, 1959 (Anon. 1959a).

Resources

MARINE: It is generally recognized that, at present, the waters of the Caribbean are not overfished and that, under the stimulus of various fishery development schemes, larger catches are possible and are to be expected. Close inshore grounds, fished for many decades by thousands of small craft, as well as the spiny lobster and turtle fisheries may be exceptions to this. On the other hand, off-shore banks and cays have barely begun to be exploited and, in the almost complete absence of systematic exploratory fishing in the area, their potentials are unknown. Special attention has recently been paid to the possibilities of exploiting the tuna migrations in the Eastern Caribbean and long-lining experiments are being reported from an increasing number of territories. The shrimp resources of the Guiana continental shelf, adjacent to the Caribbean, are receiving increased attention by commercial interests and may require conservation measures before long. Through the good offices of the Caribbean Conservation Association, it has been possible to procure shipments of green turtle hatchlings from their hatchery at Tortuguero (Costa Rica) and liberate them on protected beaches of some Eastern Caribbean islands in the fall of 1959. It is expected that more islands will take advantage of this service next year.

It is clear that, as long as no means are provided to carry out systematic, scientific exploration, especially of the Eastern Caribbean, progress in "deep sea fishing" will be slow and hazardous, though not impossible. It is also evident that such exploration could only be undertaken on a regional, international basis, since none of the territories could afford such long term research on its own, and few, if any, have any real research vessels or trained personnel. The marine biological research laboratories of the region, which have recently

formed an Association of Island Marine Laboratories, and include institutes in the Bahamas, Barbados, Bermuda, Curaçao, Cuba, Jamaica and Puerto Rico, are primarily interested in general marine biological research and teaching, and only incidentally concern themselves with fisheries biology.

Efforts of the Caribbean Commission to list the fish species of commercial importance to the Caribbean territories are gradually bearing fruit. Such lists have been prepared recently for Puerto Rican waters, the French West Indies, French Guiana, the Netherlands Antilles, Surinam and Florida. The Report of the Third Caribbean Fisheries Seminar (Anon. 1959b) contains (Appendix IV) the local and scientific names of the most important commercial fishes of some of the West Indies Territories, including Antigua, Barbados, Jamaica, St. Kitts and Trinidad, as well as an extensive list of the fishes of Puerto Rico.

The Seminar also prepared a list of experts willing to undertake the work of identifying and classifying fishes.

All efforts should be made to interest one of the organizations active in giving technical assistance to less developed countries, such as the United Nations Technical Assistance Board (Special Fund) which has just granted considerable funds for fisheries research to Peru and Ecuador, the International Cooperation Administration (U.S.A.), UNESCO and others in assisting this essential project of exploring the marine fishery resources of the Caribbean.

FRESH AND BRACKISH WATER: Considerable progress has been made in some of the larger islands, e.g. Jamaica and Trinidad, in the field of fish culture research and fish farming. British Guiana and Surinam, adjacent to the Caribbean area, are also in the forefront of development of their inland water fishery resources. Monosex culture of *Tilapia mossambica* in fish ponds, concrete tanks and ordinary farm ponds has proven most successful and release of specimens, accidentally or by stocking, in rivers, reservoirs, swamps and brackish water lagoons has led to the establishment of mixed tilapia populations which, controlled by natural predators, are producing fish of marketable size in many localities.

Through systematic extension work, the Fisheries Division of Jamaica, for example, has stocked with *Tilapia* over 400 farm ponds, covering almost 1,000 acres, and *Tilapia* are now sold by local vendors and in local fish markets. In Trinidad, the water reservoirs of some of the oil companies and large estates have been stocked with *Tilapia* and are yielding good crops.

Fish culture research is continuing, aimed at breeding slow-maturing, fast-growing *Tilapia* and at determining the best pond fertilization and harvesting practices and the most economical size of fish to produce. Systematic surveys of the fresh waters are contemplated in some of the territories.

Production

Fishery development schemes in operation in all territories have, in the first instance, concerned themselves with increasing the catches of fish from local resources, in view of the great demand for fish in the diet of the rapidly increasing population and the heavy drain on the economic resources of the islands through the importation of large amounts of processed fish to meet this demand. **BOATS:** The major effort, so far, has been in the field of boat mechanization and introduction of new boat designs. Where local boats, such as the dug-out canoes of Jamaica and the pirogues of Trinidad, were unsuitable for inboard motors, the installation of outboard motors has made greatest progress; thus, in mid-1959, Trinidad and Tobago had some 800 outboard-driven boats (without

Government loan assistance), 62% of its fishing fleet being motorized (including 126 inboard motors), as against 6% in 1946. Jamaica, by mid-1959, had some 450 motorized boats, about 430 using outboard motors procured through a government loan scheme. This is about 16% of the total fishing fleet. Barbados, on the other hand, greatly "assisted" by hurricane Janet which caused considerable losses to the fishing fleet in 1955, turned rapidly from the prevailing, not too seaworthy, planked sailing boats, to a new type of mechanized launch with inboard diesel engine. With extra rehabilitation funds being made available through a government loan scheme, it increased the number of such boats, mostly in the 21 to 24 feet length and 10 to 20 h.p. class, from 32 launches in 1955 to some 415 by mid-1959. This represents 100 per cent of the whole fishing fleet, as compared with 5 per cent in 1953. Antigua, on a smaller scale, has also provided some 50, i.e. 80 per cent, of its larger fishing boats with inboard diesels, under a government loan scheme. The smaller islands have all started similar programs.

It must be realized, of course, that the mechanization of dug-outs and pirogues does not produce more seaworthy boats as such, does not increase their range of action very much, nor does it enable such boats to carry more gear, more fish, nor ice boxes. While such boats will serve a useful purpose under certain conditions, for a long time to come, the necessity of introducing larger, even decked boats, as an integral part of fisheries development, is under active consideration in most of the islands. A recent visit to Jamaica, Antigua, Dominica, Barbados, St. Lucia, Grenada and Trinidad by the FAO Naval Architect to advise on the design of new boats suitable to each unit and its potential fishing methods, and on the improvement of the design and of the propeller selection of present boats, as well as the great interest shown on the subject of design and mechanization at the recent Caribbean Fisheries Seminar indicate the awareness of fisheries administrations in these territories of these needs.

Complementary to the government loan schemes for engines, and for boats in some cases, the fisheries divisions in Jamaica, Barbados and Antigua have established shops for repairing, servicing and training, with excellent results. **FISHING GEAR AND METHODS:** It has been stated many times before that the fishing boat is merely a "platform" from which the fishing gear is operated, and that the type of fishing gear to be used determines the type of boat required. Thus, apart from replacing sail and oar by engine propulsion, the introduction of new and more intensive fishing methods than the traditional pot fishing and hand-lining ("banking") in itself calls for improved boats. In addition to the task of increasing the food supply of the population from local resources, the chief aim of fishery development schemes is to increase the productive capacity of the individual fishermen and to better their living standards. Thus, the use of more effective methods of catching fish must be considered as one of the foremost means of achieving this goal. Rough estimates of the average annual production per fisherman, made by an FAO technical assistance expert, range from 0.3 tons in the least productive territory to 2.3 tons in the best (average 0.87 tons) (Salmon 1958). It must be pointed out that such figures include both full time and part time fishermen, the latter being in the majority in some of the territories. They nevertheless reflect the low productivity of the fishermen in some of the territories due to the inefficient fishing methods in common use and to the primitive boat types still in operation, which are limited in their annual

number of fishing days by weather, and which are unable to follow fish seasonally into deeper, off-shore waters.

The fishery officers in all territories either have been or are being provided with suitable boats to try out and demonstrate the use of new types of gear and gear materials and to train fishermen in their use. As mentioned previously, "miniature" tuna long-lines are being tried out at various depths, e.g. in Puerto Rico, Antigua, Barbados, Grenada, etc. Gill net fishing for flying fish, so successfully introduced and universally adopted in Barbados, is being demonstrated in other islands, including Grenada and Dominica. Although in some territories, especially in the Leeward and Windward groups, small-meshed nets and seines are still laboriously hand-knit from sewing cotton thread, the use of machine-knit webbing is becoming more common and, with the introduction of synthetic fibre netting and lines through government experimental fishing demonstrations, modern nets are being adopted at an increasing rate. In many territories, the Fishery Divisions themselves are providing a sales service to fishermen to help in introducing new gear materials until commercial interests or fishermen's cooperative sales organizations are willing to undertake this. In spite of some initial drawbacks with gill nets, such as the difficulty of removing some types of fish from the meshes and the extensive damage done to this expensive gear by sharks in some localities, the advantages of the synthetic fibre materials are fully recognized. This is not surprising, since the life of natural fibres in these tropical waters is rather short, especially, as is often the case, when no net and twine preservatives are used.

New types of gear are being demonstrated, such as high-speed reels for red snapper fishing, multiple trolling gear, floating and bottom long lines. Although some of the fishing operations, including pot fishing, are carried out at considerable depths, the use of power gurdies, or even hand winches, is almost unknown as yet. It should be remembered that the boat mechanization program should not stop at mechanizing the boat propulsion, but should be extended to the mechanization of the fishing operation itself, thus increasing manifold the number of gear units that can be hauled in a given time and, at the same time, making the strenuous work of hauling pots and long lines from great depths, or hauling gillnets and seines hundreds of fathoms in length, less back-breaking.

It would be of great interest also to test, through well planned experimental fishing, the possibilities of using submerged electric lights to attract fish when seine fishing on dark nights, a method widely and successfully practiced in many parts of the world.

On the whole, it should be the aim of any fishing community to avoid dependence on one or two fishing methods only, thus limiting the scope both seasonally, geographically and species-wise of the fish resources they are able to exploit. It has been said, not without reason, that the most prosperous fishing villages in the West Indies, or elsewhere, are those with the widest range of gear, so that all the fishes within reach, at one season or another, can be harvested.

So far, only some of the experimental fishing boats of the fishery officers have been provided with modern fish finding instruments. The successful introduction, however, of more intensive fishing methods will depend to a large extent on the ability to locate fish schools in mid-water and near the bottom of the fishing grounds.

Fish Handling, Processing and Marketing

In a recent issue (Sept./Oct. 1959) of the "West Indies Fisheries Bulletin," the author has discussed in detail the problems of handling and distributing fresh fish in the West Indies (Hess 1959).

As mentioned earlier, fisheries development schemes have, in the past, put the main emphasis on increasing the production of fish, without always giving due consideration to the fact that increased landings create problems of their own in the holding, transporting and marketing of these very perishable products. What may have been adequate when most fish were sold directly out of the boat to the consumer, at the beach, is no longer sufficient when increased catches must be carried longer distances from fishing grounds to landing places and must reach many new inland consuming centers and urban markets. Thus, as production increases there is need for improving the facilities and methods of handling the fish in the boats, at points of landing and during transport, distribution and storage on land. There is little sense in catching more fish, unless they reach the consumer in good merchantable condition. The amount of fish available to the consumer can and should be increased, above all, by eliminating all waste caused by fish spoilage. The main principles of preventing spoilage must be dinned again and again into all personnel handling fish, from the fisherman to the retailer: speed of handling, coolness and cleanliness. Any prejudice that may still exist in some quarters against iced fish must be overcome and the need for immediate and rapid cooling of the fish to as near 31 degrees F. as possible, and their maintenance at this temperature throughout the distribution chain, must be thoroughly understood by all.

When better handling and distribution methods and facilities assure that the consumer demand for fresh fish by both urban and inland rural markets, many of which have hardly been touched, are really and regularly satisfied, the problems of short seasonal and often quite local glut landings will have been minimized. It is strongly felt that the main efforts in most of these territories should be made in this direction, i.e. the development of the market outlets for fish as fresh (chilled) fish. It is believed that this can be achieved with less capital outlay (for costly freezing and processing plants) and bring better returns to the fishermen. The main requirements are: liberal ice supplies; suitable, rapid transport facilities by land and by sea; sufficient cool storage space at marketing centers; and an educational campaign among all who handle fresh fish.

With few exceptions, once the fresh fish markets have been fully developed, no real surpluses exist in these territories, to support any fish processing or fishmeal plants. It is true that with the introduction of new types of gear, e.g. otter trawls, new species of fish may be landed which at first may not be readily merchantable and for which new markets will have to be found.

Export possibilities appear to be limited to a few special products, such as spiny lobsters (frozen tails or frozen whole), shrimps (frozen), green turtles, and tuna (plans for a tuna cannery in Trinidad are in an advanced stage), with the U.S.A. as the main market.

While in most territories retail market buildings for fish are gradually being provided by Governments at the larger landing centers and in consuming centers, usually equipped with concrete slabs and running water, and occasionally with cold rooms for over-night storage of local surpluses, unfortunately few territories have any fish marketing organization. The result is that the fishermen are usually at the mercy of local hucksters and maybe a few outside buyers,

except in large centers where wholesale marketing by auction may take place.

If an adequate daily fish marketing intelligence service were available in each island, informing a central office of the landings at the main fishing centers each day, the center could direct the orderly distribution of the landings towards all markets, to assure that all are adequately supplied at minimum effort and transportation cost, and by the most direct routes to insure rapid delivery and preservation of quality. Whether such a marketing intelligence center should be operated by Government, by a fishermen's co-operative union, or a territory-wide fisheries association, is outside the subject of this paper.

Fisheries Statistics

In most of the territories, a system of registration of all fishing craft and gear, usually recording size and value, use of inboard or outboard motors, is established. It is usually only possible to collect accurate and complete information where registration is compulsory by ordinance. Trade statistics to indicate the country's imports and exports of fishery products are generally collected by customs and commerce departments of governments, and such statistics are the most complete and detailed ones available, as a rule. On the other hand, due to the large number of landing points and markets, the collection of catch and market statistics has proven very difficult, and no accurate figures are available for any of the territories. Estimates are in some cases based on the collection of daily market statistics in the major markets, as is done in Trinidad, with indications as to the origin of each lot entering the market; whereas in other territories, landing statistics are collected directly at the major beaches. Since in most cases only about 50 per cent of the total landings are reached by these systems, a properly organized and easily applicable standard system of sampling for collection of catch statistics should be provided.

In any case, the current common practice of collection of statistics only during "office" or duty hours of the market clerks, which bear no relation, as a rule, to the hours when the fish are actually landed, should be changed. Fishing operations cannot be carried out according to government office hours; neither should the collection of fisheries catch and market statistics.

The Caribbean Commission is endeavoring to establish a list of commercial fish species for which catch statistics should be kept throughout the area.

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