

FRIDAY, NOVEMBER 16, 1962

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## **Developing an Offshore Fishery in Jamaica**

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### **Abstract**

In order to exploit some of the vast untouched banks south of Jamaica the Government acquired a 43-foot modified Florida shrimp trawler to conduct exploratory and experimental fishing. The economy and performance of this vessel for multi-purpose operations have been tested during the past year with encouraging results.

### **INTRODUCTION**

OF JAMAICA'S 1.6 MILLION POPULATION, some 7,000 are fishermen. A good percentage of these fish only part time. Almost all the 3,000 small fishing boats are dug-out canoes hewn from cottonwood trees. These boats catch an estimated 20 million pounds of fish annually. About 90% of this is taken from the 1,100 square miles of Jamaica's continental shelf, and only ten%, or 2 million pounds, from the offshore banks covering about four times this area, only a small part of which is presently being exploited.

### **Activities of the Jamaica Government**

Prior to 1950, the government took no active interest in the fishing industry. There was no Fisheries Department to carry out development projects and private investment in the industry was negligible. Consequently, little was done to raise the productivity of these fishermen or to improve their socio-economic condition.

Early in 1950, the Fisheries Division was created within the Ministry of Agriculture and Lands. During its first ten years, some notable achievements were made in the development of both inland and marine fisheries. One achievement was the construction of an experimental station for freshwater fish culture which was stocked with African perch (*Tilapia mossambica*). Another was the development of a system of monosex culture to obtain fish of marketable size. A third was the stocking of close to 500 privately owned ponds and 10,000 acres of swampland with Tilapia. Another example of achievement was the acquisition of beaches for fishermen by the Beach Control Authority. With security of tenure established, the Fisheries Division erected gear sheds and community halls, provided fresh water, and improved landing facilities. An extension service was established within the Division to train fishermen in the use of improved fishing equipment.

Perhaps the most notable achievement in the development of marine fisheries was a scheme implemented in 1956 to mechanize local canoes with outboard motors. This well planned and highly successful project provides long-term credit to fishermen for the purchase of outboard engines. The Division maintains a servicing department to repair motors, instruct fishermen on the operation and maintenance of engines, and to train young men from various parts of the island as outboard mechanics. The Division also maintains fuel stations at the larger fishing beaches where duty-free, pre-mixed gasoline is sold. Fishermen still paying for their engines are charged one shilling (U.S. \$0.14) extra per gallon. This is credited to their accounts, assists them in repaying their loans, yet still gives them fuel at less than the commercial price.

This mechanization project has been continually expanding since it began. To the end of June, 1962, a total of 812 outboard motors had been sold to fishermen. This represents a total expenditure of £100,090 (\$280,000), of which £92,000 (\$257,600) has been recovered. During this same period, the division sold 1.3 million gallons of duty-free gasoline. This represents a savings to fishermen of £84,000 (\$235,200).

Unfortunately, no accurate catch statistics are available to measure the cumulative effect of these development projects on the industry. Undoubtedly the productivity of fishermen has been considerably increased by increased range and fishing time of canoes and more diversified operations.

A substantial amount of private and government capital has been invested in the industry during the past few years. There are, for example, several transports up to 85 feet long now buying fish from canoe fishermen based at the offshore Cays. A concrete wharf was constructed to facilitate these larger boats. A modern cold storage and ice-making plant has been built in Kingston. Numerous small cold storages and retail fish shops have been established in the corporate area.

The government realized that further development of the marine fisheries would require the introduction of larger fishing vessels and improved fishing techniques to exploit some of the vast offshore banks as well as the deep waters, surrounding Jamaica.

Several attempts were made by the Fisheries Division and the Jamaica Co-operative Union to introduce larger fishing boats. In 1955, the Fisheries Division obtained a 30-foot, open lifeboat type vessel powered by a 20 hp. Diesel engine for experimental fishing. The Jamaica Co-operative Union purchased two 30-foot Canadian Cape Island type fishing boats powered by small kerosene engines. These attempts at introducing an improved type fishing vessel with the view to encouraging their use in the industry were unsuccessful. It is felt that this was primarily because these boats neither had much advantage over the local canoe, nor were they suitable to operate offshore for several days at a time.

#### ***FAO Technical Assistance***

At the government's request, the Food and Agriculture Organization of the United Nations (FAO) provided the services of Mr. Jan-Olof Traung, Chief of the Fishing Boat Section, to advise the government on matters pertaining to further development of marine fisheries, particularly on boat design. During his visit, Mr. Traung observed a definite need for introducing a suitable fishing vessel capable of operating offshore for prolonged periods and the use of improved fishing techniques. He submitted detailed plans for a multi-purpose

prototype vessel to carry out exploratory and experimental work to determine the economic feasibility of an offshore operation. To implement his recommendations, the writer was assigned to Jamaica in October, 1960, under FAO's Expanded Program of Technical Assistance (EPTA).

As no suitable offshore vessel was immediately available in Jamaica and construction of the prototype vessel had not yet been started, the government agreed to provide funds for the purchase of a suitable used boat from abroad. The writer was requested to locate and purchase a vessel on behalf of the government. In April, 1961, a 43-foot modified shrimp trawler, the BLUE FIN, was purchased in Tarpon Springs and sailed to Jamaica. This vessel, although similar to the typical Gulf shrimp boats, differs in that it is not flush-decked, but is designed with a raised forecastle head and less freeboard at the main deck. This lower freeboard is advantageous for multi-purpose work, especially trolling, handlining, and potfishing.

As the BLUE FIN was the first vessel of its type to conduct offshore fishing operations from Jamaica, the main purpose of our project during the first several months was to train a crew and various members of the Fisheries staff in the operation and maintenance of the boat, to familiarize groups of local fishermen in this type of offshore operation, and to conduct exploratory fishing with troll and handline gear on the numerous offshore banks south and east of Jamaica. Virtually no trolling had been done previously on these banks and we were interested in obtaining some information on the abundance of tuna and other pelagic species and in testing the effectiveness of surface multiple trolling. To conduct these tests and to demonstrate commercial-type tuna trolling, the BLUE FIN was outfitted similarly to the albacore trollers which operate off the west coast of the United States.

**EXPLORATORY FISHING:** During the period from April to December, 1961, fishing activities were conducted on all offshore banks within 150 miles of Kingston. Each trip lasted four to seven days. Trolling was done over the banks, along the edges, and in deep water when surface schools were sighted. Handlines were occasionally tried during the day, but for the most part, this operation was conducted at night. This was an attempt to work up schools of yellowtail snapper, reportedly in abundance on the offshore banks. Surface schools of tuna were sighted at all the banks throughout the year, but they appeared more in abundance from March to December. Blackfin tuna seemed to be more in abundance than other tuna species. More than 50% of our total troll-caught fish were blackfin weighing five to ten pounds. Other tuna species caught were an occasional yellowfin of 30 to 40 pounds and skipjack (*Katsuwamus pelamis*).

Trolling results were encouraging, although catches varied considerably from day to day and trip to trip. For example, on one five-day trip to Albatross Bank, 3,500 pounds of fish were caught, almost entirely with troll lines. Although handlining was attempted each night, very few fish were caught. On the other hand, over 3,700 pounds of fish were landed on a five-day trip to Walton Bank, virtually all caught with handlines. It is therefore doubtful on the basis of our present knowledge if boats of this size could operate economically, solely by trolling, but a combined operation which would include trolling, handlining, and potfishing would be economically feasible.

Our best trolling results were obtained while fishing along and close to the edge of the banks. It was interesting to note that the current direction seemed to influence greatly the movements of migratory fish found near these banks.

It was found, for example, that trolling results were almost invariably good when fishing along the edge toward which the current was running. On the opposite edge, fishing was poor. The reason for this may be, in part, that feed is brought to the surface by the mass of water striking the almost vertical edge of the bank. On numerous occasions tuna schools were seen feeding on unidentified fry which remained near the edge of the banks.

Practically no fish were taken by trolling in the deep waters off the south and east of Jamaica and very few schools of fish were sighted away from the banks. The best tuna, wahoo, and kingfish catches were along the bank edges. Barracuda, rainbow runner, and jack cravelle were found over the bank. Because the best results were obtained while following the bank edge, the depth recorder proved invaluable during trolling. On several occasions we found that by setting two or three flagpoles along a particular edge, we could use them as markers so that it was not necessary to use the depth recorder continually. One of the main problems encountered while trolling and handlining was damage and fish loss caused by sharks. There were days when as many as 50% of the fish striking the troll lines were lost or damaged before they could be pulled aboard. To partially overcome this menace, troll lines were shortened as much as possible so fish could be pulled in faster.

It is unlikely that bottom-fishing at these banks will be limited to pot fishing and handlining for quite some time due to rough bottom conditions and the abundance of shark, which restrict the use of other fishing methods such as trawls, set lines, and set nets. Handlines and fishpots are traditional gear used in Jamaica and any other form of bottom-fishing introduced would have to be tested for efficiency.

While consistently good catches were experienced with pots, handlining success varied. Two types of handlining showed considerable promise: night fishing for yellow tail snapper, and fishing the deep waters along the edge for red and black snapper. Strong currents frequently hampered handline fishing. But under favorable conditions, and generally during dark nights, up to 1,000 pounds of yellowtail snapper were taken during a night's fishing. Best results were obtained when anchored within a mile of the edge in 17 to 20 fathoms.

Off these banks, the water is very deep. Most bank edges are practically vertical, making it almost impossible to bottom-fish along them. However, we found some sections of the edge steeply sloped, and by anchoring near the edge we could position the boat over depths of 25 to 100 fathoms by adjusting the scope on the anchor line. On one five-day trip when this system of handline fishing was tested, catches of red and black snapper averaged close to 800 pounds per day.

**ECONOMIC STUDY OF BLUE FIN:** Considering the encouraging results obtained during the exploratory work, we decided to use commercial methods to assess the economic feasibility of an offshore operation with boats the size of BLUE FIN. Diversified operations with a five-man crew were carried out at Pedro Bank in areas not currently being exploited. We used trolling gear, 21 local-type fishpots, and handlines. Our principal objective was to determine the potential earning power of boat and crew by a correlation of catch results, average price of fish landed in Kingston, and operational costs of the boat. This economic study was conducted over a period of approximately two months, during which time six trips of four to seven days each were made. It must be emphasized that the boat was not operated on a strictly commercial basis. Since it was a

government vessel, the catch was government property, and the crew were paid salaries instead of sharing in the catch. Therefore, the incentive factor, so necessary in any commercial fishing venture, was missing and maximum effort was not put forth. It is only natural that fishermen earning the same amount no matter how much fish is caught will not put forth the same effort as fishermen who share in the profits of the catch. Nevertheless, an analysis of the results of this survey shows that this sort of offshore operation could be an economic proposition.

The daily average catch per trip varied from 365 pounds to 820 pounds with an overall daily average of 535 pounds. Overall catch percentages showed that 38% was caught trolling, 21% handlining, and 41% by fishpots. Therefore, considering that 79% of the total catch during this survey was caught by trolling and potfishing during daylight hours, it seems likely that had more effort been given to night handlining, the daily average catch rate could have been substantially increased.

Fresh fish landed in Kingston is generally sold in three grades, as follows: trash fish (includes parrotfish, doctorfish, grunts) 6d (\$.07) per pound; common fish (includes grouper, tuna, barracuda, dolphin, amberjack) 1/8 (\$.23) per pound; quality fish (includes red snapper, mackerel, kingfish, jacks, and rainbow runner) 2/2 (\$.30) per pound.

For the purpose of assessing the potential earnings of boat and crew, an overall average price for fish landed in Kingston of 1/10 (\$.26) was reached by correlating current prices to the percentage of different grades of fish delivered during the survey. It was calculated that the gross earnings per fishing day, based on a daily average catch rate of 535 pounds, would be £49.00 (\$137.20). Operating expenses, which included ice, fuel, bait, and food, averaged out to £6.85 (\$18.00) per fishing day.

There is no standard system by which commercial fishing vessels share profits between boat owner and crew. This varies with the type of fishing, kinds of gear used, size of boat, and many other factors. In attempting to determine the potential earnings of boat and crew, it was necessary to base calculations on a hypothetical system of sharing the catch. It was assumed that the boat's share would be one-third of gross earnings with the balance shared by the crew after deducting operating expenses.

On this basis, it was calculated that the boat's share per fishing day would amount to £16.68 (\$45.80) and by further deducting the daily operating expenses from the gross daily earnings, a balance of £26.10 (\$73.00) remains to be shared by the five crew members, or £5.42 (\$14.60) to each fisherman per fishing day. If this same average were maintained throughout the year and the boat fished for 200 days during the year, the annual gross earnings to the boat would be about £3,266 (\$9,145) and each fisherman's share would be roughly £1,040 (\$2,912) annually.

I believe that while fishermen in more developed countries would consider these earnings very modest, in Jamaica, where the annual per capita income is only £130 (\$359), they would be substantially greater than fishermen's present earnings.

It is realized, of course, that the results obtained during this short period can hardly be considered as conclusive, but the combined results of the first year's operation with the boat gives good indication that boats of the BLUE FIN class could operate profitably.

As regards the few larger vessels, two privately-owned fishing boats recently began commercial offshore operations. As predicted, their catches have been somewhat greater than those obtained during our survey. One of these boats is a 60-foot former English trawler; the other, a 55-foot ex-Florida shrimp boat. In addition, a 40-foot boat, designed along the lines of BLUE FIN, is being built by private interests. One local Fishermen's Cooperative group is extremely interested in the offshore operation and has raised £2,000 (\$5,600) toward the purchase of a boat and is attempting to negotiate a loan from the government for the balance.

Two important factors should be considered by anyone planning to go into this type of fishing in Jamaica. First is the size and type of vessel to be used. It does not seem likely that the production per boat in this area will be as high as in other more productive areas. It is felt that the most important features to be considered in boats for this type of operation are suitability for multi-purpose operations, capability of operation in local weather, and minimum size to keep operation and maintenance costs low. The carrying capacity of a boat for this type of fishery would be of secondary importance. The 43-foot BLUE FIN has proved itself well suited to this type of fishing and it is possible that even smaller boats may prove equally suitable. Second, the market for fresh fish is limited, due principally to lack of facilities. The present marketing system could easily absorb the production of several offshore boats, but if a larger fleet were to begin operations, marketing and distribution procedures would have to be improved.

#### CONCLUSION

In conclusion, the writer feels that the outlook for developing an offshore fishery in Jamaica looks exceedingly bright when considering: a) that there is a good market potential in Jamaica as fish is an important part of the Jamaican diet, evidenced by the more than 35 million pounds imported annually; b) the government's interest in developing the fisheries by making loans available for the purchase of boats and equipment through the Agricultural Credit Board; and c) the existence of extensive fishing grounds nearby which have yet to be exploited. Furthermore, the United Nations Special Fund has plans under consideration for an extensive fisheries project for the Caribbean area to carry out exploratory fishing, marketing studies, and training of fisheries personnel. If this well-planned project materializes, fisheries development in Jamaica will undoubtedly make tremendous strides during the next decade.

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