

system connected with a triple pass dryer that solves this problem. This involves drawing from the dryer some of the partially dried material to blot up the surface free liquid, so that the resulting re-mixed mass is of a damp rather than wet nature. It is something like press cake that has gone through a standard fish press. In this condition the mass does not stick to the surfaces of the dryer and can be easily reduced to a uniform dried meal.

In processing this waste, the biggest individual item of cost is that of fuel oil for evaporating moisture. Further, the item of labor can be excessive if the plant is not properly designed, so that a continuous flow of the product from raw material to the sack is accomplished by means of proper control instruments. With such a plant labor costs become inconsequential. An example of the production costs for such an operation is as follows—

Fuel oil—50 gallons per finished ton of meal at 8 cents per gallon	
Labor—2 operators	\$ 4.00
Power—at 2 cents per Kilowatt hour	4.00
Steam	1.50
Bags	.60
Amortization of equipment, insurance and incidentals such as repairs, etc.	2.50
Total cost for producing meal	5.00
	\$17.60 per ton

The present market value of fish meal is about \$125.00 per ton, for shrimp bran \$100.00 per ton, for crab meal \$60.00 per ton. We can therefore figure a fair net profit of \$90.00 per ton for fish meal and shrimp bran, and \$40.00 per ton for crab meal. Since the potential annual production of these meals is something like 35,000 tons, more than \$3,000,000 of real profits are actually going to waste in the Gulf area each year. If arrangements were made to handle and market this waste, the fishermen would become interested in saving the trash and inedible fish, and would actually fish for them. In that case this tonnage and possible profit could easily be doubled.

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## Report On The Fisheries Of Surinam

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THE DUTCH ACQUIRED SURINAM, or Dutch Guiana, as it is better known in this country, in an exchange deal with the British in the middle of the Seventeenth Century, whereby the Dutch ceded Manhattan to the British. Surinam is a tropical country of about 50,000 square miles, or, about the area of Wisconsin, with a population of approximately 210,000. Of this population, 70,000 live in the capital, Paramaribo. It has one of the most mixed populations in the world, consisting of Creoles of African-Dutch and Spanish extraction, of Indians, Javanese, Chinese, Bush negroes, and approximately 2000 whites. It is bounded on the South by Brazil, on the North by the Atlantic Ocean, on the East by French Guiana, and on the West by British Guiana.

During the years 1750-1755 Surinam was a wealthy country. There were about 500 plantations, producing sugar, coffee, cotton, and cocoa. At that time the general value of exports approached 265 million guilders annually. By

contrast exports in 1948 were valued at only 27½ million guilders. (\$1 American is equal to about 1.90 guilders.)

Besides the bauxite mines at Moengo, well known in the USA, Surinam has important rice farming, citrus growing, and some goldmining and lumbering, as well as a number of industries, of which the manufacturing of leather and plywood form a fairly important element. Agriculture is mostly carried on by Hindustanis and Javanese. In Surinam there is one railroad, running from Paramaribo to the south, a distance of approximately 100 miles. The chief means of transportation is by way of the large inland rivers.

At present the fishing industry of Surinam is far behind the times. Fishing is mainly confined to inland waters. Not more than 800 families are engaged in this industry, and the catch does not exceed 2 million pounds per year. The main centers from which the fishing takes place are Paramaribo, Nickeri, and Coroni. Ocean fishing around Surinam is still in an embryonic state. It is carried on by small wooden vessels, which fish banks only a few miles from the coast off Paramaribo. Trawl fishing has not yet been tried.

The inland fishing is of much more importance than ocean fishing in Surinam. The fresh waters contain a wealth of fish, and there seems to be considerable room for expansion of the industry.

Three types of fishing gear are used: first a so-called pin-seine, for the fishing on the mudbanks, secondly a seine and bow net for fishing on the rivers, thirdly a bag net is used for fishing in the mouths of the rivers. Here shrimp are the main catch. In addition, long line fishing is practiced on a small scale

As a result of the increase of the lumber industries, several reaches of the rivers can no longer be used for fishing, because pieces of lumber, which have sunk to the bottom, cause damage to the nets. River fishing is also complicated by the strong currents. As it becomes more and more difficult to fish in the rivers, the problems of finding new fishing grounds arises. Lacking familiarity with these new fishing grounds, there is reason to believe that the fishermen in these areas are not working in the most economic and efficient manner. In the inland waters fishing is done by small rowboats, not only on the rivers, but also around the flooded plantations. There existed at one time a large number of cotton and other plantations that have fallen into decay because of the migration of the population from the country to the cities. As a result these areas returned to their original state. The former locks that served to control the waterlevel deteriorated, and the areas became inundated by the rise of the tidal rivers. In one such area, of about 25,000 acres, 33 fishermen were recently operating.

In such areas, which are essentially large fish ponds, the fishermen catch enough fish to supply the population of Surinam. Most of these fish are herbivorous and are highly prized by the population.

To increase the productivity of fish in these flooded plantations, cultivation methods are being adopted. The ponds are to be divided into plots, which will be drained independently of each other. A test pond, measuring about 12½ acres, will be used to carry out investigations on the spawning and growth of the fish. This inland fishery is important to the general welfare of Surinam.

The Bush negroes still fish with bow and arrow, with lines, and with a poison called "nicou." The poison stupefies the fish and allows them to be caught easily. A few Bush negroes have also learned the use of fish traps from the Indians.

What is the reason that ocean fishing has not developed more in a country situated on the Atlantic Ocean? It is partly because very few people live there. Java, which is only a little larger than Surinam, has 40,000,000 inhabitants, whereas Surinam has only 210,000. As long as the most modest demands of the population for fish could be met, there was no need for more intensive fishing. The standard of living in this tropical country is not high, and the diet of the people is deficient in proteins. A larger catch of fish is probably possible. At least 45 pounds of fish per annum per capita is necessary for minimum nutritional standards. Consumption in 1950, however, was only 32 pounds per capita, and 20 pounds of this quantity consisted of imported salted, dried, and conserved fish. This means that only 12 pounds per capita has been produced by the Surinam fishery. If this quantity has to be raised to 40 pounds per annum, then the catch will have to be increased by 2,000,000 pounds of fish.

At present there are too few fishermen to develop the fishing industry to this extent. Fishermen have organized themselves recently, but there are no fishery schools as yet. Though qualified authorities in Surinam give advice in the making of nets, and the use of fishery material in general, it cannot be said that there is enough skilled labor available to man the ships that are necessary to enlarge the fishing industry.

The fisheries of the countries near Surinam are rather backward too, though better in British Guiana than in French Guiana. These three countries share the same difficulties.

Such is the rather poor situation of the Surinam fishing industry. To improve this situation the Government of Surinam has instituted a research program that is being conducted by the Service for the Fishery Industry of the Department of Agriculture. This Service has at its disposal some very able experts in the fishing field. Among other things they have to investigate the migration of the fish and its frequency, and, in particular, the places where the fish spawn.

The Netherlands Government has not failed to help Surinam to develop her economy. The Netherlands has founded a Welfare Fund of 40 million guilders. Part of this money will be used for the development of the fishing industry. One of the tasks of the Fishery Service is to try out new methods that can be applied successfully in the unexplored fishing grounds. To this end a special vessel is being sent from Holland to Surinam, which is to be used for research work on the rivers as well as on the Atlantic Ocean. This ship has been fitted out in the most modern way, and is provided, among other things, with an echosounder. Research work will concern different species of fish, plankton, degree of salinity of the water, etc.

In Surinam efforts are being made to build a new fish market. Much has still to be done about the hygienic handling of fish. The present small supplies are sold on the general market, where vegetables, meats and other foods are sold as well. Though there is a cold storage warehouse in Paramaribo, where all kinds of foodstuffs are stored, this warehouse does not meet the requirements of modern methods of freezing and storing. There are plans for the construction of a well-equipped cold storage warehouse in Paramaribo, partly to be paid for out of the Welfare Fund.

There is also much interest for the processing of waste material into other products. Previously offal was discarded, but now a rather important industry for processing this waste material is growing up. There is a concern planning

to occupy itself with the handling of raw shrimp. At present the fishermen take care of their own catch of shrimp, which are boiled or fried after they get ashore. These shrimp cannot be kept for a long period of time. Probably in the near future shrimp will be taken directly from the place where they are caught to a mothership, to be processed there.

The U.S.A. is very much interested in the execution of Point 4 of the Program of the President. Surinam is in need of technical assistance which Point 4 offers. Surinam has a small population, little industry, and in consequence scanty means. The food supply could be considerably augmented by bringing fish to the market in greater quantities, at prices which the public can pay. This would improve living conditions substantially.

As long as it is scientifically undetermined to what extent the fishing industry can be extended, one cannot speak about "underdevelopment" as far as the fishery is concerned.

As soon as it is known that there are possibilities, sufficient capital and labor will have to be furnished to exploit them. It is believed that important improvements could be made in the fishery situation in Surinam by establishing fishery societies that would, among other things, concern themselves with the granting of loans for fishing material, and the organizing of auctions.

The construction of a cannery and fish meal factory is indispensable for the development of the fishing industry. Within the next few years the fishery in and around Surinam will probably be expanded considerably. Surinam is now in a transition period. Undoubtedly there is good reason to expect a great future for this country.

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## **Some Economic Aspects Of Charter Boat Fishing In The Miami Area \***

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THE PURPOSE OF THIS STUDY was to determine the extent of charter boat fishing in the Miami area, and to assign an economic value to the activity. Two questions were asked: (1) Is charter boat fishing a profitable business? (2) Of what value is charter boat fishing to the economy of the Miami area?

The information used to make the estimates in this study was gathered in many ways. Some of it represents interviews with the charterboatmen themselves, some was derived through consultation with the employees of the Cities of Miami and Miami Beach, and the authorities of Dade County. Other information was obtained from the concerns offering service to the charter boat fleet as well as by personal count and recheck wherever possible. Cross-checks were made wherever the nature of the information made them possible. The Miami Area was defined as that area as far north as, and including, the Dade County Docks at Baker's Haulover; southward along the ocean and bay front to the area known as South Bay, which fronts on the municipality of Coconut Grove.

\*Contribution No. 56 from Marine Laboratory and School of Business Administration, University of Miami.