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PROCEEDINGS  
OF THE  
CARIBBEAN FOOD CROPS SOCIETY



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SUMMARY

The main developments of Surinam fisheries are described in this paper in three sections of which the first describes the fishery situation, the problems of the traditional fishing operations and the fishermen.

The second part deals with development activities, survey work carried out by the Government owned Florida shrimptrawler "Coquette" in 1957 of fish and shrimp, and in 1960/1961 of fish. Results of this work are discussed as well as the consequences for the Surinam fishing industry.

The third chapter the future developments whereby the possibilities of fish processing in case of abundant supplies and the attempts to overcome people's resistance towards accepting iced sea fish are briefly discussed.

BACKGROUND

Surinam fisheries are in a transitory stage, with on one side the old traditional ways of in-shore fishing along the coast and in the rivers, on the other hand a rather recent system of off-shore fishing using modern craft and gear. Up to now the traditional systems are responsible for the biggest part of the landings, as shown in table below, in tons of fresh weight :

	1959	1960	1961	1962	1963	1964	1965	1966
deepsea fish	275	428	387	986	1268	1563	1662	2470
sea fish	55	212	199	300	383	327	300	290
coastal fish	1269	1484	2134	1330	1505	1592	1658	2184
estuary fish	609	365	584	534	655	770	894	751
river fish	669	495	667	638	676	540	726	523
swamp fish	443	664	714	594	495	435	793	716

The landings of in-shore fishing operations are delivered to the market by around 1000 local fishermen operating about 420 mechanized crafts and 100 not mechanized boats. Based on the production of these traditional fishing operations are the methods of preservation, handling and distribution of fish. Variations in quality and quantity enable neither the setting up of a modern fish processing plant or a well functioning market organization. Local fishing which can be best described as semi-primitive in technique and semi-commercial in purpose and organization bears among others the following characteristics.

- Fishing operations are predominantly stationary. Fish is expected to come to the gear instead of fishermen seeking out to catch fish.
- Power is not used in setting gear, the outboard engine is only used for transportation to and from the fishing grounds.
- Fishing operations are limited by natural phenomena, such as weather, tide, nature of fishing grounds, etc.

- Loss of time in fishing operations, particularly in stake net fishing where fishermen have to wait for low tide to gather the catch and then again for high tide to wash the fish and leave the fishing grounds.

In considering the fishermen some basic characteristics may explain the slow shift to full commercial fishing. To the bigger part fishing is not a business enterprise run for profit in which the rewards to labour and capital are distinguished. Fishing is a unitary enterprise that provides the fishermen with the direct means of livelihood in all its aspects. Their limited objectives are motivated by need for specific things, while their attitude towards coöperation is one of mistrust and suspicion.

Against these backgrounds the Surinam Government had since long ago tried to improve conditions under which fishermen had to work and live and to provide them with a reasonable income. However before such improved conditions could be effected for fishermen, ample survey work had to be carried out.

## DEVELOPMENT

Development plans for Surinam fisheries date back from the early fiftys when first attempts were carried out for a systematical improvement of inland fisheries. According to this set up of "half wild" brackish water fish culture on mainly abandoned cotton plantations in coastal areas, animal protein in the people's diet could best be provided by fish production in these waterbodies.

After a ten years' period a total area of bout 4500 hectares was expected to produce around 1125 tons of fish on a fresh weight base, mainly herbivorous species, mullet etc.

The reasons which caused this set-up to fail, were mainly due to the impossibility to exclude predators out of this system because of the low position of the ponds which were inundated at high spring tides, the silting of the water during the dry seasons and accretion of the ditches.

Because of these problems it was decided to start stake net experiments along the coastal mud banks in order to get indications about the presence of commercial scale and cat fish species, the effective length of nets and the processing possibilities of cat fish which had poor acceptability in the fresh state.

The results showed that stake nets for commercial operations should be at least 1000 m long, 26 meshes deep, meshsize 60 mm, while engine horsepower should amount to 12—18. The fishing, about all the tidal mud bank from the Wia Wia bank in the Eastern part of the country to the Brodobong area in the Western part, gave average productions of 3.4 ton scale fish, 2.4 ton catfish, inclusive yellow cat and 4.6 ton miscellaneous fish, for five stake net units (20 people) during a 20 day fishing period. Dried smoked catfish proved to have a better marketable value. These results led to the supply of credit to fishermen in order to improve their gear and to set up smoke houses, a habit that still exists for processing part of their catch and offers good production results to this type of fishing.

As the rough weather limited the number of fishing days for these small open craft, it was decided to survey the deeper waters of Surinam in order to promote full scale commercial fishing.

In 1957 a Gulf (Florida) type single rigged trawler "The Coquette" carried out surveys for shrimp and fish in waters up to the 40 fathom line, after trial fishing of the "Oregon" of the United States Bureau of Commercial Fisheries indicated the presence of marketable shrimp species of valuable sizes over most of the coastal region of North Eastern South America.

These surveys which were carried out along the Surinam coast from East to West showed commercial species of shrimp, which were according to the "Oregon" located in three geographically different strips off Surinam.

In the first zone from the coast to the 19 fathom line abundant catches of 150—130 lbs, heads off per fishing hour seabob (*Xiphoponeus kroyeri*, Heller), averaging 110 count (heads off) were made, as well as scattered catches of brown shrimps (*Peneus aztecus*, Ives), 30—150 count, the biggest catch averaging 92 lbs heads off per hour. Presence of different ages of brown shrimp led to believe that this species seems to be a local population rather than a migratory one to these areas.

In the middle zone from 19 to 23 fathom, practically no fish or shrimp could be detected. The bottom, consisting of dead encrusted shells, dead corals, gorgonids and sponges, was not suitable for bottom trawling.

The outer strip extending the 23 fathom line outward contained good commercial quantities of large shrimp, browns (*P. aztecus*) "spotted" brown (*P. braziliensis*) and in lesser extent white shrimp (*P. schmitti*), the total catches averaging 350 pounds, heads off per night with average sizes of 15—30 count.

Largely on base of these findings the Surinam American Industries Ltd. started their commercial operations, and I may safely say, the whole Caribbean shrimp industry, which nowadays operates around 300—400 boats and producing yearly about 25—30 million lbs of heads less shrimps, mainly exporting to the United States of America and to much lesser extent to Japan.

Having explored the shrimp possibilities mainly as a hard currency export item, in view of supplying the Surinam people with enough cheap animal protein on a year round basis, surveys had to be carried out on the presence of commercial quantities of fish. The first such a survey dating back from 1957 (May—July) between the 6 and 15 fathom line, indicated a good trawlable bottom and commercial quantities of mostly Sciaenid and catfish species.

Catches with 68 foot headrope trawl nets amounted to 330—840 lbs of fish per hour. To verify these findings a two years' survey was started by the "Coquette" with specific attention to be paid to :

— Presence and commercial quantities of fish and shrimp throughout the year

- Migratory habits and seasonal abundance of the species
- Quantity and composition of scrap catches
- Introduction of new techniques and gear
- Marketing of species

While after these two years some indicative results were obtained it was considered worthwhile to proceed with the collection of catch data during the following years, on base of which the following results were obtained :

- The second and third quarter appear to be the period of seasonal abundance ; production in the fourth quarter is average, in the first quarter bad. Catches per drag and per hour of a 3 years average are as follows :

	catch/drag (lbs)	catch/hour (lbs)
1st quarter	298.4	193.8
2nd quarter	439.4	274.5
3rd quarter	631.—	423.5
4th quarter	373.2	248.1

- A daily catch of 700—1000 kg good consumption fish during the second and third quarter is to be considered as a good catch.
- Most productive grounds for seatrout, silversnapper, butterfish and dogtrout seem to be between 6 and 15 fathom about N. of the Matapica area to about N. of the Coronie area with the best grounds in the outflow of the big rivers.
- Sharks attack on trawlnets is a grave problem. The only possible solution will be to overfish this species. Per day per 4 hooks about 3 tons of shark can be caught, what offers a reasonable basis for a small shark processing industry : hides, teeth and vertebras could be used for ornamental purposes, the liver for vitamin extraction, while the meat could be processed to shark meal.

Having explored the fishing grounds on productivity it was once more stressed that the marketing and distribution of fish were the bottlenecks for a sound development of fisheries. This knowledge had already led to the establishment of adequate shore facilities in different parts of the country between 1955 and 1957.

While it cannot be said that these stations were a failure, it must be admitted that urbanization caused a situation which nearly could be described as a loss of function. Combined with the results of the survey work this required creation of a reasonable fishmarket in Paramaribo which I hope, will be in operation by a month or two, and basically will provide cool and coldstorage facilities, while handling and selling of the local fishermens' catches will also take place. As different circumstances prevented a compulsory delivery of fish to this outfit, a few fishermen have been demonstrated, on a trial base, the benefits for them, the consumer and the Government.

It is hoped that where both commercial and semicommercial fishermen

probably will land their fish at a central point, a greater part of the population will accept iced fish for supply of animal protein in their diet.

## FUTURE DEVELOPMENT

With the expectation of an abundance in supply if the bottleneck in fishery operations is taken away, Surinam with its small population cannot possibly absorb all the landings. As in other Caribbean countries, there is quite an import of salted fish mainly from Canada and Norway, which could be brought down if a good acceptable replacement could be produced. Experiments in connection with the Institute for Fishery Products in the Netherlands resulted in good acceptable smoked and salted products from mainly seafish species: seatrout, croaker, dogtrout and shark.

— A survey recently carried out to detect existing resistance towards acceptance of seafish showed as the main reason the unavailability of fish at all times and the fact that people resented iced fish, claiming lack of freshness because of discoloured, pale gills, while personal reasons as too bony, no taste, no colour etc., also influenced sea fish acceptance. Consumption per head per year, not included the imports, vary according to ethnical groups from 8—11 kg. It is however my personal opinion, that on the long run these obstacles will disappear and the low kilogram price of commercial catches will be taken into consideration, when buying animal protein.

— In stressing the need for a sound sea fisheries development vocational training for both younger people and local fishermen will have to take place. Fortunately there is a distinct attraction of sea fishing on young fishermen, mainly due to the fact, that earnings are better.

However if local captains are to be employed by both foreign and yet to be established local companies, it is a must to have a proper training facility.