

Artisanal Fishery of Guyana

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RESUMEN

En esta ponencia se describe la pesca artesanal de Guyana y su flota pesquera. Se discute el papel del gobierno guyanés en el desarrollo y manejo de su pesca artesanal. En 1977 el consumo de pescado en Guyana fué de 23 kilos (50.7 lb) per caput. La pesca artesanal aporta poco más de dos terceras partes de la producción total de pescado y camarones.

INTRODUCTION

The Guyanese population of 850,000 inhabitants is economically dependent on its artisanal fishery, because practically the entire catch is consumed locally as either fresh fish or fresh shrimp. This fishery exploits both the demersal and pelagic species of Guyana's estuaries and adjacent shallow seas. The artisanal fishermen catch a variety of finfish and are responsible for most of the finfish landed in Guyana (Table 1). The shrimp fishery focuses on two species, seabob, *Xiphopenaeus kroyeri*, and small, white belly, *Palaemon schmitti*. In 1979, of the total Guyanese production of finfish and shrimp of 42.7 million pounds, the artisanal fishermen landed 34.5 million pounds; during the same year the estimated production of seabob and white belly shrimp combined was 4 million pounds.

Guyana has a tropical climate with an annual temperature range of 21° to 32°C and has two wet and two dry seasons. The average annual rainfall is 239 cm (94 in) and varies considerably between the coastal area and the densely forested interior of the country.

The nutrients supplied by rivers and favorable bottom habitat of the estuarine and shallow coastal waters are chiefly responsible for rich finfish and crustacean fauna (particularly shrimp fauna) of Guyana. The coastal waters of the continental shelf receive large volumes of sediments and nutrients from the Orinoco, Essequibo, Amazon, and several other smaller rivers. The sea bottom of the continental shelf down to 40 m (21.9 fm) is characterized by soft, sticky mud; from 40 m seaward the mud becomes more and more mixed with sand until the sand predominates, somewhere near the 70–80 m

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Table 1. Fish landed by the artisanal fishery of Guyana for the period 1975-1979

| Year | Boats (No.) | Fin-fish (Thousand lb) | % Total Production | Total National* Production (Thousand lb) |
|------|-------------|------------------------|--------------------|--|
| 1975 | 1,056 | 34,444 | 87 | 35,122 |
| 1976 | 1,066 | 30,905 | 88 | 35,000 |
| 1977 | 1,104 | 43,960 | 88 | 50,203 |
| 1978 | 1,012 | 34,648 | 85 | 40,436 |
| 1979 | 1,006 | 34,480 | 81 | 42,732 |

* Shrimp included. Source: Fisheries Division, Ministry of Agriculture, 1979.

(38.3-48.7 fm) contour.

A diagrammatic presentation of certain environmental features off the coast of Guyana, the distribution of finfish groups and shrimp, and the fishing methods used to catch them are shown in Figure 1.

The Fleet

The artisanal fleet, owned by 925 fishermen, consists of about 1,000 boats ranging from 5 to 16 m (16.4-49.2 ft). All the boats are made from wood and are manufactured locally. Except for handliners and large gill-netters, most of the boats are a flat-bottomed dory type with little draft. The most frequently used boats are shown in Figures 2-3. Physical characteristics of the boats, their power, length of the fishing trip, composition of the crew, the qualitative and quantitative composition of the catch, and the principal fishing grounds of the Guyanese artisanal fleet are presented in Table 2.

Based on their size, the gill-net vessels of Guyana can be conveniently grouped into two categories, large (12-16 m; 39.4-52.5 ft) and small (8-10 m; 26.2-32.8 ft). Large gill-net vessels are diesel-powered and far-ranging, with insulated ice boxes capable of carrying up to 5 t of ice. Most of these vessels are equipped with compasses. Because ice is available there, most large vessels operate out of Georgetown. The length of their trips is 10-12 days. Small gill-net vessels, equipped with outboard motors up to 48 hp, fish and land their catches along the entire coast of Guyana. A number of small vessels with small ice boxes remain at sea for 2-3 days at a time, while others without ice boxes land their catches about every 12 hours.

Fishing boats known as handliners are 15 m (49.2 ft) in length and fish between 120 m (65.6 fm) and near the edge of the continental shelf. Handliners are equipped with insulated ice boxes which hold up to 5 t of ice. Each fishing trip is 12 to 15 days. Each boat is equipped with eight handlines, one handline per fisherman. Handlines are polyethylene, each line carrying 16

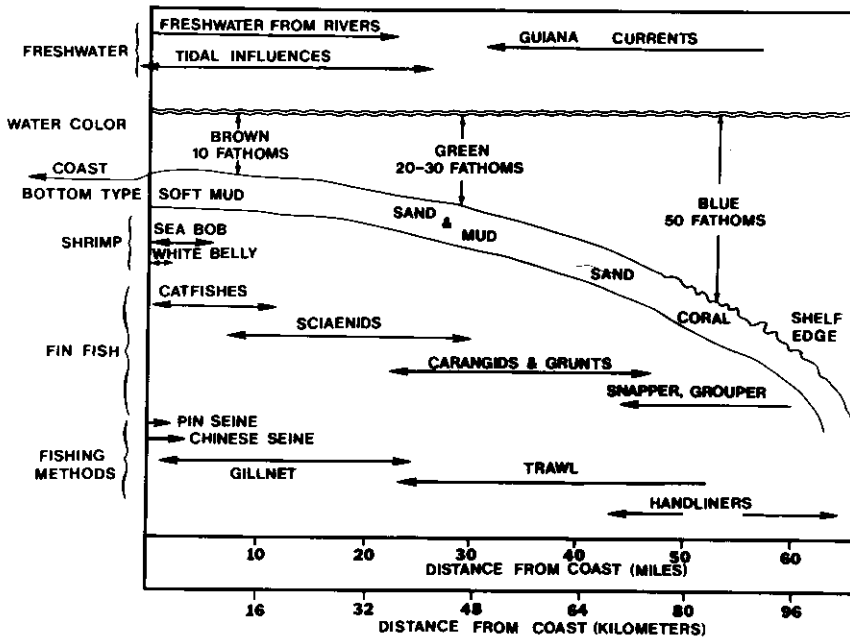


Figure 1. A diagrammatic presentation of the environmental characteristics, fish and shrimp groups and fishing methods of the Guyanas' fishing sector of the artisanal fishery.

hooks, size 4 or 5. Their catch consists chiefly of snapper, *Lutjanus* sp., and groupers, *Epinephelus* spp. Inefficient gear and high operating costs caused the number of handliners to drop from 15 in 1960 to 2 in 1979.

A distinct group of flat-bottom boats in the 4.6–9.1 m (15–30 ft) size category is used in connection with Chinese seine, cadell line, and pinseine-type fisheries (Fig. 4). The advantages of flat-bottom boats are their simple construction and great maneuverability over shallow muddy and sandy bottom areas. These boats operate close to shore because they are not equipped with ice boxes; they are propelled by sail or 6–9 hp outboard motors.

Fishing Gear

The gill net is the most productive gear in the artisanal fishery. More than half of the total catch is caught with gill nets, and about one fourth of all Guyanese fishermen use this gear. Gill nets vary in length from 1,000 to 1,600 m (3,281–5,249 ft) and are 4 m (13.1 ft) deep with a stretched mesh measure of 20 cm (7.8 in). Polyethylene nets are preferred by the fishermen because the nets last longer and tangle less than those made of nylon. Even though most of the Guyanese fishermen agree that they would catch more fish with nylon than with polyethylene, they use the polyethylene nets because of their durability.



Figure 2. Several flat bottom boats of less than 10 meters (32.8 feet) used in pin-seine-type fisheries.

Nets are set and hauled manually from the boats. No fish-finding equipment is used. The catch consists mainly of gray snapper, *Cynoscion acoupa*; pagee, *Lobotes surinamensis*; bashaw, *Cynoscion jamaicensis*; trout, *Cynoscion virescens*; cavalli, *Caranx hippos*; tarpon, *Megalops atlanticus*; gill-backer, Ariidae; croaker, *Micropogonias furnierei*; mackerel, *Scomberomorus maculatus*; and sharks, *Carcharhinus* spp. All these fish are of high food value and bring excellent prices in the local markets.

Chinese seines (Fig. 4) (fyke nets) are funnel-shaped nets 16 m (52.5 ft) long and 4–6 m (13.1–65.6 ft) wide at the mouth end. Their mesh size gradually tapers from the mouth end (8 cm; 3.1 in) toward the bag end (1 cm; 0.25 in). The net is attached to poles and set on mud banks along the coast, in rivers, and particularly at river mouths. Fish and shrimp are swept into the bag of the net by the tidal currents. Each boat operates between four and eight nets. The Chinese seine is the only gear used in the inshore shrimp fishery of Guyana. The catch consists primarily of seabob, *Xiphopenaeus kroyeri*, and white belly, *Palaemon schmitti*, bangamary, *Macrodon ancylodon*, butterfish, *Nebris microps*, and catfishes, mainly of the family Ariidae. An undetermined amount of immature fish is caught in Chinese seines and discarded; the mortality of these fish is 100%. Cadell or long-line fishing is practiced with a ground-line anchored at each end. A series of ganging lines carrying baited hooks are attached to the long line at regular intervals, about 2 m (6.3 ft) apart. Each cadell is about 1.6 km (1 mi) long and usually has 800 hooks. Before each fishing trip the hooks are baited and stored in wooden trays. In 1978, 178 vessels were engaged in this type of fishing. Cadell line catches consist mainly of catfishes and sharks.

Pin seines or beach seines are 2 m (6.6 ft) high and up to 2,000 m (6,562 ft) long with a stretched mesh size of 9 cm (3.5 in) or less. The net is set at high tide in the intertidal zone. A row of stakes arranged in a semicircle holds the

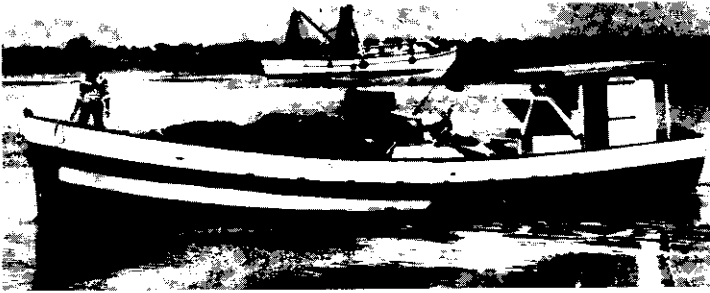


Figure 3. Typical gillnetter of the 12–16 meters (39.4–52.5 feet) range.

net in a vertical position. During the ebbing tide the fish are trapped and then retrieved from the mud flats by the use of a “catamarang”, which is an upward-curved mud-riding board of about 2 m (6.6 ft) in length and 60 cm (23.6 in) wide fitted with a fin underneath and a box for storing fish. The fishermen pick up their catch from a kneeling position on their catamarangs. Boats engaged in the pin-seine fishery are usually equipped only with sails since there is no need for them to cover great distances. The number of vessels associated with pin-seine fishing in 1978 was 76. Their catch includes mullet, queriman, *Mugil* sp.; snook, *Centropomus* sp.; bangamary, *Macrodon ancylodon*; croaker, *Micropogonias furnieri*; and catfishes of the family Ariidae.

Fishing Area and Landing Sites

The Guyanese artisanal fleet operates in an area extending from the estuaries to the edge of the continental shelf, but most of the fleet activity is between shores and 24-km (14.9 mi). Handliners fish the edge of the continental shelf; gill netters fish up to about 19–24 mi (30.6–38.6 km) offshore, and the majority (60%) of the boats (10 m or 32.8 ft in length) engaged in Chinese seine and pin seine operations do not venture farther than 2 mi (3.2 km) offshore. Boats operating Chinese seines primarily fish at the river mouths and on mud banks along the coast.

To facilitate navigation of commercial and non-commercial vessels, particularly near the sea ports and the river mouths, the Government of Guyana has reserved certain areas for fishing only and other areas for navigation only. An area near the mouth of the Demerara River is reserved for fishing and closed to navigation.

For the sake of safe navigation in the Berbice River, the erecting and placing of nets is strictly prohibited in the main ship channel. Erecting fish pens in the New Amsterdam Harbor south of the Rosignol Stelling is also not allowed.

Landing sites are scattered along the coastline of Guyana and on the river banks, usually in the vicinity of a sizable population and of potentially ready markets. Landing of fish in populated areas eliminates the need for preservation and transportation of the catch.

A great part of the coastline of Guyana is lower than sea level. To keep the

Table 2. Certain characteristics of the artisanal fishing fleet of Guyana

| Boats (No.) | Power | Length (m/Ft) | Gear | Trip length (X) | Catch composition | Crew (No.) | Preseason | Est. annual catch (Thousand lb) | Principal Fishing Area |
|-------------|-----------------------|---------------|---------------|-----------------|--|------------|-----------|---------------------------------|--|
| 2 | Inboard Diesel | 14/45 | Handlines | 12-15 days | Snapper, grouper | 8 | Ice | 84 | Edge of continental shelf, rocky areas (area between 10 and 20 fathoms isobaths) |
| 93 | Inboard | 12/15/40-50 | Gill net | 10-12 days | Grey snapper, croaker, gill-backer, tarpon, paguee, mackerel, shark, trout | 3 | Ice | 84 | Area between 10 and 20 fathoms isobaths |
| 233 | Outboard to 48 hp | 8/11-2-35 | Gill net | 2-3 days | Grey snapper, trout, paguee, shark, croaker, tarpon, gill-backer, mackerel | 3 | Ice | 44 | Area between 10 and 20 fathoms isobaths |
| 388 | Sail, Outboard 6-9 hp | 6-9/15-30 | Chinese Seine | 12 h | Seabob, White-belly, immature fish, bangamary, butterflyfish, catfish | 2 | Fresh | 24 | Estuaries, river mouths, and banks on coast |
| 178 | Outboard 6-9 hp | 6-9/15-30 | Cadell | 12 h | Catfishes, shark | 2 | Fresh | 24 | Area between 5 and 10 fathoms isobaths |
| 76 | Sail | 6-9/15-30 | Pin Seine | 12 h | Mullet, snook, gueriman, catfish, croaker, bangamary | 2 | Fresh | 24 | Intertidal zones |
| 46 | Combination | 6-9/15-30 | Combination | 12 h | Combination | 2 | Fresh | 24 | |

* Includes sail and outboard motor.
Sources: Fisheries Division, Ministry of Agriculture 1978 (unpublished).

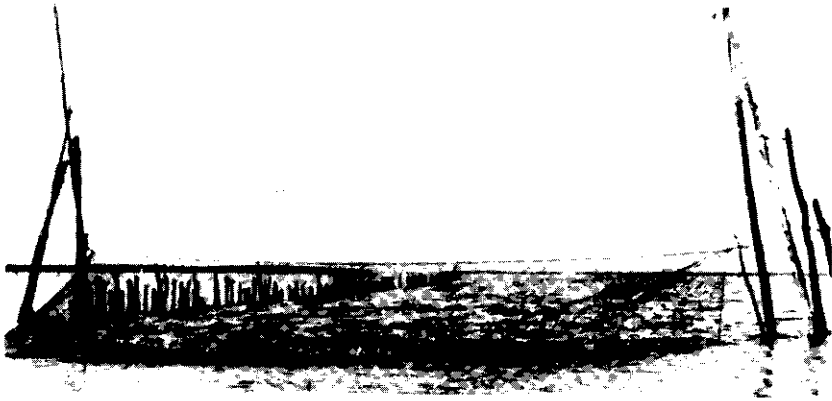


Figure 4. Chinese seine at the mouth of the Berbice River.

water out, a concrete seawall was constructed by the early Dutch settlers. The artisanal fishermen land their catch on this wall along the coast. This wall is steep and is only accessible in many instances by the use of steps, presenting a major obstacle to fishermen in loading and unloading gear and in landing their catch.

Another difficulty that artisanal fishermen in Guyana face in most areas along the coast is mud in the tidal zone that acts as a barrier to the open sea. At low tide the distance between the water mark and the seawall is about 230–270 m (755–855 ft). In these areas the landing sites are situated near “kokers”. A koker is a sluice controlling a drainage and irrigation canal. To reach the open sea or the seawall, boats use this canal, which normally has about 1 m (3.3 ft) of water at low tide. Flat-bottom boats, having little or no draft, are particularly suited for such conditions. Pier facilities exist only in Georgetown, New Amsterdam, Rosignol, and on the west bank of the Demerara River.

Boat building and maintenance facilities in Guyana consist of several small boat yards scattered throughout the country. These boat yards are run by an estimated 70 shipwrights and all artisanal boats are built there. High quality local wood is their only boat building material. Due to limited modern boat-building equipment, the productivity at these boat yards is rather low, but their final products are excellent. It takes 6–8 months to construct a gill-net vessel in the 12–16 m (39.4–52.4 ft) size category.

Most of the maintenance work on small flat-bottom boats in Guyana is done after tradition. The boats are hauled and repaired on the nearest suitable shore using the same type of tools that their forefathers used. Only the Greater Georgetown Cooperative Society, Ltd., has a small ramp at their Sussex Street wharf for the maintenance of vessels that are too big to be hauled on to the beach.

Fishing Season

Despite quantitative and qualitative seasonal differences in the artisanal catch, there is no definite fishing season in Guyana. Instead, fishing activity

takes place throughout the year, at about an even pace.

Seasonal differences in the catch seem to be associated with environmental conditions, particularly with rainfall and river discharges, which appear to affect the availability and abundance of different marine organisms. For example, the catches of both seabob, *Xiphopenaeus kroyeri*, and white belly shrimp, *Palaemon schmitti*, are best during the January–May period, with peaks in March and April. The January–May period precedes the heavy rainy season and is characterized by low river discharge. The finfish catch is better during the rainy months of May, June and July, and immediately after these months. Similarly, during surveys of the MV CALAMAR and the CAPE ST. MARY, the largest quantities of finfish were caught during the heavy rainy season (May–July) when the freshwater outflow from the rivers was at its maximum. During the same period (May–July) the Chinese seine fishermen, who fish mainly for shrimp, also catch more finfish than shrimp than during the January–May period.

Economic Aspects—Marketing and Employment

Almost the entire catch from the artisanal finfish and shrimp fishery is usually absorbed directly into the fresh fish market and consumed domestically. Whenever there is a glut in the fresh fish market, the catch is either sold to Guyana Fisheries, Ltd., or converted into dry salt fish by sun drying. Shrimp are blanched with salt for a few minutes and then sun dried. The shrimp are sun cured with heads on, then pounded gently to separate the heads and shell and sold as a dried product. Guyana is also beginning to export certain fish caught by artisanal fishermen. In 1979, 454 kg (10,020 lb) of gray snapper, *Cynoscion acoupa*, were exported to Jamaica. Small quantities of shark are also being exported.

On a weight basis, fish constitute the largest source of animal protein in the Guyanese diet. The per capita consumption of fish for 1977 was 23 kg (50.7 lb), according to statistics from the Ministry of Agriculture. The actual process of selling and the distribution of catch is very old. At the landing sites the public purchases fish and shrimp directly from the fishermen. The public also buys fish and shrimp from street hucksters (vendors) and from hucksters in local markets, municipal markets, and supermarkets. Most of the fish landed by the artisanal fishery is marketed by an estimated 1000 hucksters who provide an efficient service by quickly distributing the catch. Certain aspects of marketing and processing of the artisanal catch in Guyana are shown in Figure 5.

The only storage plant (25 t capacity) available to the artisanal fishermen is owned by the New Amsterdam Fish Processors, Ltd., and is located in New Amsterdam. This plant is not fully utilized by the local fishermen. In addition to the storage plant, two ice-making facilities serve the artisanal fishery of Guyana. One plant with a daily production capacity of 15 t of flaked ice is located in Georgetown and managed by the Greater Georgetown Fishermen Cooperative Society, Ltd. The other plant, located in New Amsterdam and owned by New Amsterdam Food Processors, Ltd., has a rated daily production capacity of 10 t. Loading of the flaked ice on one of the boats is



Figure 5. Fish auction at the Greater Georgetown fishermen co-operative society Sussex Street wharf.

shown in Figure 6. Artisanal fishermen could use more ice than the two plants produce.

In the area of employment, the artisanal fishery provides a small though important contribution to the national labor force. In 1978, an estimated 4,500 individuals were employed in this fishery; 3,457 were directly employed as fishermen, and the remainder were active in the marketing and distribution aspects of the industry. There were 925 boat owners and the majority engaged in active fishing.

The Government of Guyana's Role in the Artisanal Fisheries

The Guyanese Government encourages the development of the artisanal fishery by: (a) duty-free purchase orders for fishing equipment; (b) subsidizing rebate payments on fuel, oil, and engines; (c) exempting fishermen cooperative societies from taxation; (d) providing free materials and technical help to fishermen cooperative societies for the construction of facilities (shops, storehouses, wharves, meeting rooms, fuel dumps); and (e) providing monetary aid to individual fishermen through the Guyana Cooperative Agricultural and Industrial Development Bank.



Figure 6. Loading of the flaked ice on one of the gill-net boats.

Most of the above listed items and practically all matters related to the fisheries are handled by the Ministry of Fisheries. The Ministry is also involved in the licensing of vessels and to a limited extent in the enforcing of the licensing provisions. While boats under 32 ft (9.8 m) are not required to register, the owner of a boat between 32 ft (9.8 m) and 50 ft (15.2 m) in length is required to register his vessel and buy an annual license for fishing. The boat registration fee is G \$2.0 and the fishing license is G \$10.0.

The Ministry also compiles and analyzes fishery statistics and carries out research related to marine fisheries and aquaculture. The systematic catch and effort collection of statistics has already started.

The artisanal fishermen are grouped into 14 fishermen cooperative societies (Table 3) that champion the interests of their members. These societies have existed for 20 years and are located along the coast of Guyana. The Guyanese Government has supplied free building materials and technical skills to the most active societies for the construction of storage and berthing facilities. The Greater Georgetown Fishermen Cooperative Society, Ltd., is the largest

Table 3. Fishermen cooperative societies of Guyana

| Cooperative | District | Headquarters | Membership | Physical Structures |
|---|---|---|------------|--|
| Upper Corentyne Fishermen Coop Society, Ltd. | Crabwood Creek to Tarlogie, Corentyne | Corrivertown | 101 | Two story building--fishing equipment store; storage room; meeting room; fuel pump and ice holding facilities. |
| Corentyne Pin Seine Fishermen Coop Society Ltd. | Alness to Fyrish | Whim | 71 | One story building--fishing equipment store; storage room; meeting room; fuel and oil dump and ice holding facilities. |
| Berbice Fishermen Coop Society Ltd. | Palmyra (East Coast) to Ithaca (West Coast) | Rosignol | 134 | One story building--fishing equipment store; storage room; meeting room; fish market; fuel wharf and oil dump. |
| Lower East Coast Coop Society, Ltd. | Helene Mahaica to Success | Lusignan | 37 | Fishing equipment store located at Sussex Street Wharf. Rental retail outlet on Lombard Street, a 10-ton and 5-ton ice plant and fuel and oil dump. Wharves at Ruimveldt and Grove on East Bank of Demerara River. |
| Greater Georgetown Fishermen Coop Society, Ltd. | Plaisance to Grove | Lombard Street Charleston, Georgetown | 181 | |
| West Bank Fishermen Coop Society, Ltd. | Wales to V/Hoop West Bank Demerara | Lombart Street Georgetown | 51 | Wharf at Wales, West Bank Demerara. |
| Upper West Coast Fishermen Coop Society, Ltd. | Crane to Leonora | Not Specific | 21 | |
| Lower West Coast Fishermen Coop Society Ltd. | Uitvlugt to Parika | Not Specific | 24 | |

continued

Table 3. continued

| Cooperative | District | Headquarters | Membership | Physical Structure |
|---|--------------------------------------|-------------------|------------|--------------------|
| Wakenaam Fishermen Coop Society, Ltd. | Island of Wakenaam | Not Specific | 14 | |
| Leguan Fishermen Coop Society, Ltd. | Leguan | Not Specific | 10 | |
| Essequibo Fisher- men Coop Society, Ltd. | Johanna Cecilia to Pomeroon River | Charity | 41 | |
| Morawhanna Fisher- men Coop Society, Ltd. | Morawhanna N.W.D. | Morowhanna N.W.D. | 28 | |
| Moruka | Moruka N.W.D. | Moruka, N.W.D. | 6 | |
| Bartica | Bartica to Bonasika Creek | Bartica | 38 | Fuel pump |

Source: Fisheries Division, Ministry of Agriculture, 1979.

society and has its own ice plant, wharf and ramp. This Society also handles the importation and distribution of all fishing requisites for the entire artisanal fisheries system.

The primary source of credit for artisanal fishermen is the Guyana Cooperative Agricultural and Industrial Development Bank which loans money to individual fishermen and to fishery cooperative societies. The bank was set up by the Guyanese Government primarily to aid developing agriculture, including fisheries, and is more lenient toward fishermen than the Guyana National Cooperative Bank, which also gives loans to fishermen, but follows strict commercial banking principles.

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