BASIC DESIGN STUDY REPORT
ON
THE DEMERARA FISH PORT COMPLEX PROJECT
IN
THE CO-OPERATIVE REPUBLIC OF GUYANA

DECEMBER.1984

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

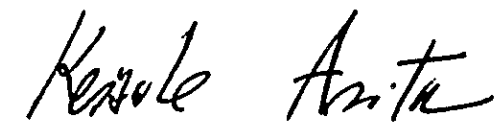
In response to the request of the Government of the Co-operative Republic of Guyana, the Government of Japan decided to conduct a Basic Design Study on the Demerara Fish Port Complex Project and entrusted the study to the Japan International Cooperation Agnecy(JICA). JICA sent to Guyana a study team headed by Mr. Tatsumi Ojima, Fisheries Administration Department, Fisheries Agency, from August 14 to September 3 1984.

The team had discussions with the officials concerned of the Government of Guyana and conducted a field survey. After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the CO-operative Republic of Guyana for their close cooperation extended to the team.

December 1984



Keisuke ARITA

President

Japan International Cooperation Agency

C O N T E N T S

Attached Documents


SOUTH AMERICA
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NORTH ATLANTIC OCEAN
PACIFIC OCEAN
SOUTH ATLANTIC OCEAN
CENTRAL AMERICA
COLOMBIA
VENEZUELA
ECUADOR
PERU
BOLIVIA
BRAZIL
PARAGUAY
URUGUAY
ARGENTINA
CHILE
FRENCH GUIANA
Barranquilla
Cartagena
Medellin
Bogotá
Cali
Buenaventura
Quito
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Trujillo
Cerro de Pasco
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Lima
Cuzco
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La Paz
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Santa Cruz
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Teresina
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João Pessoa
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Corumbá
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Curitiba
Florianopolis
Pôrto Alegre
Rio Grande
Asunción
Corrientes
Formosa
Santa Fé
Salto
Concepción
Manaus
Pôrto Velho
Riberalta
Trinidad
Ciudad Bolívar
Caracas
La Guaira
Maracaibo
Curaçao
Margarita
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Islas Galápagos (Ecu)
Cocos (Costa Rica)
I. San Felix (Chile)
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Isla Juan Fernández (Chile)
Falkland Is (Br)
South Georgia (Br)
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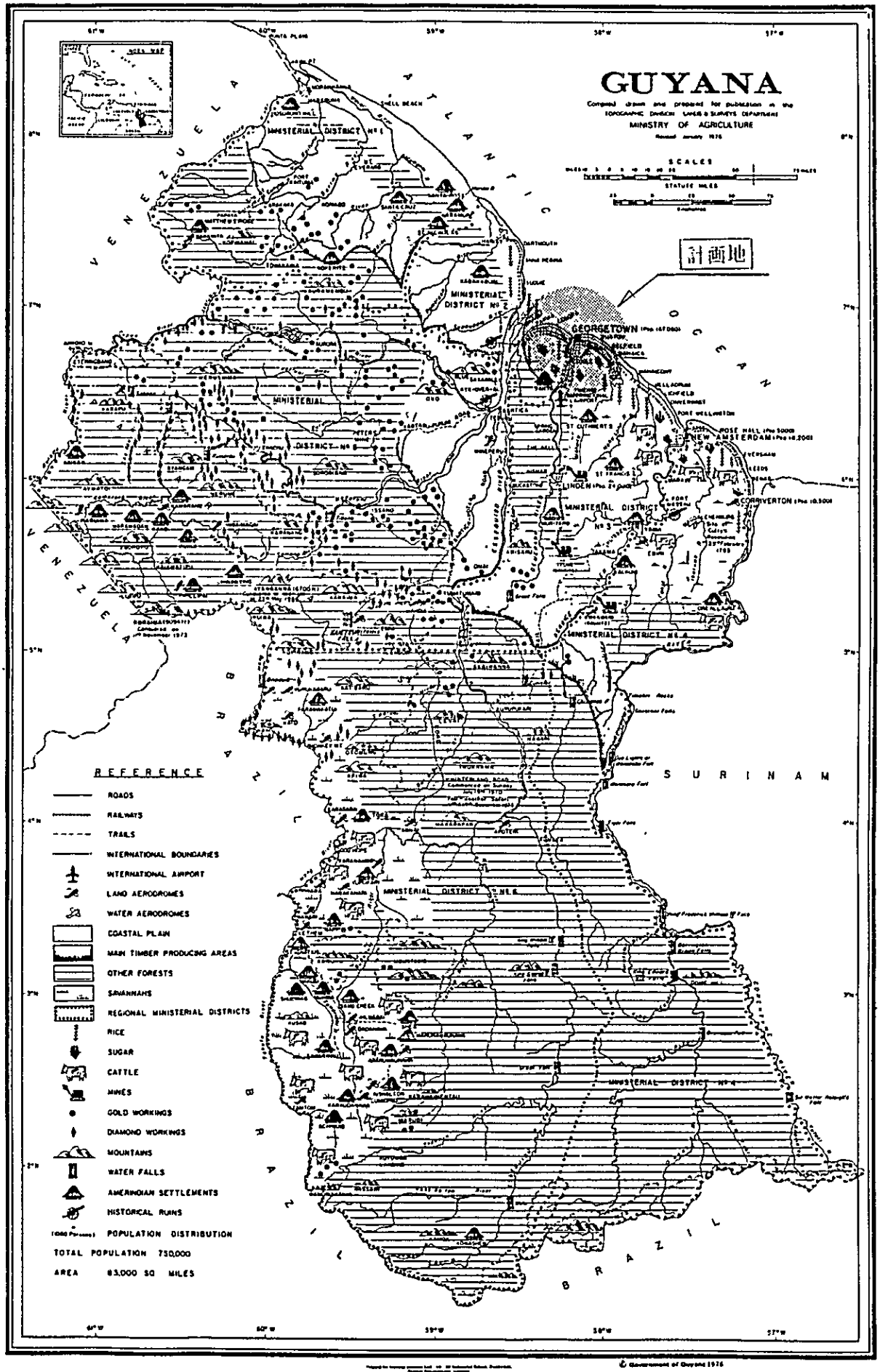
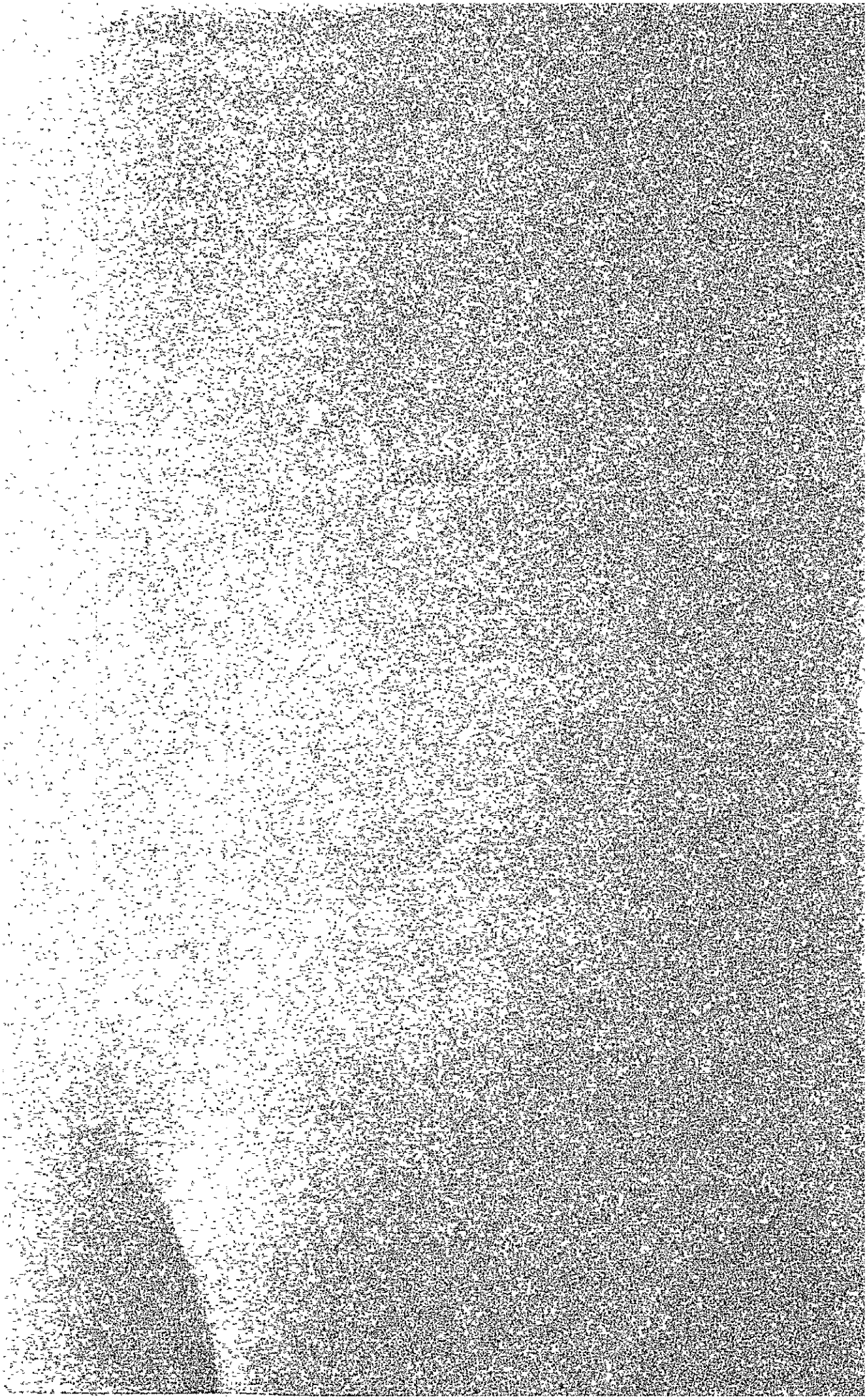


SUMMARY



S U M M A R Y

The Cooperative Republic of Guyana, being independent from Britain in 1966, became a republic in 1970, and in order to realize "cooperative socialism", nationalized the baxite and sugar industries, which together with the rice crop are the three leading export industries supporting the national economy.

Guyana's economy has been easily affected by changes in the international economic environment. In addition, due to the worldwide economic recession since the oil crises, there has been a serious shortage of foreign currency over the past few years, which even has forced the government to regulate imports of foreign products and foodstuffs.

Under such economic circumstances, existing industrial facilities have not been satisfactorily maintained, which in turn decreased the operating capacity of the facilities, reducing production and export revenues, leading to a vicious circle of depression.

Thus, the Guyanese Government made it the top priority of the national economic development programme to secure food for the nation by realizing self-sufficiency in food through the expansion of rice and fish production. The government has prepared a construction plan for the fishery base at Demerara port as an essential means of development and also established

the GFL (Guyana Fisheries Ltd.) to execute the plan with aid from Japan, the EC nations, Canada and other donating countries.

The Government of Japan through its grant aid has cooperated to construct in three steps since 1975 facilities such as the pier, offices, facilities for the repair of machines and equipment, freezer and cold store and a slipway.

Furthermore, Guyana requested for the Japanese Government to provide grant aid for fishery materials such as 20-ton fishing trawlers, a shrimp grading machine, ice making and freezing equipment and a refrigerator truck in order to expand the project for the fisheries base at Demerara Port, to increase fish production and to improve domestic sale, distribution and consumption.

In response to the above request, the Government of Japan dispatched a study team to Guyana for 21 days from August 14 to September 3, 1984. The team, while taking into consideration the preceding grant aid, checked the details of the request, studied propriety and urgency, and discussed scale and specifications of the project with representatives of the Guyanese authorities concerned. The fishery promotion program of Guyana has high priority to secure food for Guyanese. The GFL is an organization for the purpose of taking large quantities of the abundant bottom fish by using the fishing trawlers, processing them on the shore and selling them, exercising total control

over the management of the project from production to sale, and accelerating achievement of self-sufficiency in food and the development of distribution and consumption system.

On the basis of a study and analysis of the present demand for fish in Guyana, potential demand in the future, the processing capacity of the equipment and transportation, the study team formulated the proper scale and specifications of the project as follows:

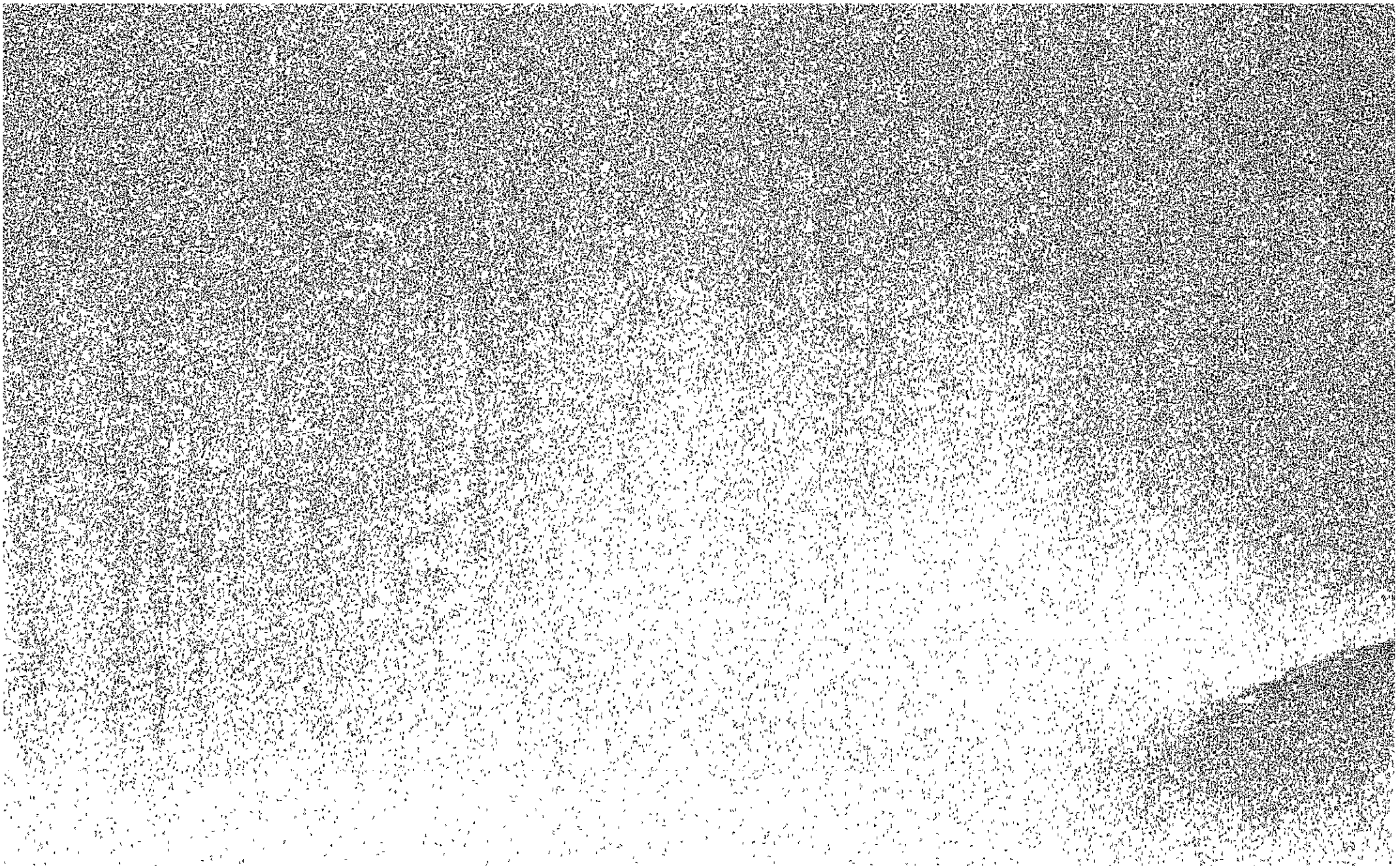
(1)	Fishing trawlers (20-ton type)	10
(2)	Shrimp grading machine	1
(3)	Ice making machine	1
(4)	Air blast freezing facility	1
(5)	Water treatment and purification system	1
(6)	Standby generator	2
(7)	Refrigerator truck	3
(8)	Fish boxes	5,000
(9)	Forklifts	2
(10)	Trawl Fishing Gears for 10 boats	3 years

The construction period for the shore facilities shall be 12 months, and for fishing trawlers and trawl fishing gear shall be 16 months, after the Exchange of Notes. With regard to the current number of shrimp trawlers of GFL in operation, there are no problems in terms of managing the technologies applied after the completion of the project. However, in terms of continuing management, there is a need to train capable specialists

who will be able to carry on this project with spirits of enterpreneur. This, together with budget control is vital to the success of the project.

In conclusion, the supply of the fishing trawlers, equipment and facilities for processing and freezing, as a means of achieving self-sufficiency in foods, means of production and distribution of fish, would contribute greatly to the alleviation of the depressed national economy of Guyana and would be a highly valuable and meaningful grant aid of the Japanese Government, while there are some aspects the Cooperative Republic of Guyana should endeavor to solve.

CHAPTER I INTRODUCTION



CHAPTER I INRODUCTION

The Cooperative Republic of Guyana, being independent from Britain in 1966, became a republic, and in order to realize "cooperative socialism", nationalized major industries such as the bauxite, sugar and lumber, paving the way for economic independence.

Due to the weak economic base, however, which can be regarded as the result of the monocultural industrial structure common to non-oil producing and developing countries, there has been in serious shortage of foreign currency over the past few years, and imports of all marine products have been prohibited since 1971. Controls have recently been expanded even to luxury foreign products and food.

Fortunately Guyana, located on the northern coast of the South American continent typified by high temperatures and heavy rainfall is rich in agricultural products such as rice, vegetables and fruits, and fishery resources whose potential of development is expected to be very large.

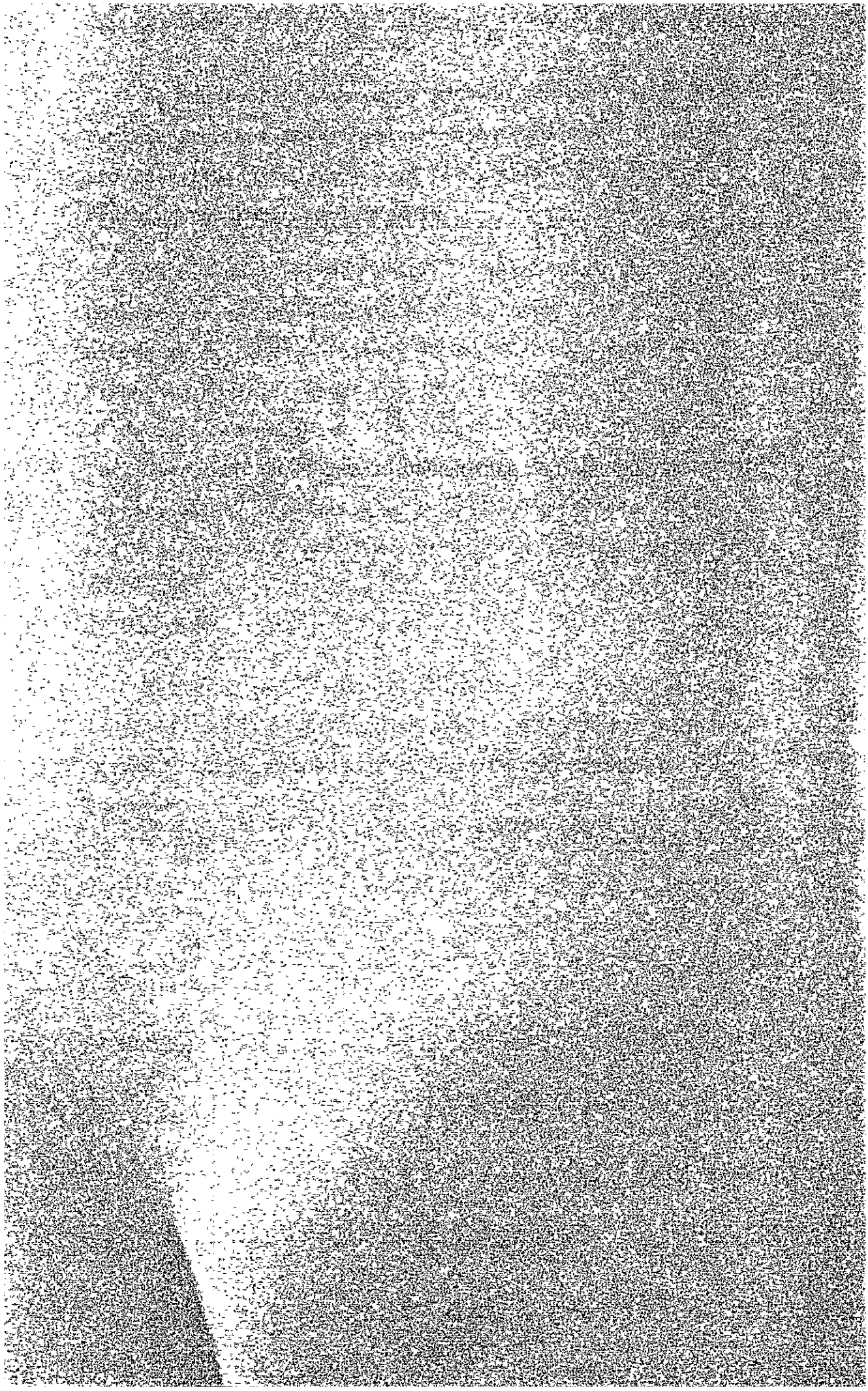
Against this background the Guyanese government, under the basic national policy of "nationalization and control of essential basic resources," targeted the development of a fishing port as the top priority of the country as a means of achieving self-sufficiency in food and securing foreign currency. The Demerara fishery port improvement plan is being executed with the GFL in three steps, with cooperation from Japan.

As the fourth program to promote the above plan by a further step the Government of Guyana requested Japan to provide fishing trawlers, and the related ice making & freezing equipment on the shore.

In response to the request, Japan International Cooperation Agency dispatched a Basic Design Study Team, headed by Mr. Ojima, Fishery Distribution Section, Fisheries Administration Department, Fishery Agency for 21 days from August 14 to September 3, 1984. The Study Team discussed the request with the officials concerned of Guyana, checked the details of the project to set up the basic design which would maximize the aid effect, and the team submitted a report based upon the results and analysis of the study.

The organization of the committee, the schedule for the investigation, list of persons concerned and progress record of discussions are shown in the accompanying documents.

CHAPTER II BACKGROUND OF THE PROJECT



CHAPTER II BACKGROUND OF THE PROJECT

2-1 Present Condition of the Fishing Industry in Guyana

The fishing industry of Guyana, facing the Caribbean Sea and having a shoreline of 426 km, are roughly divided into three sectors; (1) a commercial shrimp trawling fishery, (2) a coastal fishery mainly comprising small fishermen ogranized into a cooperative society and (3) a fresh-water fishery: including fish farms. A break-down of production shows that catches of small coastal fishermen account for over 80% of total production, while the fresh-water fishery has not reached a commercial scale yet. However, commercial shrimp trawling fishery has been operating with sufficient success as to enable them to export their catches. According to the statistics of the Ministry of Agriculture and Forestry of Guyana the production of the sea fishery in 1983 is as shown in the following table.

(Unit: M/T)

Item / Year	Shrimp Trawling			Coastal Fishery	Total
	Shrimp	Mixed Catch	Sub-total		
1981	2,686	2,176	4,862	16,265	21,127
1982	3,112	1,133	4,245	19,056	23,301
1983	2,712	*2,074	4,786	21,000	25,786

*The estimated amount was less than the actual amount because the forecast was made before the end of December 1983.

(1) Commercial Shrimp Trawling Fishery

The Guyana shrimp fishery started when a freezing and processing factory was built at Georgetown in 1957 by the Guyana Industrial Holding Co., Ltd. (G.I.H.) with British capital, and American shrimp fishing boats began operating. Since then Japanese shrimp fishing boats have also entered service and fishing is underway on the continental shelf off Guyana, with Georgetown as the base. The boats used are 72' double rigger, American Florida type. Although the number of boats operating had been changing for various reasons, since the establishment of the GFL in 1970 the operation of Guyanese shrimp has been led by the GFL, while foreign boats have either been operated under joint ventures or have paid for fishing rights. 132 shrimp boats including 23 GFL boats were operating from the Georgetown Demerara port as of the end of July, 1984. 22 of GFL's boats are now being replaced by new shrimp boats with an IDB credit. When all the boats have been replaced, catches are expected to improve. Among the foreign boats 75 belong to a local American corporation, Georgetown Sea Food which built a universal base in Providence district. These boats are new and very efficient. Guyana aims at operating a total of 150 boats, including 50 owned by GFL, 20 under contract and 75 owned by Georgetown Sea Food. With the maximum sea yield

(MSY) of bottom fish catch off Guyana including shrimps estimated by FAO statistics in 1971 at 65,000 tons, according to Guyanese sources and with the ratio of shrimps to mixed catches of shrimp boats at 6.3%, the shrimps MSY is calculated to be about 4,100 tons. This is close to capacity, as the catch of 150 shrimp boats is from 3,500 to 4,000 tons.

The shrimps caught are classified by size, frozen in the processing factory at Demerara base and exported mainly to Japan and America. Japanese imports of frozen shrimps from Guyana in 1983 were, approx. 816-ton worth 2,500 million yen (equivalent to about $10.6 million U.S. dollars: 1 U.S. dollar = 238 yen) and comprised pink, brown and white shrimps.

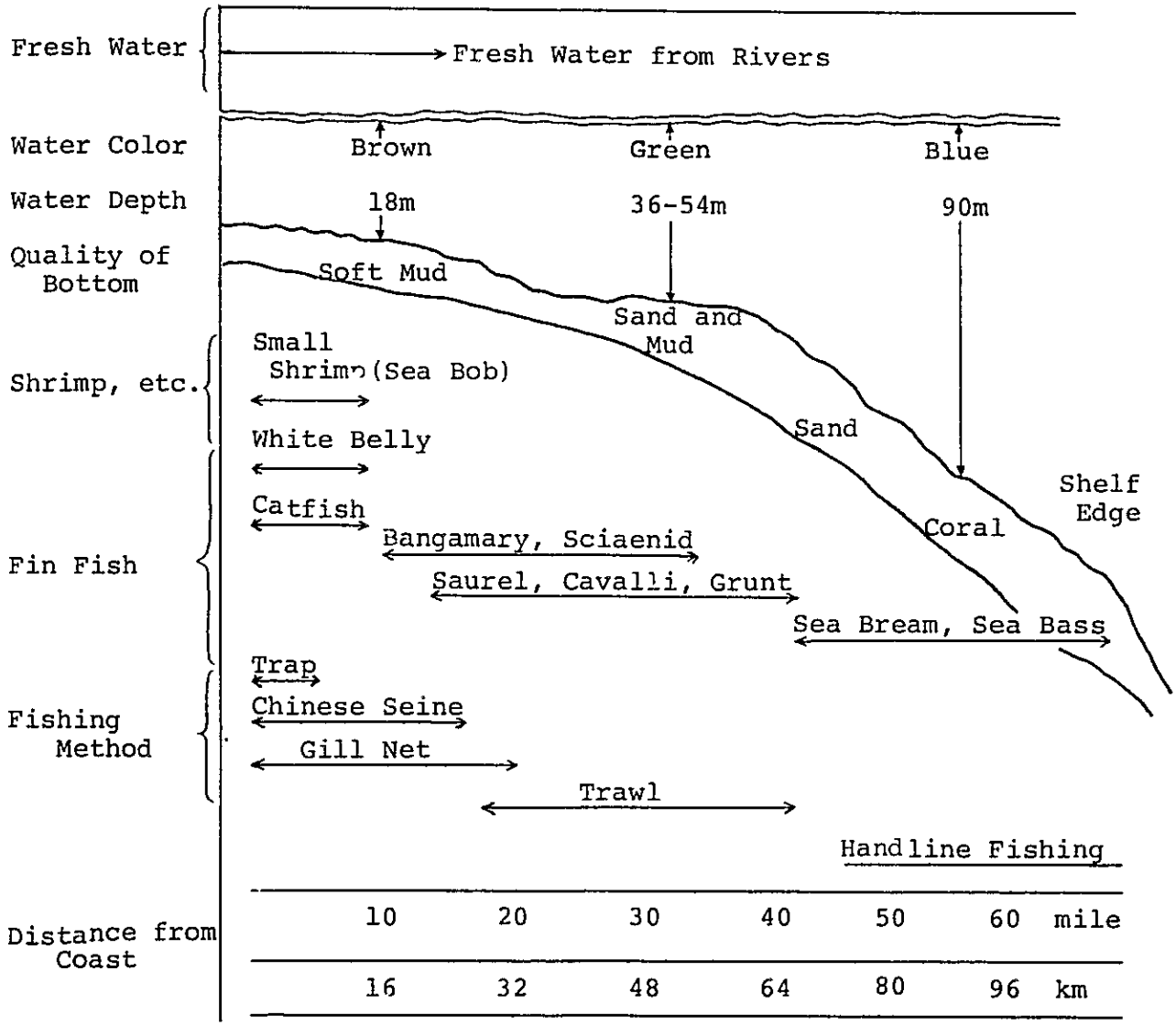
The landing conditions of bottom fish caught together with shrimps by boats based at Demerara, being most closely related to the plan, are described below. In 1971, the Guyanese Government prohibited imports of all marine products to protect foreign currency reserves and instructed all shrimp trawlers including foreign trawlers based at Demerara to land 4,000 pounds (about 1.8 tons) of bottom fish per trip, in addition to the shrimp catch. There were two reasons for this policy; to increase the fish protein products with the effective utilization of bottom fish resources and to prevent foreign currency

from flowing out of the country to pay for imported food. Trawlers exclusively used for fish were required to comply implement the policy and make the fishery contribute to the national economy. By the way, the fish caught together with shrimps are all purchased by the GFL regardless of species. The GFL then processes them after classification and sells the bulk on the domestic market. According to their data, the GFL handled 5,733,479 pounds (about 2,580 tons) of fish caught together with shrimps by the shrimp trawlers in 1983, and they are continuously trying to improve production.

(2) Coastal Fishery

The majority of the fish landed at Guyana are those caught by small fishermen operating in coastal waters; catches amounted to 21,000 tons in 1983. There are estimated to be 6,000 to 7,000 fishermen, with about 1,100 wooden boats measuring 6 to 15m. The fishing ground is the continental shelf until a depth of about 80 m, including the sandy and muddy area at the sea bottom which is rich in nutritive substances supplied by the rivers. Fishing is carried out with hand-lines in deep waters, while in shallow waters gill nets, barrier nets, trap nets, etc. are used. Among the catches are sea trout, butterfish, croker and bangamary. High-class fish such as sea bream and sea bass are caught with hand-lines. As for the Chart please refer to the next page.

Environment of Guyanese Coastal Fishery:
Chart of Fish Species and Fishing Method



One trip of a hand-line fishing boat carrying ice boxes with a crew of 7 to 8 is 12 to 15 days. The gill net fishing boats going to fishing grounds where the water is more than 20m deep are equipped with engines, while those which operate in local fishing grounds are equipped with an outboard motor or sail, and return within one day.

Fish caught by coastal fishermen are usually sold as fresh fish at markets not far from the local port. If supply exceeds demand at fresh fish markets, the excess fish are either sold to the GFL or are salted and dried.

Fish are the largest source of animal protein for the Guyanese. According to the statistics of Guyanese government for 1983, per capita fish consumption in 1983 was 60.5 pounds (27 kg).

The storing plant available to coastal fishermen is that of New Amsterdam Fish Processors Ltd.

There are two ice making machines with a capacity of 15 tons/day each in Georgetown and one 10 ton/day machine in New Amsterdam.

As described above, the coastal fishery in Guyana is basically a small scale family based fishery. Thus, to promote the development of the coastal fishery the Guyanese government provides (1) tax exemption for purchasing fishing tackle, (2) sub-

sidies on purchases of engines and fuel, (3) tax exemption for the fishery cooperative society and (4) material aid and technologies to construct fishery facilities (warehouse, fuel storage, etc.) The Guyana Cooperative Agricultural & Industrial Development Bank, which is established by the government to provide aid for agricultural development including fisheries, provides loans to coastal fishermen under far more advantageous conditions than city banks.

The coastal fishery in Guyana, whose general condition is described above, is in process of restructuring in the future, with emphasis on the fishery society, such as the preparation of fishery-related infrastructures and the acceleration of systemizing distribution with the support of the government.

2-2 Fisheries Development Plan

The role of the fishing industry in Guyana is determined by two basic national policies. The first policy is the "nationalization and control of essential basic resources" and the second is "to provide the nation with food, clothing and shelter."

The fishing industry, which contributes only 1.2% of the gross national product, plays a very important role in the Guyanese economy by providing the nation with animal protein. The government has great expectations that the industry will earn foreign currency through exports, in-

crease employment and play an increasingly more important part in the national economy.

In July, 1983, the Guyanese government set up a new medium term fishery development plan (1983 to 1990) based upon the ideas described below.

- The lack of management skills to catch, process and sell fish efficiently is a more serious problem than the resources available for the development of the Guyanese fishery. This is an area requiring improvement.
- The fishery must be managed to maximize profits while minimizing costs if fishing activities are to be expanded and resources effectively utilized.

The government has therefore established a fishery development plan in order to maximize the role of the fishery for economic independence.

(1) Commercial Fishery

The object of promoting the commercial fishery is to supply government-related enterprises and facilities w ith inexpensive protein and, if available, to export fish to CARICOM (Caribbean economic bloc). To achieve this end it is necessary to improve and prepare the fishing fleet by:

1) Studying whether it is possible and economical to increase catches of fish together with shrimp by shrimp trawling. (Canadian aid is scheduled.)

2) Building boats to replace GLF's shrimp trawlers and converting old shrimp fishing boats into fishing trawlers. (To be carried out with IDB funds.)

3) Building fishing trawlers (Japanese grant aid is requested.)

To cope with the increased fish catch receiving equipment and processing plants, such as a 40-ton ice making plant, air blast freezing equipment and a fish meal factory are to be constructed in the Houston district where the GFL head office is located at present. As far as distribution and sales are concerned, with the premise of self-sufficienty in food, cold storage warehouses are going to be built, and refrigerator trucks will be distributed not only in cities but also in local districts, to supply the nation with inexpensive protein through a nation-wide cold chain system.

(2) Coastal Fishery

The objects are to: A) install power units in small boats and prepare construction equipment to promote the coastal fishery. For this purpose to reinforce the existing fishery cooperative society and enhance management's capacity to handle business diversification including sales and distribution. B) To promote the landing of snappers, which

are the only fish thought capable of being sold for foreign currency from the coastal fishing grounds, thereby increasing income of the fishermen.

C) To increase the number of 40 to 50 feet class fishing boats, to study and introduce the new fishing gear and methods, and to proceed with a local port plan in addition to Demerara port.

(3) Fresh Water Fishery

Although the fresh water fishery in Guyana has no commercial base, 10 Guyanese states have set up their own plans in the field. Among the fish farmed are Telepia of Mozambique, and Nilotica, local Catfish, Grass Fish, etc. with which the following plans are proceeding.

1) Preparation and Expansion of Breeding Ponds

- Expansion of the fresh water pond in the botanical garden of Georgetown into a 2 acre breeding pond.
- Reopening the fresh water facilities at Matthews Ridge.
- Experimental breeding project at Rupununi.

2) Local Activities for Fish Farming

Establishment of a breeding center in each district to supply local traders with materials and to improve breeding technology by examning the fish produced in the respective districts.

3) Exports of Aquarium Fish

Attracting sales of aquarium fish bred to secure foreign currency.

(4) Examination and Training

The government of Guyana has set up the following examination and training plan to promote the effective development of the fishery.

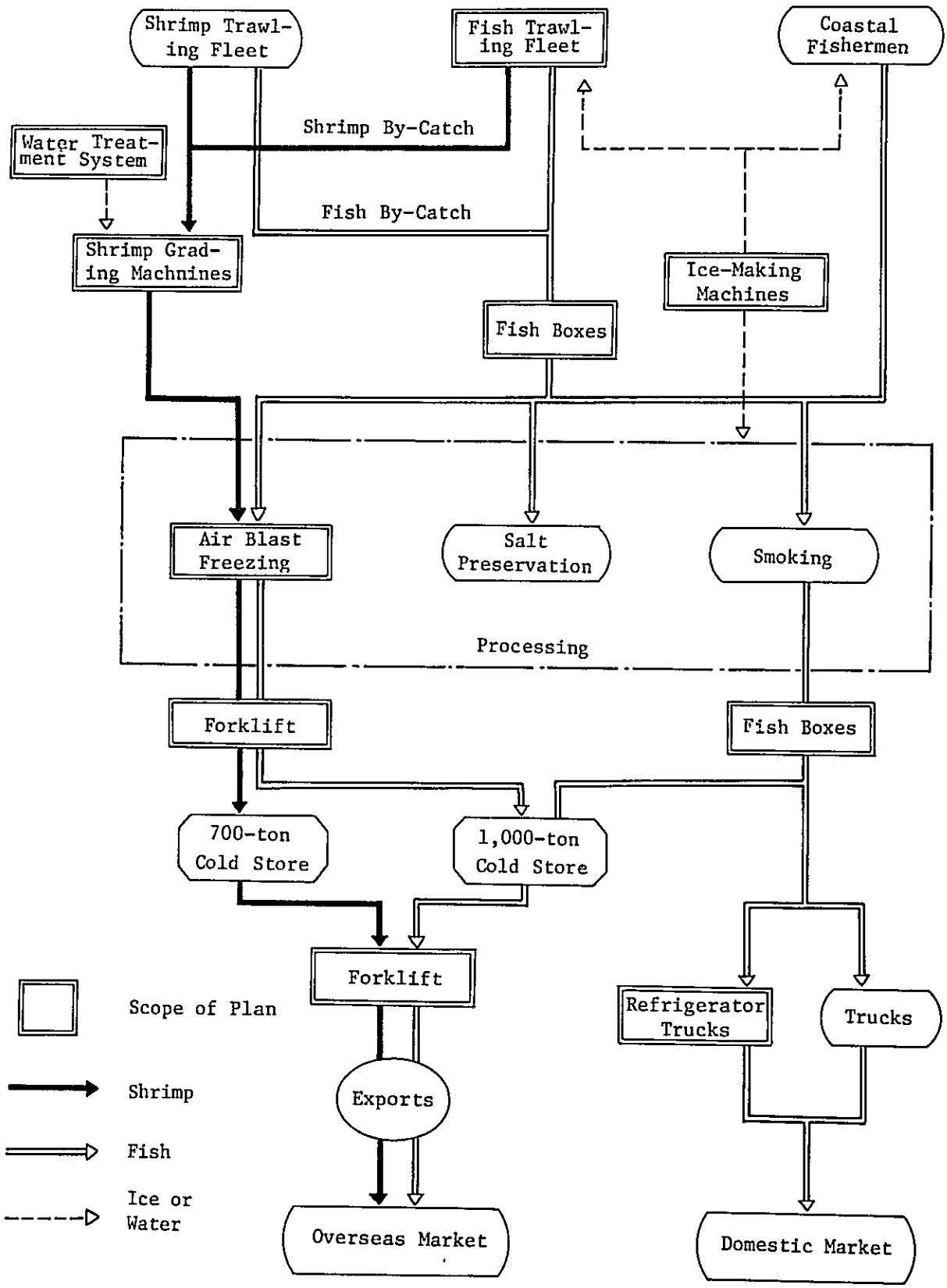
1) Examinations are to be carried out to evaluate and control resources, and to regulate fishing in Guyanese fishing waters.

2) Skilled technicians are to be trained in sailing, maintenance, ship building as well as repair and maintenance of factories.

The aspect of the plan currently under consideration is the promotion of commercial fishing by improving distribution and increasing catches from trawlers to provide the nation with as much fish as possible.

The management system mentioned above is tabulated as under.

Flow Chart of GFL's Activities from Production to Sales



2-3 Role and Present Status of the GFL

The GFL was established on September 30th, 1979 as a public corporation in charge of all public fishery and marine product processing projects in Guyana by merging the following companies.

- Guyana Marine Foods Ltd., established in 1972, a trawling fishery public corporation, financed by the government.
- Guyana Food Processing Ltd., established in 1976, financed 80% by the government and 20% by Yutaka Gyogyo.
- Trawling Department of Guyana Store Ltd., established in 1976, financed by the government.

GFL is threfore entirely responsible for all fishing by fishing vessels, including shrimp fishery, marine products processing and distribution and fishery development in the country.

2-3-1 Role and Target

- The role of the GFL is to:
  (1) Establish a stable fishing industry and to provide the nation with inexpensive fish protein.
  (2) Establish a processing method to maximize the utilization of fish caught including small fish.
  (3) Increase employment by using profitable production technologies.
- The targets GFL set from 1983 to 1984 to fulfill its role are as follows.

(1) To seek a stable market in Caribbean nations to sell a large portion of the fish caught and to export them to Europe.

(2) To control catches through an effective management organization, by modernizing processing & treating technologies and by quality control and cost reduction.

(3) To utilize new treatment technologies and machines, while carrying out training and producing high level products.

2-3-2 Present Status of GFL

GFL's equipment, on the west bank of the Demerara river, include:

- in Houston district - the GFL head office, landing piers for the shrimp trawling fleet and installations such as warehouses, repair yards, fishery net factories and slipways.
- in McDoom district - production equipment comprising a 1,000-ton and a 700-ton refrigerator, fish and shrimp processing factories, freezing & ice making equipment, etc.

There are 278 employees, 94 at Houston, 92 at McDoom and 92 shrimp trawlermen.

(1) Present Status of Fishing Fleets

1) Shrimp Trawlers

The GFL possesses 27 fishing boats, 23 shrimp trawlers and 4 wooden fish trawlers which

are under repairs (August 1984). The shrimp trawlers which have been in service for more than 10 years are in process of replacement with steel boats constructed with IDB funds (1983-1984). 17 shrimp trawlers at American Bender Shipbuilding Inc. have been already constructed and another 5 are being constructed at Guyana National Engineering in which 3 boats have already been delivered to GFL. As most of the boats are newly made, they are smoothly in operation. The final target is 150 boats, 75 owned by Georgetown Sea Food; the remaining boats will have overseas owners and be operated under licence. All the boats will be based at Houston on the Demerara river.

Meanwhile, the shrimp catch handled by the GFL in 1983 was 1.04 million pounds (468 tons) and fish caught together with the shrimps amounted to 5.73 million pounds (2,580 tons).

2) Shore Facilities at Houston Base

At the Houston Base are located the GFL headquarters, a repair shop, warehouse and related facilities including a fishing net factory. The administration at the headquarters is efficient and the management endeavours to keep up-to-date information on the volume of produce by using graph and tables.

Warehouse is in good order. There is adequate provision for safe storage of goods and materials and their handling in general is efficient.

Although some parts of rail at the slipway are in need of repair, it is capable of raising the rate of operation of shrimp trawlers belonging to GFL.

3) Problems in Managing Fishing Boats and Request to Japan

The GFL, while endeavoring to increase catches of shrimp and fish, has listed the following management problems.

- Poaching by foreign shrimp fishing boats in the Guaynese trawling fishing ground.
- Illegal disposition of shrimps by shrimp boats of Guyanese register at the fishing ground.
- The price of fuel is too high.
- Spare parts for boats are not always available.
- The fuel loading area for boats located upstream of the Demerara bridge is far from the base; this makes lay day of boats longer.

As countermeasures to these problems the GFL requests that Japan provides aid in the form of a patrol boat to control poaching and a

fuel tank with a capacity of 0.3 million British gallons at the Houston fishing fleet base.

4) Specifications of GFL Shrimp Trawlers purchased with IDB Funds

Item	Detail
Type	Forecastle, Florida-type, Double-rigger, Shrimp Trawler
Material	Steel
Length	72 feet
Width (at center of hall)	20 feet
Depth (at center of hall)	10 feet
Draft (at center of hall)	8 feet 6 inches
Free Board in departure condition	approximately 2 inches
Fuel Tank	11,000 British gallons
LO Tank	208 British gallons
Fresh Water Tank	4,000 British gallons
Fish Hold Capacity	2,350 cubic feet
Sailing Speed	About 9.5 knots
Bollard pull in departure condition (not less than)	4.5 tons
Main Engine	Caterpillar 3408 365 H.P.

Note: Shrimp Trawler "F.V. BONITO" built and delivered by Guyana Engineering on August 25th, 1984.

(2) Present Condition of Shore Plant

1) Ice Making & Storing Equipment

One American plate-type ice making machine is installed, facing the pier of the McDoom fishery processing factory, with an estimated capacity to make 15 tons of ice per day. But as the capacity of the ice store is only 5 tons, the equipment is operated only at night; far from 24 hour continuous operation. The ice is used to keep shrimp cool, for ice packs in factories and at sales points, but little ice is supplied to fishing boats at present.

2) Shrimp Grading Machine

One line of U. S. shrimp grading machines is installed in the fishery processing factory, whose grading capacity is said to be 12,000 pounds (approx. 5.44 tons) per day. Grading machine No. 1, has been in service for 15 years, and No. 2 and 3 for 8 years; they are therefore approaching the end of their useful lives, even though they are cleaned before and after use.

3) Freezing Equipment

·Air Blast Freezing

The air blast equipment has a capacity of 15 tons per day, and was installed in 1983 by

separating off part of a 1,000-ton refrigerator. This is the main freezing equipment of GFL at present for freezing shrimp and fish. The equipment is in very good operating condition.

·Rotary Freezer

One rotary freezer set (the capacity is estimated to be about 300 kg/hour) supplied by the EC is installed in the processing factory. The freezer has never been operated, because refrigerant (R-502 & R-11) is not available and because, even if it were obtained, running costs would be too high.

·Contact Freezer

Although 7 1,250-kg machines were supplied by the EC and installed, 4 of them have been removed as they broke down due to ammonia lacks etc. The remaining 3 machines are not used as the pumps for the ammonia liquid have failed (Ammonia leaks from the mechanical seal).

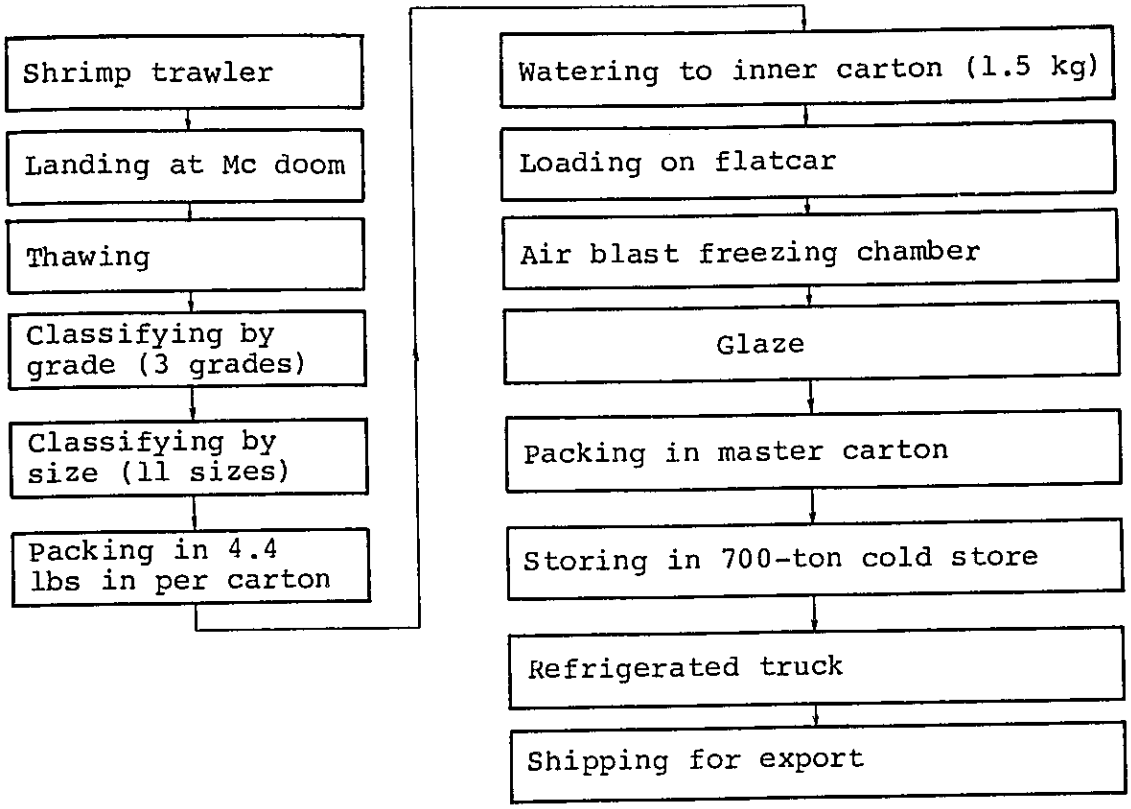
As mentioned above the GFL freezes shrimp for export and fish for the domestic market using the air blast technique. Shrimp and fish to be stored temporarily after landing are frozen slowly in the 1,000-ton cold store to make up for the shortage of the freezing capacity. Such being the case, the 1,000-ton refrigerator,

whose temperature not falls at all (-5°C to 10°C), is not playing the primary role of a refrigerator.

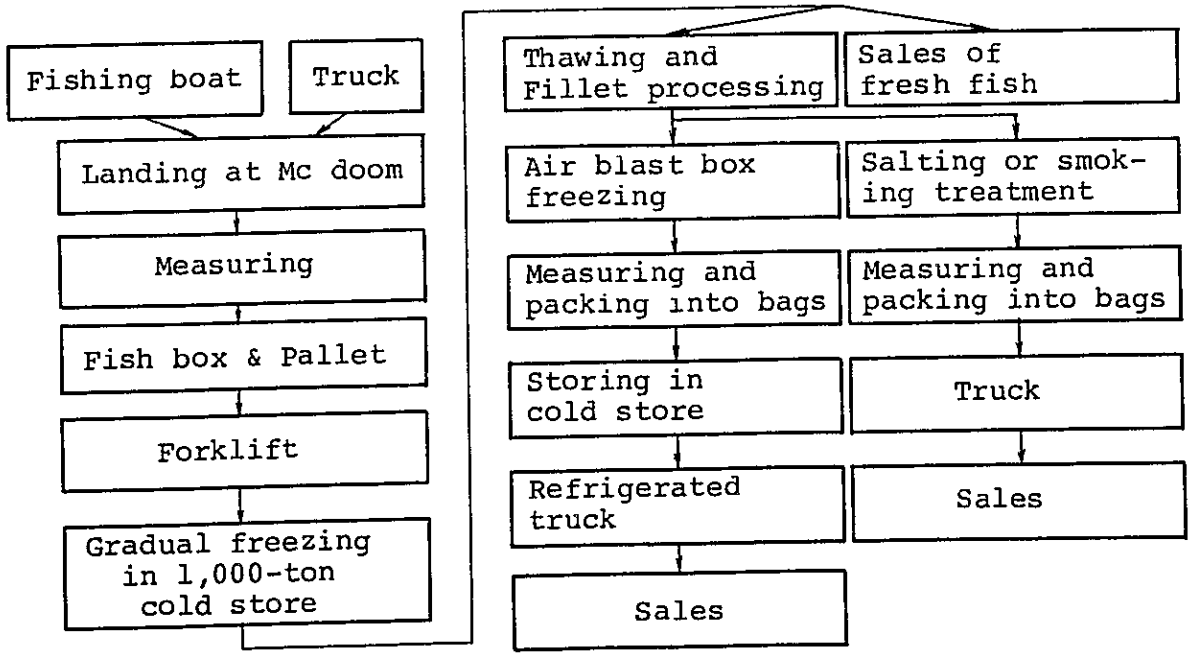
The following diagram shows the processing and treatment process at GFL's McDoom processing factory.

Diagram of Shrimp and Fish Freezing Process

1) Process of Shrimp Treating



2) Fish Treatment Process



4) Water for Processing Factory

The factory water used in the McDoom fish processing factory is drawn up by an under-water pump from a well located 215m to 300m under the site of the Guyana Timber Corporation and is stored temporarily in a tank ($150m^3$) at McDoom. The water in the tank is supplied by a pump without treatment to the processing factory, where it is used for the processing of shrimps and fish or for drinking water. GEL is using this water containing a large amount of iron for food processing. Especially, the ice pack of shrimps for export, further reduces the quality of frozen shrimps adversely affecting the reputation of the product overseas. reduces the quality of frozen shrimps adversely affecting the reputation of the product over-seas.

The investigating team brought back a sample of the water and as results of tests, the quality of the water are shown below.

Results of Tests on the Quality of Water used at Guyana McDoom Processing Factory

Item	Value		Standard Water Regulation Value of the Tokyo Waterworks Bureau
	Processing Water for Shrimp Treatment	Water at Exit of Well Pump	
Chlorine Ions	8 mg/l	8 mg/l	Less than 200 mg/l
Iron	0.82 mg/l	1.91 mg/l	" 0.3 "
Manganese	0.08 "	0.07 "	" 0.3 "
Hardness	19 "	22 "	" 300 "
Residue after Evaporation	34 "	46 "	" 500 "
pH Value	6.4 "	6.0 (23°C)	5.8 - 8.6
Color	20 degree	50 degree	Less than 5 degree
Turbidity	50 "	100 "	" 2 "

5) Standby Generator

Electric power in Guyana is supplied by the Guyana Power Supplying Public Corporation, which frequently fails to supply electricity because of the condition of steam power generating equipment (diesel engine) and defective maintenance.

According to the operating record of the standby generator for the 700-ton cold store supplied under the third Japanese grant aid, there were about 1,000 hours of power failures in the two years after operation started. For example, in the 16 day period from the 16th to 31st October, 1983, 22 power failures occurred and power way

stopped for a total of 58 hours. The power failures are quite a serious problem for a fishery processing factory handling fresh fish.

6) Refrigerator Truck

GFL processes 2 Brazilian Benz refrigerator trucks (with freezer) at the McDoom cold store and processing factory, which are used for

- Loading and transporting frozen shrimp for export to Georgetown port.
- Distribution of the frozen fish to GFL's shops in Georgetown.
- Transportation of the frozen and fresh fish to local cities.

The trucks have a load capacity of about 7 tons and are equipped with containers fitted with a freezer.

7) Forklifts

There are 3 forklifts in the McDoom processing factory, one of which, powered by propane gas, is not used at present because it is not economical and the exhause gas pollutes the air of the cold store. The remaining 2 forklifts, and one, which was provided under the third Japanese grant aid, all battery powered, are used efficiently in the 700-ton and 1,000-ton cold store., processing factory, landing piers, etc.. For example, 36 fish

boxes each containing 50 pounds of fish are loaded on a pallet at the landing pier and delivered to either the processing factory or cold store. The forklift in the cold store , used for stowage work, requiring a 3.6 m lift, is indispensable at McDoom factory.

8) Fish Boxes

The glass fiber fish boxes made in Denmark and marked GFL, which were provided by EEC as free aid, can hold about 50 pounds of bottom fish. The box, 660mm long, 330mm wide and 190mm deep, with drain holes at the bottom is widely used as a general purpose box for;

- Delivering fish caught together with shrimp by shrimp trawling in and out of the factory and cold store.
- Shipping processed marine products (salted & dried, smoked or frozen fish).
- Containing fish during processing.

(3) Present Condition of Landing and Processing of Shrimp & Fish

- GFL's landings in 1983 were as follows:

1) Shrimp Landings

(Unit: ton)

Company	Quantity
Guyana Fisheries Ltd.	92.1
Private	95.7
Fleets Inc.	106.7
Dashmood	0.2
Yutaka Head on	133.9
Yutaka Headless	39.5
T o t a l	468.1

2) Bottom Fish Landings

(Unit: ton)

Company	Quantity
Guyana Fisheries Ltd.	388.8
Georgetown Sea Food	1,533.2
Yutaka Fisheries Co.	32.8
Private	55.4
Fleets Inc.	146.8
Artisanal	423.0
T o t a l	2,580.0

·GFL's processed fish products in 1983 were as follows:

1) Salted & Dried Fish Production

(Unit: ton)

Fish	Quantity
Shark	39.1
Mixed	47.3
Sea Trout	3.0
T o t a l	89.4

2) Smoked Fish Production

(Unit: ton)

Fish	Quantity
Cavalli	5.4
Mixed	10.6
Bonito	-
Salmon	1.0
T o t a l	17.0

3) Frozen Fish Production 76.1 tons

4) Production of Fish Pickled in Vinegar 3.7 tons

The total production ofGFL's processed fish products in 1983 amounts to

1)+2)+3)+4) = 89.4 + 17.0 + 76.1+ 3.7 = 186.2 ton

(4) Distribution and Sales

The distribution and sales of GFL's products is roughly divided into two categories, for export and for domestic use. The main export product is the frozen shrimp destined for Japan and the U.S..

Small amounts of the fish are exported to Caribbean nations.

The breakdown of GFL's sales in 1983 is as follows.

ex-rate 1 G$ ≒ 65 Yen

Destination	Item	G $	Sales (yen)
Export	Frozen Shrimp	2,768,000	179,920,000
	Frozen Fish	12,000	780,000
Domestic	Shrimp	153,000	9,945,000
	Fish	7,863,000	511,095,000
Sub-total	-	10,796,000	701,740,000
Income from Processing	-	1,052,800	68,432,000
Total	-	11,848,000	770,172,000

The sales of GFL on the domestic markets are not organized except the retail shops in Georgetown, to which, are mentioned before, the products are delivered by two refrigerator trucks with a 7 ton capacity and ordinary trucks. With increased sales of frozen fish in the future, construction and preparation of local stock points and distribution centers will be required.

(5) Management of GFL

GFL is a national policy company which has great responsibility and authority for the development of fishery of Guyana. Although its management has been

greatly improved since it was established, the business shows a loss, the reasons are as follows.

As it is not long since it was established, they are not familiar with business management and do not have enough trained personnel.

The fishing boats, facilities and equipments which were taken over from the previous companies to GFL established with 3 companies amalgamated are now all worn out and not in full operation. Parts are difficult to obtain.

Since the business is in the deficit they have debt and interest is heavy.

We have described the present general status of GFL's Houston fishing fleet base and at the McDoom fishery processing base.
GFL needs to improve the operation of boats, product quality and reliability of its facilities.

To develop a functional fishery complex it is necessary to remove bottlenecks in both production and receiving, and to proceed with this plan taking GFL's characteristics into consideration, so that the facilities and machines, including those in operation, run efficiently.

2-4 Progress of Japanese Grant Aid and Features of the Plan

2-4-1 Progress of Japanese Grant Aid

Japan through its grant aid has cooperated to construct the Demerara Fish Port Promotion Plan in three steps in the past to the Government of Guyama.

Japanese Grant Aid covers the mooring piers, refigerators, office buildings and slipways located in the Houston and McDoom Districts which are listed in the table below, and focus on the fishery infrastructure. As to the effect of the aid items it can be said that almost all have been completely integrated into the base functions and contribute substantially to the fishery promotion plan, which is highly evaluated by the Guyanese Government.

Contents of Japanese Grant Aid

Order	Fiscal Year	Content of Aid
1	1975	(1) Pier and office building (2) Water and electricity supply equipment on the pier (3) Mobile crane (4) Road to slipway
2	1978	(1) Construction of office building and two work sheds on the pier in the first grant aid. (2) Administration house, office, rest house and locker room (3) Construction of additional pier, workshop, electricity room and ıd repair factory for fishing net
3	1980	(1) Extension of pier and fender pile (2) Work sheds on the pier (3) Slipway and work shed (4) 700 ton cold store (5) Workshop material (6) Fence and gate (7) Generator (2 units)

2-4-2 Contents and Features of the Plan

With the aim of positioning the fishery more firmly as a basic industry and making it contribute to the stabilization of their national economy, the Guyanese government requested for Japan to provide grant aid for the fourth Demerara fishing port plan. The contents and features of the plan confirmed by the field survey are as follows.

(1) Content of Request

	I t e m	Standard	Quantity
1	20 ton Fishing Trawlers	Made of FRP	10
2	Shrimp Grading Machine	8,000 pounds/ day	1
3	Ice Macking Machine	15 tons/day	2
4	Refrigerator Trucks	Each with two refrugerator containers	2
5	Forklifts	1.5 ton Powered by Battery	2
6	Water Treatment and Purification System	50 tons/day	1
7	Fishing Gear for Fishing Trawler	for 10 trawlers	For 1 year
8	Air Blast Freezer	15 tons/day	1
9	Standby Generators	275 KVA	2
10	plastic Fish Boxes		5,000

(2) Features of the Contents requested

The main content of this request, which differs from conventional requests oriented toward shore

installations, includes; (1) Expansion of the fishery production with the introduction of fishing trawlers, (2) Improvement of receiving functions to cope with the expansion, (3) Improvement of quality control associated with shrimp processing and (4) Preparation of distribution system and increasing sales. It is imperative that a balance in production and sales should be maintained. When the plan is completed, the fishery base of Demerara fishing port will have been equipped.

2-5 Condition of Facilities

(1) Fishing Boat Facilities

·Guyana National Engineering Corporation

This company is located in a district of Georgetown by the Demerara river and has already constructed 126 vessels. They have 252 regular workers and 150 temporary workers, one 800 ton dry-dock and one repair shop whose machines are of a little dated. The company is going to build and deliver 572 feet, double rigger shrimp trawlers to GFL purchased with IDB funds, including one now under construction. There is an American supervising engineer. The repair work for the fishing trawlers will be carried out in this dockyard and no technical problems are anticipated.

·Friendship & Co., Ltd.

This company, located up-stream of the Demerara Harbour Bridge and on the banks of the Demerara river is operating a privately owned slipway. Maximum ship dimensions are L x B x D = 80 ft. x 23 ft. x 95 ft. There are 7 to 10 employees: 5 are regular workers.

As the GFL's slipways are in bad condition at present, GFL's shrimp boats use either Friendship's slipway or Guyana National Engineering Corp.'s dock. As about 12 vessels are grounded a month at Friendship, they are fairly busy.

The slipway charges are listed in the tables below.

Basic Grounding Charges

Grounding Charge	Wooden Vessel	Steel Vessel
Grounding Time First 48 hours	700 G$	900 G$
Grounding Time 48 to 72 hours	300 "	350 "
Grounding Time 72 to 96 hours	325 "	375 "
Grounding Time more than 96 hours	350 "	400 "

Charges for Work during Grounding

Steel Vessel		Wooden Vessel	
Work	Charge	Work	Charge
Bottom cleaning, washing and painting	900 G$	Bottom cleaning, washing and painting	800 G$
marking one coat vessel name and registered port	100 G$	marking one coat vessel name and registered port	100 G$
Cleaning strainer	90 G$	Cleaning keel cooler (one piece)	160 G$
Draft mark (4 positions)	100 G$	Inspection and cleaning of kingstone valve and strainer	90 G$
Registered number (2 positions)	100 G$	Removal and installation of propeller	250 G$
Replacement of propeller	250 G$	Installating a zinc plate on Bottom hull	15 G$
Replacement of ground shaft	75 G$	Inspection of cutless bearing	40 G$
Cleaning and installation of kingstone valve	90 G$	Special painting-one coat	300 G$
Special painting one coat	300 GE		

·United Plastic Works

This company (located at No. 8, Good Hope, East Coast, Demerara) Manufactures furniture, bodies for machines and small boat by FRP. It imports glass fiber from America and England at 1 US dollar per pound and plastic from America at 400 US dollars per 1 D/M. Established 14 years ago, the company now has 20 employees. Due to a lack of foreign currency they sometimes have difficulty getting raw materials.

If the fishing trawlers of FRP are to be used, small repairs can be made satisfactorily by this company.

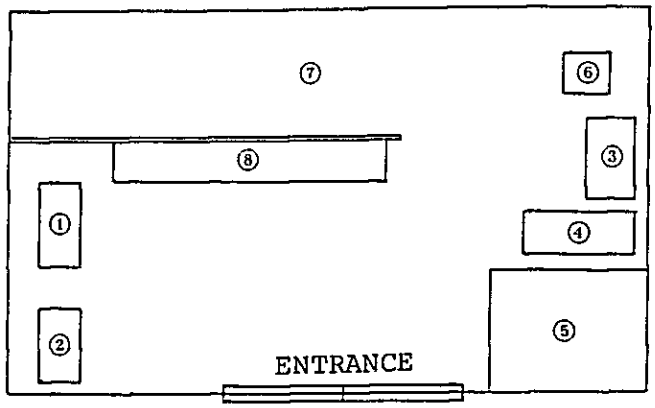
(2) Guyana Shipping Corporation

Located down stream of the Demerara river Houston, this company handles all business concerning foreign vessels. The wharf, on the Demerara river, is 750 feet (230 m) in length, along which two 1,000 ton cargo boats can moor at a time. Cargo boats from Japan dock here once a month regularly. There is a large bonded warehouse by the wharf, where cargo is kept for 17 days after unloading for customs clearance. Transportation of the materials related to the project will raise no problems as a 20-ton trailer is available. If customs clearance is started immediately after shipment from Japan, cargo can be cleared the moment the ship docks in the port.

(3) GFL's Retail Shops in Georgetown

There are three GFL retail shops in Georgetown at; (1) McDoom, (2) Regent Street and (3) Shell Road Kitty, where GFL's fish products and seasoning are sold. The stores, about 100 m^2, are arranged as shown in the sketch below.

Sketch of GFL's Retail KITTY Shop



1) Freezer for frozen shucked shrimps
2) Stocker containing frozen shark and dog food
3) Stocker containing Thai and Spanish mackerels pickled in vinegar
4) Freezer containing frozen bangamary
5) Cashier
6) Clerk who sells by weight
7) Clerk who sells fish from GFL's fish boxes
8) Seasoning arranged for sale

Sales Prices at GFL's Shell Road Kitty Shop

Goods	Standard	Price(G$)	Price(yen)
Rice Flour	2 lbs in 906 g package	3$-15¢	205 yen
Curry Powder	8 oz (227g)	8$-10¢	527 yen
Frozen Shucked Shrimp	71 up in 2 lbs box	30$/case	1,950 yen/ case
Frozen Spanish Mackere (pickled in vinegar)	in 1.5 lbs package	5$-25¢/lb.	758 yen/ kg
Frozen Red Sea Bream	with head	8$-75¢/lb.	1,264 yen/ kg
Frozen G/G Bangamary	in 2 lbs package	5$-60¢	404 yen/ kg
Frozen Fillet Bangamary	in 2 lbs package	10$-00¢	722 yen/ kg
Frozen Butter Fish G/G	in 2 lbs package	8$-00¢	578yen/ kg
Black Pepper	package of 1 oz	4$-05¢	263 yen/ oz
Meat & Fish Spice	package of 2 oz	2$-25¢	81 yen/ oz
Baking Powder	package of 8 oz	2$-70¢	22 yen/ oz

GFL's Sales Prices Classified by Fish and Cut

(1G dollar ≒ 65 yen)
(1 lb = 450 g)

Goods	G$/lb	Yen/kg
Mixed Fish	1$-25¢	181 yen
Trout (F)	7 -15	1,033
Trout (D)	3 -75	542
Croker (D)	2 -80	404
Butter Fish (D)	4 -00	578
Bangamary (D)	2 -80	404
Sea Bass (Block)	5 -00	722
Sea Bass (Head)	1 -25	181
Shark (Salted)	5 -75	831
Trout (Salted)	6 -00	867
Mixed Fish (Salted)	4 -75	686
Cavalli (Smoked)	6 -00	867
Salmon (Smoked)	6 -00	867
Mixed Fish (Smoked)	4 -50	650
Spanish Mackerel (Pickeled in Vinegar)	5 -25	758
Small Fish	5 -00	722
Shucked Shrimp (in 2 lb package)	30 -00	2,167
Cocktail Shrimp(in 2 lb package)	43 -00	3,106
Frozen Shrimp (51 to 61 pieces) 4.4 lbs	70 -00	2,253
Frozen Shrimp (61 to 70 pieces) 4.4 lbs	66 -00	2,167
Pet Food	0 -85	123

Note: (F)... Fillet (D)... Dressed

We have described the condition of fishing trawler repair facilities, delivery of materials and retail shops, which are related to this project. As shore equipment such as the ice making machine, freezing equipment, water treatment system are to be installed in GFL's McDoom factory, there is no particular problem, although some assistance is required for the labour force of Guyanese workers to install the equipment.

CHAPTER III CONTENTS OF THE PROJECT