

JICA INTERNATIONAL COOPERATION AGENCY (JICA)

No. 1

TRADE, INDUSTRY, ENERGY AND PRODUCTION GRENADA
MINISTRY OF AGRICULTURE

**BASIC DESIGN STUDY REPORT
ON
THE ST. GEORGE'S ARTISANAL FISHERIES
COMPLEX PROJECT
IN
GRENADA**

MARCH 1994

OVERSEAS AGRO-FISHERIES CONSULTANTS CO., LTD.

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JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

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PREFACE

In response to a request from the Government of Grenada, the Government of Japan decided to conduct a basic design study on the St. George's Artisanal Fisheries Complex Project and entrusted the study to the Japan International Cooperation Agency (JICA).

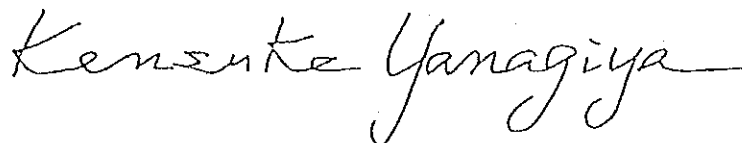
JICA sent to Grenada a study team headed by Mr. Hitoshi Fujita, Chief Fisheries Officer, Office of the Overseas Fisheries Cooperation, Fisheries Agency and constituted by members of Overseas Agro-Fisheries Consultants Co., Ltd., from 21 September to 20 October, 1993.

The team held discussions with the officials concerned of the Government of Grenada, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Grenada in order to discuss a draft report, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of Grenada for their close cooperation extended to the teams.

March, 1994



Kensuke Yanagiya
President

Japan International Cooperation Agency

March 1994

Mr. Kensuke Yanagiya
President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Transmittal

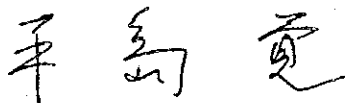
We are pleased to submit to you the basic design study report on the St. George's Artisanal Fisheries Complex Project in Grenada.

This study was conducted by Overseas Agro-Fisheries Consultants Co., Ltd., under a contract to JICA, during the period 27 August 1993 to 31 March 1994. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Grenada and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

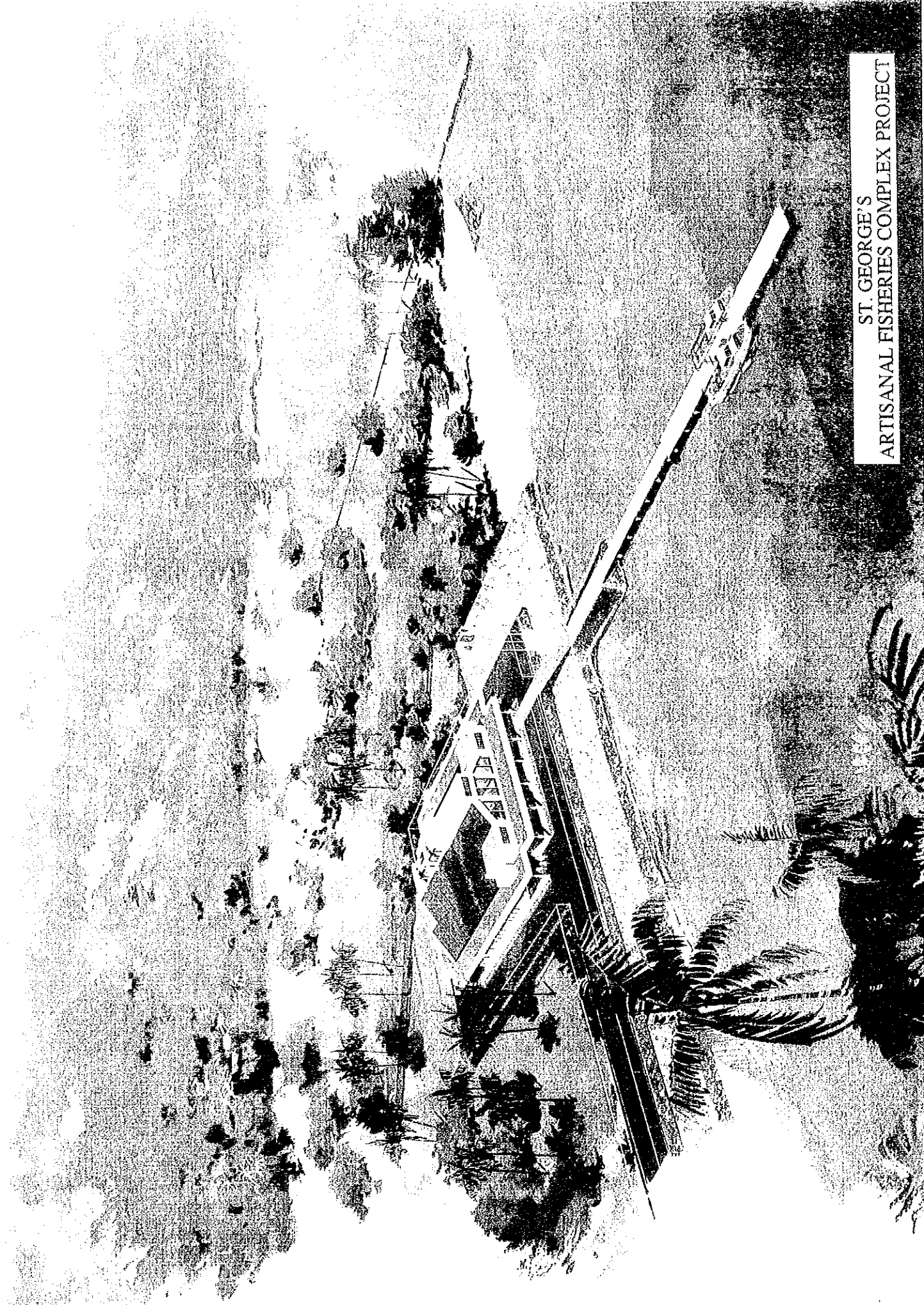
We wish to take this opportunity to express our sincere gratitude to the officials concerned of JICA, the Ministry of Foreign Affairs, and the Ministry of Agriculture, Forestry and Fisheries. We would also like to express our gratitude to the officials concerned of Ministry of Agriculture, Trade, Industry, Energy and Production, the Embassy of Japan in Trinidad and Tobago for their cooperation and assistance throughout our field survey.

Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

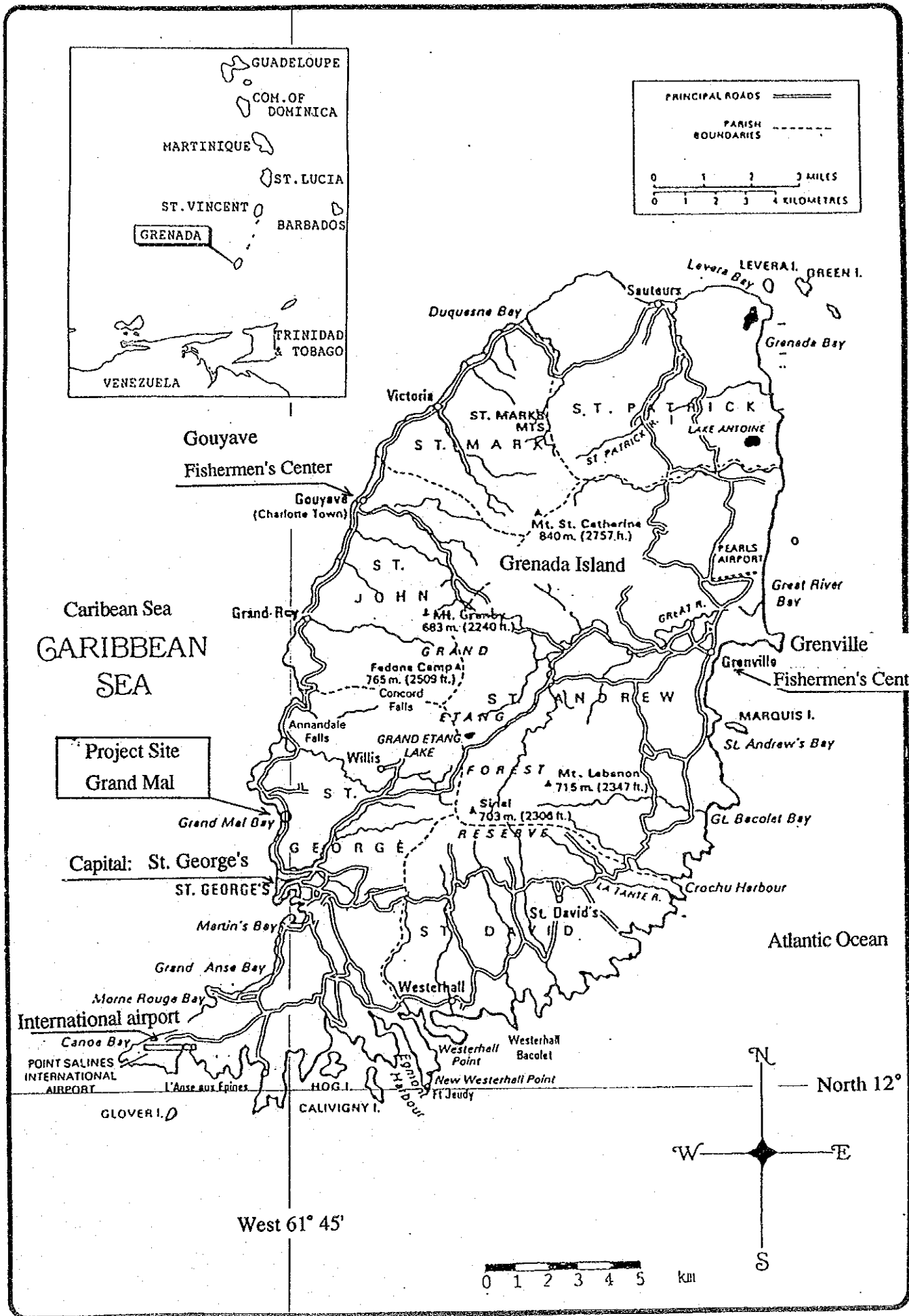


Satoru Hirashima
Project Manager,
Basic Design Study team on
the St. George's Artisanal Fisheries
Complex Project
Overseas Agro-Fisheries Consultants Co., Ltd.



ST. GEORGE'S
ARTISANAL FISHERIES COMPLEX PROJECT

Map of Planning Site



SUMMARY

Located in the Eastern Caribbean Sea north of the South American continent, Grenada is made up of the three islands of Grenada, Carriacou and Petit Martinique, the southernmost of the Windward Islands.

The central to southern part of Grenada Island is mountainous. The island has an area of 344 square kilometers. As its other name, the Island of Spice, indicates, Grenada's main crops are cinnamon, nutmeg, ginger, black pepper, vanilla and other spices. In addition, bananas, cocoa and other crops are also produced. These agricultural products account for about 20 percent of Grenada's GNP. In recent years, however, the reduced production and lower quality of such main products as nutmeg and mace (a spice made from the dried skin of nutmeg seeds) has led to a reduction in export volume. In addition, increased exports of these products from Indonesia has led to a depressed export market for Grenadian products, with the result that Grenada is experiencing lower foreign exchange earnings. The difficult financial situation, the lack of investment in the private sector by the financial market, and the chronically fragile financial base have also led to stagnation in the country's economy.

In order to revive the economy, Grenada is trying to improve its industrial structure and promote the tourist industry. In regard to primary industries, it is trying to change from a dependence on traditional crops and convert to the production and export of a more diversified crop base. At the same time, it has also implemented a policy to improve the production efficiency of crops. As part of this policy, Grenada is trying to improve its fishing industry by developing coastal fishing, increasing domestic consumption of marine products, improving distribution of marine products, maintaining a stable supply of marine products, and decreasing reliance on imports of marine products. It has also positioned the fishing industry as a 'link' industry with the tourist industry. In addition, it is promoting exports of marine products in order to obtain foreign currency, and the country has high hopes for the promotion of the commercial fishing industry, so that it can effectively utilize its marine resources.

The existing fisheries-related facilities in St. George's, the capital, must serve as the core for the expansion and promotion of the commercial fisheries industry, but these facilities are aging. As a result, there are many problems, including decreasing functionality and a lack of refrigeration capacity and ice-making ability, etc. In addition, the Port Authority is

demanding the removal of these antiquated facilities, with the result that preparation of a fisheries foundation near the capital is urgently required.

Because of these circumstances, in 1992 the Government of Grenada established Grenada Commercial Fisheries Limited (hereinafter referred to as GCFL) to promote and revitalize the commercial fisheries industry and part of the government-owned fisheries facilities managed by the Fisheries Division was transferred to GCFL. However, because the existing fisheries-related facilities at the capital of St. George's are suffering from the aforementioned difficulties, it is necessary to construct a new complex which has fish landing, processing and storage, ice-making, and distribution and sales facilities and which can become the core for the modernization of Grenada's fisheries industry. To this end, the St. George's Artisanal Fisheries Complex project, which includes the improvement of resources and materials for fisheries activities, was formulated. In order to implement the project, the Government of Grenada has submitted a request for Grant Aid from the Government of Japan.

In response to this request, the Government of Japan decided to conduct the Basic Design Study for the Project and the Japan International Cooperation Agency (JICA), commissioned by the Government of Japan, sent the Basic Design Study Team to Grenada for the period between September 21st and October 20th, 1993 to conduct the field survey. Following the completion of the Draft Report, JICA sent the Explanatory Team to Grenada for the period between January 24th and February 4th, 1994 to explain the contents of the Draft Report.

Through the field survey in Grenada and analysis of the survey results in Japan, the Basic Design Study Team identified the following points of improvement to improve coastal fisheries in Grenada.

- (1) Development of fish landing facilities at St. George's for the smooth operation of all fishing-related activities, including sailing out and fish landing.
- (2) Development of fish processing and storage facilities to provide hygienic locations for the processing, packaging and shipping of fresh tuna for export and to process fish for the domestic market.
- (3) Encouragement of the use of ice during transportation and after landing of the catch to preserve fish freshness and to improve the quality of marketed fish for higher commodity value.
- (4) Establishment of an efficient fish transportation system between local fishing ports and the domestic and overseas markets to consolidate the distribution and sales system for marine products.
- (5) Provision of technical information and data, including that on the repair of fishing gear, availability of spare parts, fishing performance and fish prices, to support fishing activities.

The Grand Mal district near the capital is the planned site for the Project. The Project aims to promote fisheries in Grenada, through the construction of basic fisheries infrastructure such as ice-making & storage, chilled & cold storage, fish processing and fish landing facilities, and through the provision of related equipment and machinery

The facilities and equipment necessary to implement the Project are outlined below.

| Category | Facility/equipment | Shape, specifications, purposes | Quantity |
|--|--|--|--------------------------------------|
| Fishing harbor basic facilities | Jetty | Steel pipe pile construction (depth -1.5 to -2.7 m) | Length: 90 m |
| | | Causeway surface (riprap) | Length: 20 m |
| | Revetment | Slope type (installing stone veneers) | Length: 80 m |
| | Road paving | Asphalt | Length: 300 m |
| Buildings | Fisheries facility | Reinforced concrete structure/ PC pile foundation | Building area: 977 m ² |
| Attached equip. | Water supply equip. | Water resevoir tank | 60 m ³ |
| | | Elevated water tank | 4 m ³ |
| | Drainage equipment | Septic tank (for daily waste water) | For 25 persons |
| | Electrical equipment | Emergency generator, 40 KVA | 2 units |
| Ice-making equip., storage equip., etc. | Ice-making machine | Flake ice (R-22), 5 tons/day | 2 units |
| | Ice storage | 0 °C (for ice storage), 42 m ³ | 2 units |
| | Chilled storage | 0 °C (for fresh fish storage), 51 m ³ | 2 units |
| | Cold storage | -20 °C (for frozen fish storage), 51 m ³ | 2 units |
| | Blast freezer | -25 °C (for freezing fish), 1 ton/day | 1 unit |
| Machinery & equipment | Insulated vehicle | 2.0 ton capacity | 1 unit |
| | Insulated vehicle | 1.0 ton capacity | 1 unit |
| | Forklift | 1.5 ton capacity | 1 unit |
| | Small crane track | 350 kg : (lifting) (for large tuna) | 2 units |
| | Carts | For transporting tuna, 500 kg | 4 units |
| | Carts | For transporting ice, 300 kg | 5 units |
| | Fish boxes | For transporting ice (with lids & handles), 100 kg | 20 boxes |
| | Quality inspection equipment | | One set |
| | Fish processing equip. | | One set |
| | Repair tools for facility & equipment | | One set |
| | Repair tools for small fishing vessel engines | | One set |

The project will be under the supervision of the Ministry of Agriculture, Trade, Industry Energy and Production, and managed by GCFL, the executing organization. The facilities constructed in the project will be the center of commercial fisheries in Grenada and will be used for training of fishermen and expansion of fishing techniques. At the same time, this facility will buy, process, store and sell marine products for the purposes of increasing the amount of fish caught, providing a stable supply of marine products to the domestic market and promoting the export of large migratory fish.

This project will be executed in two stages.

Phase 1 of the plan calls for four months for implementation design and eleven months for the construction period. Phase 2 calls for four months for implementation design and ten months for the construction period. The contents of each Phase are as follows:

Phase 1: Engineering work (construction preparation, temporary construction, banking construction, pier construction, revetment construction), completion of fish landing facilities

Phase 2: Building construction (fisheries facilities: cold & chilled storage, ice-making machines, processing area, offices, other), completion of processing and storage facilities

The implementation of the project will greatly improve the fisheries environment, and through the promotion and development of commercial fisheries, the following specific effects are expected:

- (1) By constructing a jetty adjacent to processing and storage facilities, large tuna can be handled more efficiently, the freshness of fish for export can be preserved, and higher unit prices for exported fish can be expected.
- (2) The securing of processing and storage facilities will contribute to promoting the export of fresh fish, obtaining of foreign currency, increasing the income of fishermen, and stabilizing the lives of fishermen.
- (3) By providing ice to fishermen, the quality of marine products after they are caught will be improved, revitalizing the domestic fresh fish market.
- (4) In the fisheries environment of Grenada in which the catch fluctuates greatly from season to season, the securing of chilled and cold storage facilities for domestic products will increase the enthusiasm of fishermen to work throughout the year. This will lead to the promotion of fishing and increase in the size of the catch.
- (5) By effectively utilizing marine resources near Grenada, the demand for domestic marine products will be increase, there will be a contribution to the tourist industry, and reliance on imported marine products will be reduced. This will help to reduce the flow of foreign currency abroad and contribute to the obtaining of foreign currency.

- (6) The secondary effects of the above will contribute to the stabilizing of the lives of not only fishermen, but of all citizens, and will also help to stabilize the economy.

For these reasons we believe that implementing this project through Grant Aid from the Government of Japan is very meaningful.

In order to efficiently achieve these results, the GCFL which is the operating organization for these project facilities must play a major role in promoting small scale fisheries, promoting education concerning the need for freshness in the fisheries industry, and establish and promote a foundation for commercial fisheries. In considering the maturing of commercial fisheries under healthy management and an improved fisheries environment, in the future these project facilities should be kept under the ownership of the government. However, in order to further open the distribution market for fresh fish and increase the willingness of fishermen to work, the management should be transferred from the GCFL to a semi-public organization such as the Grenada Fisheries Cooperative which stands on the producers side.

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LETTER OF TRANSMITTAL

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CHAPTER 1
INTRODUCTION

CHAPTER 1 INTRODUCTION

1-1 Objective of the study

In order to restructure the economic conditions in Grenada which are suffering from a slump in exports of agricultural products and a worsening balance of trade in recent years, the Government of Grenada has reviewed its industrial structure. As a result, it has decided on a policy to reduce the dependence on the export of traditional agricultural products, convert to the production and export of a more diversified crop base, and improve agricultural production efficiency. As part of this policy, the Government of Grenada is making an effort to improve the fisheries industry by increasing the catch and increasing domestic consumption of marine products, as well as improving distribution, maintaining a stable supply, and decreasing imports of marine products. It has also positioned the fisheries industry as a 'link' industry with the tourist industry and is promoting exports of marine products in order to obtain foreign currency and to effectively utilize the available marine resources. To date, the Government of Grenada has implemented the Artisanal Fisheries Development Project (AFDP) and Coastal Fisheries Development Project (CFDP) to promote fisheries, improve fishing gears and methods, and reinforce the fisheries foundation in local areas. In regard to fisheries production, in 1992 the Government of Japan provided Grant Aid for the introduction of eight long-line tuna fishing vessels, and this has contributed to the transition from artisanal fisheries to commercial fisheries. However, in the capital of St. George's, the fisheries-related facilities which must play the role of the main base for the expansion and promotion of the commercial fisheries industry are aging. As a result, the functionality of these facilities is decreasing and there is a lack of storage capacity. Therefore, improvement of the fisheries infrastructure near the capital is urgently needed.

Under these circumstances, in July 1992 the Government of Grenada established Grenada Commercial Fisheries Limited (hereinafter referred to as GCFL) and part of the government-owned fisheries facilities managed by the Fisheries Division was transferred to GCFL. After that, the St. George's Artisanal Fisheries Complex project was formulated with the intention of providing a core for the modernization of Grenada's fisheries industry through the improvement of resources and materials for

fisheries activities; this project includes plans for the construction of a new complex which has fish landing, processing and storage, ice making, and distribution and sales facilities. The project will replace the fisheries facilities of the old Artisanal Fisheries Development Project. The Government of Grenada has submitted a request to the Government of Japan for Grant Aid for project implementation.

This study was conducted pursuant to the St. George's Artisanal Fisheries Complex project submitted by the Government of Grenada for the following purposes: understand the specific contents and background of the request, investigate the scale and management structure of the implementing organization, consider the social and economic effects of the Project, and consider the appropriateness of providing Grant Aid for the Project. At the same time, the study group was given a mandate to create a basic design for the necessary and appropriate scale for the facilities and equipment in the project, and summarize those findings in the basic design study.

1-2 Dispatch of study team

The Japan International Cooperation Agency (JICA) sent to Grenada a basic design study team headed by Mr. Hitoshi Fujita, Chief Fisheries Officer, Office of Overseas Fisheries Cooperation, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries, from September 21 to October 20, 1993. This team conducted the necessary investigations, collected data and held discussions with the concerned government personnel. During their stay, the team exchanged the minutes of discussions with the concerned officials from the Government of Grenada. (Refer to Appendix 4.)

Upon returning to Japan, the above field survey result was analyzed and a draft final report was summarized. Then, in order to discuss and confirm the content of the basic design, the Japanese government entrusted the Japan International Cooperation Agency (JICA) to dispatch a draft report explanation team headed by Yoshio Ishiyama, Associate Specialist on Fisheries, Second Basic Design Study Division, Grand Aid Study & Design Department, JICA to Grenada from January 24 to February 4, 1994.

1-3 Contents of the study

The basic design study team conducted the following activities to study the possibility of providing Grant Aid.

- (1) Study of the background and feasibility of the request.
- (2) Study of National Plan related to the project.
- (3) Study of the present conditions and problems with the fisheries and the marketing system of marine products.
- (4) Discussion and study of the contents and scale of the Project.

- (5) Confirmation of an executing agency, operational structure and scope of work for the project.
- (6) A survey of the project site.
- (7) A survey of relevant facilities.
- (8) Collection of data related to the project.

Based on the survey results, this report summarizes the basic design of the facilities and equipment, implementation system, the project evaluation, and suggestions, etc. judged to be appropriate for the implementation of the project. The member list of the survey team, survey schedules, minutes of discussions, and list of interviewees are found in the Appendix.

CHAPTER 2

BACKGROUND OF THE PROJECT

CHAPTER 2 BACKGROUND OF THE PROJECT

2-1 General information

2-1-1 Outline of Grenada

Grenada lies north of the South American continent at 12 degrees north latitude. It is an island country made up of the three southernmost islands of the Windward Islands volcanic islands group: Grenada, Carriacou and Petit Martinique.

Grenada island is mountainous from its center to its south, and there is a large crater lake called Grand Etangs at a height of 530 meters above sea level. The island is 344 square kilometers in area or about half the size of Sado Island in Japan.

Grenada has a dry season and a rainy season. The dry season is from December to May and has temperatures ranging from 24 to 31 degrees centigrade. The rainy season is from June to November, and temperatures range from 21 to 29 degrees Centigrade. The rainfall in the coastal areas averages about 1,500 mm, but it sometimes exceeds 4,000 mm in the mountains. Grenada is rarely affected by hurricanes.

The largest part of the population is made up of descendants of black Africans (84%), followed by mulattos (11%), Indians (5%), and whites (1%). The population is about 95,000 (1991 census). The capital is St. George's which has a population of about 30,000 (1990).

Grenada was discovered by Columbus in 1498 and was ruled by French, and then British. In December 1973, the British Parliament authorized Grenada's independence, and it became an independent nation on February 7, 1974.

Because Grenada produces cinnamon, nutmeg, ginger, black pepper, vanilla and other spices, it was called the Isle of Spice. In addition, it also produces bananas, cocoa and other crops. These crops are produced at different elevations, so that the types of trees differs according to the elevation.

2-1-2 Current political and economic condition

Grenada's GNP in 1991 was EC \$531 million (US \$98.1 million). Agricultural produce accounts for about twenty percent of this. The main crops are nutmeg and mace, but because of reduced production and low quality, exports are decreasing. In addition, because of the worldwide supremacy of Indonesian products, export prices have fallen. The pressure on fluidity caused by financial organizations started in 1989 and became significant in 1990. The fact that the central government increased borrowing from domestic financial organizations in order to cover budget deficits increased pressure on finances. As a result, in October 1990 new loans were stopped and this created a lack of investment by the financial market in the private sector. This, together with a permanently fragile financial foundation, caused stagnation in the country's economy.

As Table 2-1 shows, the international trade deficit has increased in recent years, and in 1991 it reached EC \$254 million. This is equal to 47 percent of the GNP and is about 1.43 times the national budget.

Table 2-1 Annual Trends in Overall Trade

Unit: EC\$1,000

| Year | 1987 | 1988 | 1989 | 1990 | 1991 |
|---------|----------|----------|----------|----------|----------|
| Exports | 85,234 | 88,908 | 76,617 | 70,771 | 62,623 |
| Imports | 239,416 | 248,842 | 272,319 | 294,150 | 316,525 |
| Balance | -154,182 | -159,934 | -195,702 | -223,379 | -253,920 |

Source: Central Statistic Bureau, Government of Grenada.

In comparison the tourist industry is doing better. There has been an increase in the number of direct flights between Grenada and the U.S.A., and there is also a daily flight between the two countries (via Puerto Rico) which started in June 1990. In addition, direct flights from Germany during the tourist season have been started. This led to a 46 percent increase of tourists in 1990, so that they totalled 281,000 people. Furthermore, the number of tourists visiting on tour ships increased by 82 percent. About 128 passenger ships visit Grenada every year. In 1989 the number of passengers on these ships was 121,000 passengers and this increased to 194,000 passengers in 1990. The gross revenues of the tourist industry in 1990 was EC \$37.8 million. The Government of Grenada is putting an emphasis on developing this industry.

According to its 1991 census, the population of Grenada is 94,806. Population increased from 1982 to 1991 by 0.6 percent. The working population is about 38,000. Of this number, about 33 percent work in the service industry, 20 percent in manufacturing and construction, 29 percent in agriculture and forestry. Of the last,

about 1,770 or 4.6 percent work are fishermen (1,500 full time, 270 part time). In addition, 17 percent of the population works in commerce and transportation. Unemployment is however, high, at 28 percent in 1990. (In the national development plan for 1991 to 1995, unemployment is to be reduced to 10 percent.)

As the descriptions above show, Grenada is suffering from a severe economic environment, so that it has decided on a policy to reduce the dependence on the export of traditional agricultural products, and convert to the production and export of diversified crops, and improve the production efficiency of agricultural products. As part of this policy, Grenada is trying to improve its fisheries industry by developing coastal fisheries, increasing domestic consumption of marine products, improving distribution in marine products, maintaining a stable supply of marine products, and decreasing imports of marine products. It has also positioned the fisheries industry as a 'link' industry with the tourist industry. It is also promoting exports of marine products in order to obtain foreign currency, and the country has high hopes for the promotion of the commercial fisheries industry, so that it can effectively utilize marine resources.

2-2 Condition of marine products industry

2-2-1 Current condition of coastal fisheries

(1) Fishing environment

Grenada is surrounded by the productive currents which flow between the Atlantic Ocean and Caribbean Sea, so that it is known as a rich fisheries area for migratory fish. (Refer to Fig. 2-1, Surrounding Fishing Areas Around Grenada.) Grenada's 200 nautical mile economic zone is 12,000 square kilometers or about 35 times its land area. Because its surrounding seas are stormy between June and October, however, the catch of Grenada's small-scale coastal fishing fleet drops abruptly. Small-scale fishermen fishing for coastal migratory fish are particularly affected from season to season and year to year, causing the catch to fluctuate greatly and resulting in an unstable revenue stream and a detrimental effect on the lives of the fishermen.

(2) Fisheries resources

The catch of large, pelagic fish (tuna species including bonito and marlin) in the waters around Grenada exceeds 70,000 tons. If the catch of 30,000 tons of medium size, pelagic fish such as Spanish mackerel, barracuda and dolphin fish are included, then about 100,000 tons of medium and large, pelagic fish are caught (FAO: Fisheries Policy, Planning and Programming Mission to Grenada. Report prepared for the Government of Grenada. 1985. Rome). In addition, it is

estimated that the catch of small, pelagic fish such as flying fish, horse mackerel and sardines is from 60,000 to 70,000 tons.

In addition to such pelagic fish, the continental shelf around Grenada has demersal fish. The catch per area of demersal fish for continental shelves by sea area conducted by the West-East Coastal Atlantic Ocean Fisheries Commission (WECAFC) in 1983 are as shown in Table 2-2.

Table 2-2 Demersal Fish Catch Per Area for Different Sea Areas

Unit: Ton / km² / year

| Area | Catch | Area | Catch | Area | Catch |
|----------|-------|----------------|-----------|--------------|-------|
| Bermuda | 0.4 | Cuba | 0.4 - 0.5 | Puerto Rico | 0.8 |
| Bahamas | 2.4 | Jamaica | 4.1 | Pedro Island | 0.4 |
| Dominica | 1.8 | Virgin Islands | 0.3 | Grenada | 0.08 |

In addition to this, there are also demersal resources on the slopes of the continental shelf (200 meters or deeper), but these are not being fished at the current time around Grenada. According to the Grenada Fisheries Development Study conducted in 1985 by FAO, there is a very good possibility to develop the fishery resources around Grenada. If fishing gears, equipment and methods are improved, and land based facilities are improved, then FAO report says that the catch of large pelagic fish and demersal fish could be increased by two to three times the current figure without any danger of depleting the resources.

2-2-2 Fisheries at the planned project site

Grenada's fishery can be divided into the small scale fishing on Grenada island and the small scale and commercial fishing on Carriacou. (Refer to Fig. 2-2, Main Landing Areas in Grenada and Number of Fishing Vessels.)

(1) Small scale fishing on Grenada island

There are about 1,456 fishermen on Grenada island, and their annual catch is 1,605 tons (1992). Most of the fishermen live in villages around the island and fish with wooden boats from 6.0 to 8.4 meters long with outboard engines. They mainly fish for shallow water fish returning the same day, and their catch is distributed within Grenada island.

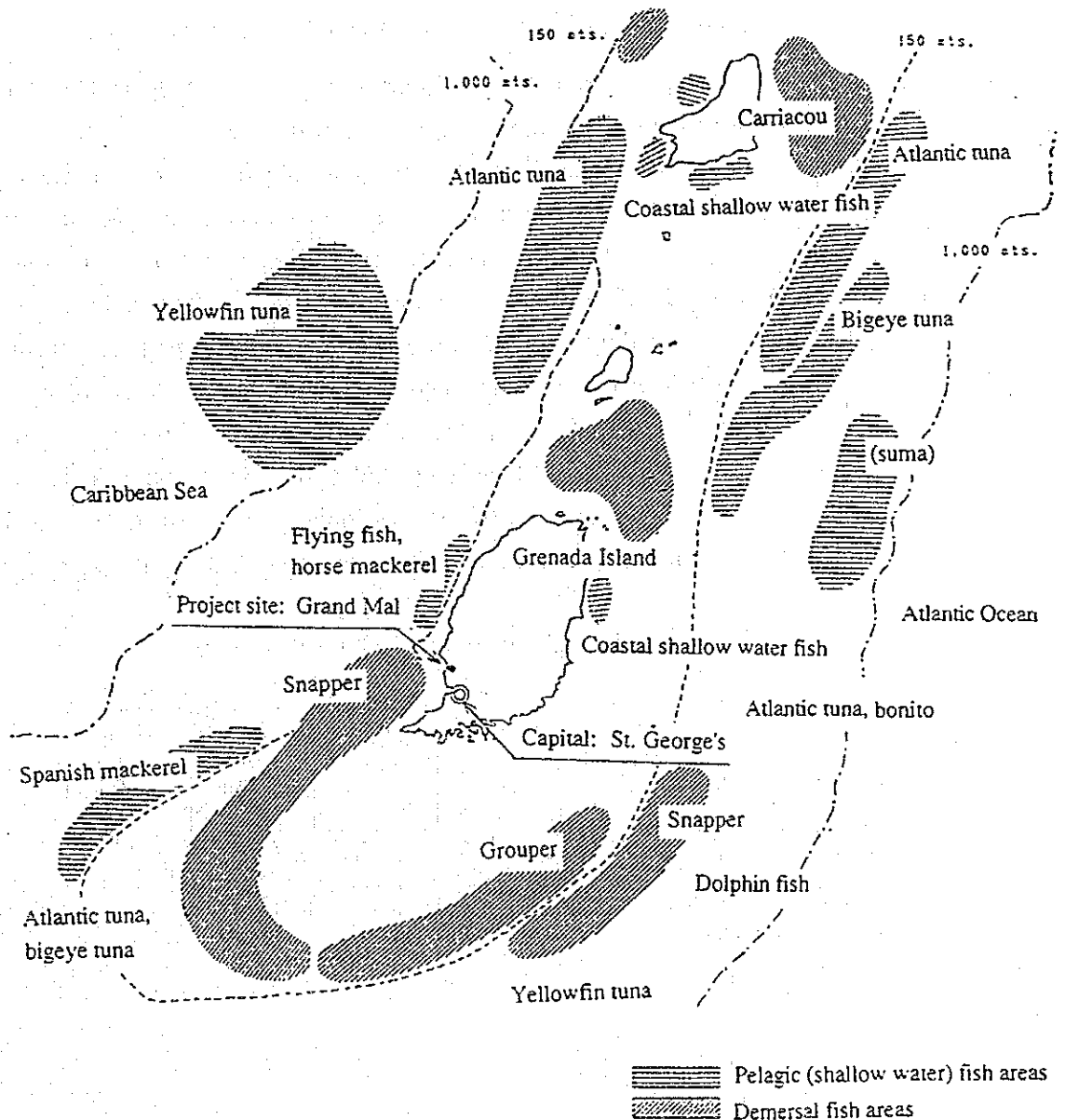
Although the number of days they fish is affected by the weather, the fishermen tend not to fish until they run out of money earned from their previous catch, and this is the major reason that the number of days they fish is not large.

(2) Artisanal fishing on Carriacou

Because Carriacou which is located about 40 kilometers north north-east of Grenada island and Petit Martinique have a large continental shelf surrounding

them, about 80 percent of the catch at these islands is demersal fish. The methods of fishing used are beach seine net fishing, trolling, angling, basket fishing, bottom gillnet, and bottom longline fishing. There are about 240 full-time fishermen. Their annual catch (1992) was 449 tons. The fishing boats they use are "sloops" powered by both engines and sails (40 to 50 boats), or 6 to 9 meter wooden ships powered by outboard engines. Demersal fish such as groupers and snappers and shellfish such as the mollusks lobsters and conch (which account for about 90 percent of the demersal catch) are exported to French Martinique. Therefore, the fishing environment on Carriacou differs from that on Grenada for which this project is planned. As a result, the figures for this island must be separated from the fishing statistics when studying them.

Fig. 2-1 Fishing Areas



(3) Commercial fishing

There was a time when three or four small scale American longline fishing vessels (15 to 18 meters in length) visited Grenada. These ships operated out of St. George's and fished for marlin. Because the results of these ships were good, three joint venture companies formed by Grenadian and foreign companies introduced three new ships of similar types to conduct longline fishing. Most of the catch is exported to the United States.

After that, in 1986, the government commenced its Artisanal Fisheries Development Project (hereinafter referred to as AFDP) to implement commercial fisheries. The official fixed price system introduced in the project which determined the producers prices and consumer prices was effective in establishing fisheries and creating a stable market at the outset of the commercial fisheries development; however, the defects of this method in which business is transacted despite the kind of caughtfish and its quality are becoming significant today.

In this system, there is no difference in price whether the fish are fresh or not. In fact, the cost of ice to keep the fish fresh is a total loss for the fishermen in this system, so that this is one reason that the use of ice has not expanded among fishermen. In addition, many of the fishermen are unable to break out of the system in which they are still working out of villages on a daily basis, so that they are economically inefficient and have unstable revenues. This is because there is a delay in increasing the awareness towards commercial fishing. The eight 36-foot longline tuna ships (one of which is owned by the Fisheries Division) which were introduced as a result of Grant Aid from the Government of Japan started operating in April 1992, and have recorded considerable catches. At the same time, they have had a new impact on the fishermen of Grenada, and they are contributing considerably to the expansion of commercial fishing (see Table 2-3).

Table 2-3 Change in Annual Catch (in weight)

Unit: Tons

| | 1988 | 1989 | 1990 | 1991 | 1992 |
|----------------|-------|-------|-------|-------|-------|
| Grenada Island | 1,258 | 944 | 1,436 | 1,513 | 1,605 |
| Carriacou Area | 736 | 766 | 347 | 477 | 449 |
| All of Grenada | 1,994 | 1,710 | 1,783 | 1,991 | 2,055 |

Source: Fisheries Statistics.

(4) Trends in catches and marine product exports

Table 2-4 shows the trends in annual catches for Grenada Island and Carriacou (??). The statistics for the last five years show that there are fluctuations in the catch in the Carriacou (??) area, but that the catch for Grenada Island is growing slowly. For the entire Grenada area there has been a slight increase (although there are some differences in good years and bad). Table 2-5 shows the catch in terms of money for the entire Grenada area. There are no major differences when compared with the catch quantity, and the overall trend is stable. This indicates that market management is appropriate. Table 2-6 shows the trends for export quantities and export amounts for the entire Grenada area. Both the export quantities and export amounts hold a fixed percentage regardless of fluctuations in the domestic catch. This is due to the insufficient facilities capacity of AFDP and the reduction in the quantities handled because of aging facilities. As Table 2-7 shows, this fact is substantiated by the fact that the landed catch has been increasing since 1991 for Gouyave, Grenville and other areas which had their fisheries facilities improved by Japanese grant aid. In comparison the landed catch has been decreasing since its peak of 1991 for the Grand Mal area where AFDP is located. This is despite the fact that the Grand Mal area is located near the capital city and Grand Anse beach where many hotels which consume marine products are located. We believe that this clearly indicates the decline in AFDP handling capacity.

Table 2-4 Change in Annual Catch (in value)

Unit: EC\$1,000

| | 1988 | 1989 | 1990 | 1991 | 1992 |
|----------------|--------|-------|-------|--------|--------|
| All of Grenada | 11,037 | 9,418 | 9,486 | 10,974 | 11,036 |

Source: Fisheries Statistics.

Table 2-5 Change in Marine Product Exports by Year

| | 1988 | 1989 | 1990 | 1991 | 1992 |
|--------------------|-------|-------|-------|-------|-------|
| All Grenada (tons) | 398 | 445 | 421 | 410 | 395 |
| EC\$1,000 | 5,514 | 5,570 | 4,581 | 4,987 | 5,237 |

Source: Fisheries Statistics.

Table 2-6 Catch by Area (in weight)

Unit: Tons

| Year | Total catch | Total catch at Grenada Island (excluding Carriacou) | Grand Mal Area (Melville Street) | Gouyave | Grenville | Other |
|------|-------------|---|----------------------------------|---------|-----------|-------|
| 1988 | 1,994 | 1,258 | 284 | 321 | 253 | 400 |
| 1989 | 1,710 | 944 | 286 | 253 | 143 | 262 |
| 1990 | 1,783 | 1,436 | 468 | 389 | 277 | 302 |
| 1991 | 1,991 | 1,513 | 514 | 493 | 305 | 201 |
| 1992 | 2,055 | 1,605 | 413 | 504 | 319 | 369 |

Source : Fisheries Statistics.

Table 2-7 Results of 36 foot Longline Tuna Ships

Period: April 1992 to March 1993

| Ship Name | Quantity (kg) | Value (EC\$) |
|----------------|---------------|--------------|
| Bacaye Bay | 9,434 | 57,497 |
| Conference Bay | 5,876 | 35,280 |
| Duquense Bay | 5,703 | 36,773 |
| Flamingo Bay | 6,974 | 42,499 |
| Grand Bay | 1,981 | 13,218 |
| Irvings Bay | 6,569 | 39,872 |
| Millet Bay | 6,700 | 41,845 |
| Total | 43,237 | 266,984 |

Source: Fisheries Statistics.

2-2-3 Fisheries administration

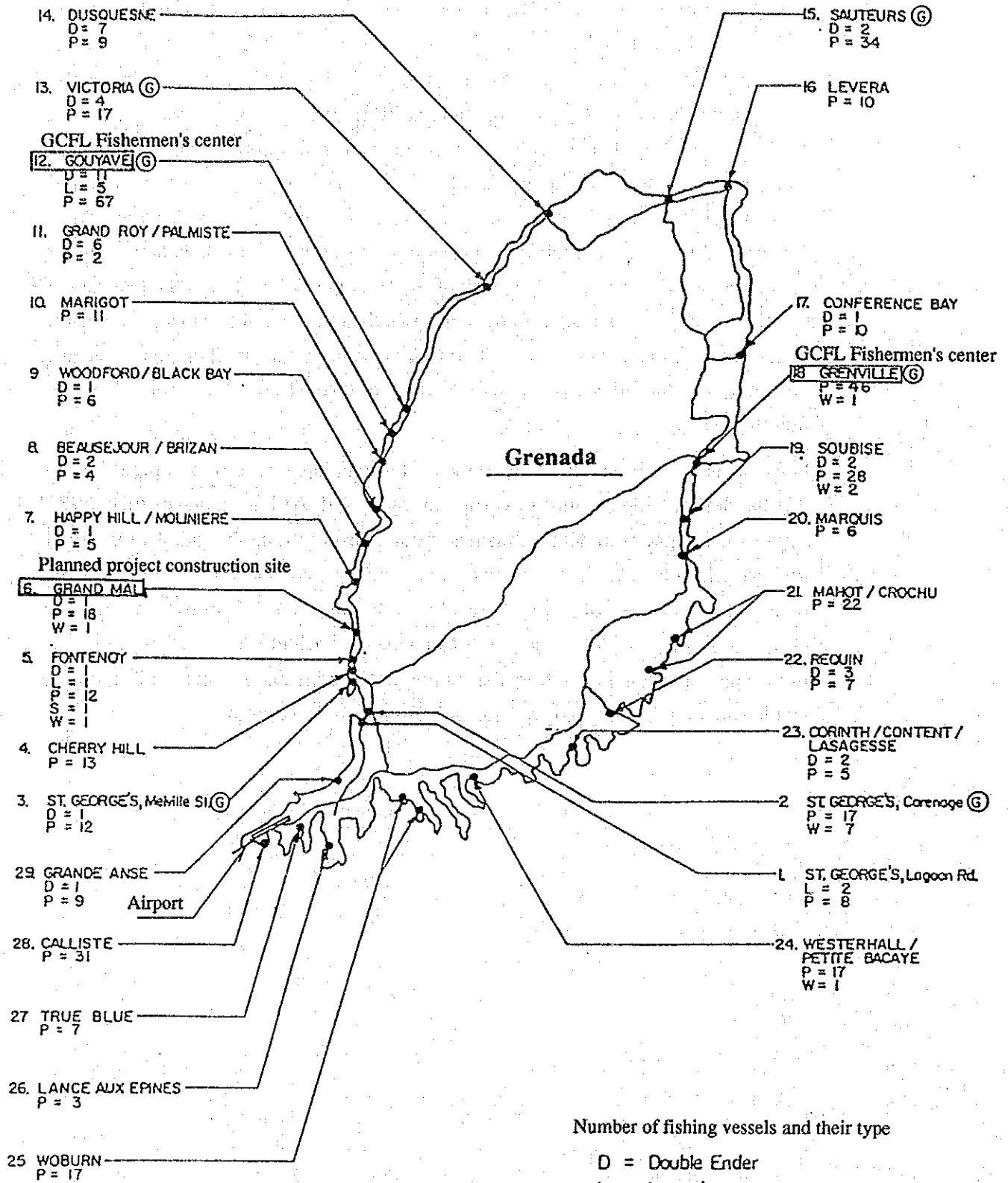
(1) Background

For the four years from 1982 to 1986, Grenada received loans from the International Fund for Agricultural Development (IFAD) and the Venezuelan Investment Fund (VIF) so that it could develop its fishing industry. With this aid, Grenada executed the AFDP and constructed various facilities centered on the capital of St. George's. Since then, these facilities have been controlled and managed by the Fisheries Division.

In addition, with Grant Aid from the Government of Japan, the Government of Grenada implemented the AFDP to construct fishing centers, cold storage and ice making facilities at its main fishing villages, such as Gouyave and Grenville, in order to reinforce its fishing base. In order to improve the productivity in the fishing industry, eight 36 foot longline tuna fishing vessels were provided, so that the industry could change from small scale fishing to commercial fishing, and that equipment and techniques could be improved for large pelagic fish fishing. However, the fishing processing, sales and cold storage facilities which were constructed under the AFDP have grown old, and the lack of dedicated landing areas, the lack of sales space, the lack of cold storage capacity, and the lack in the supply of ice have become detriments which are the main causes of deficit management. Furthermore, the Port Authority which owns the land and buildings on which the facilities exist is asking for the earliest possible removal of the facilities.

Under these conditions, the Government of Grenada decided on the breaking up of the deficit ridden and government managed AFDP, and in July 1982 established a new commercial business public corporation, Grenada Commercial Fisheries Limited. With this change, the Ministry of Agriculture separated the positioning and roles of the Fisheries Division and GCFL. Through the organic connection of these two organs, the Ministry of Agriculture has high hopes for increasing the catch, promoting distribution in the domestic market, maintaining a stable supply, promoting exports, and obtaining foreign currency.

Fig. 2-2 Main Landing Areas in Grenada and Number of Fishing Vessels



Fish landing areas in Grenada

Number of fishing vessels and their type

- D = Double Ender
- L = Launch
- P = Frogue
- S = Sloop
- W = Whaler
- Ⓞ = Fishing markets managed by the government

Table 2-8 Number of Fishing Vessels and Fishermen at the Various Fish Landing Areas on Grenada Island (excluding Carriacou and Petit Martinique)

| Area no. | Name of harbor | Type of fishing vessel | | | | | | | | No. of fishermen | | |
|----------|--------------------------------|------------------------|----------------|-----------------|----------------|--------------|-------------|-------------|-------|------------------|-----------|-------|
| | | Type | Inboard Whaler | Out'b'd Pirouge | Inboard Launch | Vessel Sloop | Keel Rowing | Beach Seine | Total | Full time | Part time | Total |
| | | Size (feet) | 26-32 | 18-32 | 30-40 | 30-40 | 10-14 | 26-32 | | | | |
| 1 | Lagoon Road | | | 8 | | 2 | | | 10 | 15 | 9 | 24 |
| 2 | Carenage | | 7 | 17 | | | | | 24 | 51 | 7 | 58 |
| 3 | Queen's Park & Melville Street | | | 6 | | | 6 | 1 | 13 | 17 | 8 | 25 |
| 4 | Cherry Hill | | | 12 | | | 1 | | 12 | 23 | | 23 |
| 5 | Fontenoy | | | 11 | 2 | 1 | 1 | 1 | 16 | 28 | 11 | 39 |
| 6 | Grand Mal | | 1 | 17 | | | 1 | 1 | 20 | 48 | 11 | 59 |
| 7 | Molinire & Happy Hill | | | 1 | | | 4 | | 4 | | 4 | 4 |
| | | | | 1 | | | | 1 | 2 | 8 | 4 | 12 |
| 8 | Baeusejour & Brizan | | | 3 | | | | 2 | 5 | 20 | 8 | 28 |
| | | | | 1 | | | | | 1 | 1 | 1 | 2 |
| 9 | Black Bay & Wood Dord | | | 2 | | | 1 | 3 | 1 | 1 | 4 | 1 |
| | | | | 2 | | | 3 | 1 | 6 | 12 | 4 | 16 |
| 10 | Marigot | | | 8 | | | 3 | | 11 | 20 | 6 | 26 |
| 11 | Grand Roy Palmiste | | | 2 | | | | 5 | 5 | 35 | 20 | 55 |
| | | | | 2 | | | | 1 | 3 | 16 | 4 | 20 |
| 12 | Gouyave | | | 64 | 5 | | 3 | 11 | 83 | 207 | 44 | 251 |
| 13 | Victoria | | | 17 | | | | 4 | 21 | 57 | 16 | 73 |
| 14 | Du Quense | | | 6 | | | 3 | 7 | 16 | 71 | 29 | 100 |
| 15 | Sauteurs | | | 31 | | | 1 | 2 | 34 | 84 | 8 | 92 |
| 16 | Levera | | | 7 | | | 3 | | 10 | 25 | | 25 |
| 17 | Conference | | | 4 | | | 6 | 1 | 11 | 30 | 6 | 36 |
| 18 | Grenville | | 1 | 37 | | | 9 | | 47 | 96 | | 96 |
| 19 | Soubise | | 2 | 28 | | | | 2 | 32 | 77 | 12 | 89 |
| 20 | Marquis | | | 6 | | | | | 6 | 13 | | 13 |
| 21 | Mahot | | | 12 | | | 9 | | 21 | 34 | | 34 |
| 22 | Requin | | | 4 | | | 3 | 3 | 10 | 19 | 9 | 28 |
| 23 | Content & Corinth | | | 3 | | | 1 | 1 | 4 | 12 | 4 | 16 |
| | | | | 3 | | | 1 | 1 | 2 | 4 | 4 | 8 |
| 24 | Westerhall | | | 6 | | 1 | 7 | | 14 | 29 | | 29 |
| 25 | Woburn | | | 17 | | | | | 17 | 36 | 13 | 49 |
| 26 | L'anse aux Epines | | | 3 | | | | | 3 | | 5 | 5 |
| 27 | True Blue | | | 7 | | | | | 7 | 17 | 5 | 22 |
| 28 | Calliste | | | 31 | | | | | 31 | 62 | 6 | 68 |
| 29 | Grand Ansd | | | 9 | | | | 1 | 10 | 22 | 8 | 30 |
| | Total | | 11 | 380 | 7 | 4 | 65 | 46 | 512 | 1190 | 266 | 1456 |

Source: Statistics Department, Fisheries Division 1991.

▣ Indicates fishing villages where facilities and equipment were improved by Japan's previous grant aid.

(2) Grenada Commercial Fisheries Limited (GCFL)

GCFL is a public corporation which is under the direct control of the Minister and Ministry of Agriculture. All of its capital was invested by the government. The purpose of this company is in both the fields of actual business and in educating fishermen.

- 1) Reforming the awareness of fishermen. (Reforming the awareness of fishermen from artisanal fishing to commercial fishing.)

(Quality control of the catch)

(Transition from an officially fixed price system to a free market system.)

- 2) Promotion of the distribution and sales of the catch.
- 3) Improvement, promotion and education for domestically built fishing vessels. (Installation of chilled and cold storage boxes.)
- 4) Promotion and education on larger fishing vessels.

In regard to the business aspects, the aim is to become a profit center base for commercial fishing. At the same time this organization will be responsible for earning foreign currency and promoting commercial fishing. In regard to reforming the awareness of fishermen, the important tasks are "making the transition from an officially fixed price system to a free market system" and "improving quality through the use of ice," and it will conduct the necessary instruction and expansion activities.

(3) Fisheries Division

The Fisheries Division is conducting activities with the following goals in the promotion of fisheries in Grenada.

- 1) Fisheries administration
- 2) Proposing and implementing fisheries development projects.
- 3) Surveying the fisheries industry, statistics, studying marine resources, etc.
- 4) Improvement and expansion activities for fishing gear and methods.

This Bureau has contributed greatly in regard to the promotion of the regional fishing industries by establishing and managing fishing centers in seven locations throughout Grenada. In regard to commercial businesses such as AFDP, however, it was not able to manage it smoothly because it is made up mostly of government workers.

(4) Problems

As was mentioned earlier, the Coastal Fisheries Development Project was successful in promoting regional fishing facilities and fishing, and improved necessary fishing gear. However, when examined from the point of view of

commercial fisheries which is to be developed and promoted jointly with GCFL, the core facilities at the capital of St. George's has the following problems.

- 1) Aging (decreased functionality): The sealing of cold and chilled storage facilities is bad, they are unhygienic, and they are the cause of excessive electric power use.
- 2) Lack of ice-making capacity: The current ice-making capacity is 1.5 tons/day. This is inadequate for a central facility. This is obstructing the instruction of fishermen in the use of ice and the keeping of the freshness of the catch.
- 3) Insufficient processing facilities: Because the facilities were for storage when established, the processing plant is too small when considered as a facility for processing, distribution and sales. In addition, in regard to cleaning, there are only small processing benches, so that large tuna must be cleaned on the floor.
- 4) Insufficient storage facilities: There are four chilled storage facilities and one cold storage facility. This is not sufficient for commercial fisheries aimed mainly at exporting. In addition, these are the cause for increases in the amount of frozen fish for the domestic market, and increased costs through power consumption, etc.
- 5) Insufficient landing facilities: St. George's harbor is mainly a harbor for passenger ships, so that there is no dedicated landing pier for fishing vessels. Therefore, under the current circumstances the pier for small passenger vessels which is used to unload passengers from large passenger ships is being used. Because of this, this pier is separated from the ice making and processing facilities by 100 meters, and only small carts can be used. This is one of the causes for the deterioration in the freshness of the catch and is an obstacle to fish landing work.

These conditions were indicated as the causes of inefficient work and increased expenses even in the days of the AFDP. They are also the cause of significantly decreasing 'freshness' which is a central factor in commercial fishing. As a result, the construction of a core facility for commercial fisheries which allows efficient work and has the appropriate functions is urgently needed.

2-3 Outline of related projects

2-3-1 National Development Projects

(1) National Development Strategy (1986 to 1990)

Grenada formulated the National Development Strategy (1986 to 1990) in 1986. The five items of this strategy are the basic elements of the country's development.

- 1) Achieving a real economic growth rate of 4 percent.
- 2) Countermeasures for inflation.
- 3) Increasing employment opportunities.
- 4) Improving the living standards of the people.
- 5) Improvements through the redistribution of wealth. (Reforming the differences in salaries.)

(2) National Development Strategy (1991 to 1995)

In this development strategy, the basic policy is to revitalize various nationalized businesses through privatization and improve productivity. In the fisheries industry, revitalization is being attempted through the establishment of a new company, and the target is to raise the amount of Grenada's catch (target amount) to EC \$40 million by the year 2000.

2-3-2 Fisheries-related development projects

In the national development projects the following three items are given for the promotion of fisheries industry.

- (1) Increasing fisheries productivity and improving marine products.
- (2) Reinforcing the industrial structure and organization in order to increase the competitiveness of fisheries production.
- (3) Improving the fishermen's training system, so that the industry can grow as an economical industry.

The fisheries industry is especially being focused on as a main 'link' industry with the tourist industry. It is hoped that it will be able to increase the supply of marine products to hotels, restaurants and markets, and contribute to the reduction of processed marine products. In addition, an important aspect is the expansion of the exporting of tuna and snappers which are high in product value. This has been developed in recent years through the introduction of medium-sized fishing vessels.

2-4 Outline of request

2-4-1 Background of request

In the outline described in the previous section, the Government of Grenada established Grenada Commercial Fisheries Limited (GCFL) in July 1992. As a result, part of the government owned fishing facilities which were managed by the Fisheries Division were transferred to GCFL. After this, a plan was formulated to replace the fishing facilities in the old AFDP with the St. George's Artisanal Fisheries Complex Project as the core of the modernization of the country's fisheries industry. In order to implement the project, the Government of Grenada has requested Grant Aid from the Government of Japan.

Through this plan, Grenada will promote the landing and export of tuna which had been known to exist as a marine resource, but which had not been developed. This would make the use of fisheries resources more efficient and help in obtaining foreign currency.

By constructing these fishing-related facilities in the St. George's area, it would contribute to the development of the country's coastal fisheries industry, an increase in the domestic consumption of marine products, the promotion of distribution, and the stabilization of supply. In addition, it would decrease the imports of marine products and processed marine products when the catch in the country is small. In addition, the plan calls for positioning the fisheries industry as a 'link' industry with the country's tourist industry.

2-4-2 Contents of request

(1) Main building (approx. 1,050 m²)

1) Ground floor (approx. 670 m²)

| Major facilities | Size | Quantity |
|--------------------------------|-------------------|----------|
| a) Processing quarters | | |
| b) Engine maintenance workshop | | |
| c) Dry storage | | |
| d) Cold storage | 50 m ³ | 2 units |
| e) Chilled storage | 65 m ³ | 3 units |
| f) Ice making plant | 50 tons/day | 2 units |
| g) Ice storage | 50 m ³ | 2 units |
| h) Blast freezer | | 1 unit |
| i) Lavatories, locker rooms | | |
| j) Emergency power generators | | |

2) First floor (approx. 380 m²)

- a) GCFL administration/management office
- b) Conference room
- c) Quality control laboratory

(2) Landing jetty (40 meters long x 4 meters wide)

2-5 Assistance of foreign countries for fisheries projects

2-5-1 Aid from Japan

In 1988 the Japan International Cooperation Agency conducted a basic design study for the Coastal Fisheries Development Project in Grenada. The purpose of the project was to develop offshore fishing resources through the promotion of fisheries cooperative activities. It also involved improving the fisheries environment for coastal fishermen, and improving the distribution system, so that Grenada's fisheries industry could be developed and strengthened. The following items were improved in this plan.

(1) Promotion of coastal fisheries industry

1) Gouyave fishermen's center

- Fishermen's center (365 m²) and a small jetty (extending 57 meters offshore)
- Equipment such as cube ice-making and plate ice-making machines and cold storage, etc.

2) Grenville fishermen's center

- Fishermen's center (355 m²)
- Equipment such as cube ice-making and plate ice-making machines and cold storage, etc.

3) Eight fishing vessels with inboard engines

(2) Improving the fisheries environment

1) Slip way for lifting small fishing vessels out of the water in Victoria

2) Safety equipment and fishing gear for the development of pelagic and demersal fishing

3) Fishermen's lockers for storing fishing gear (for 80 fishermen)

4) Equipment for waterworks for the fisheries industry in the Calliste area

5) Tools for equipment maintenance and vehicles

(3) Improvements in distribution facilities

1) Insulated fish box manufacturing machine for maintaining freshness of catch

2) Refrigerated vehicles

2-5-2 Aid from other countries and international organizations

In regard to fisheries promotion projects, the Caribbean Fisheries Resource Assessment Management Project (CFRAMP) is currently being conducted with a fund provided by the Canadian International Development Agency (CIDA).

Main activities: Studies of marine resources are being conducted in the Caribbean nations, the information collected is provided, and research and education is being conducted. Total project amount is EC \$8.0 million.

CHAPTER 3

OUTLINE OF PROJECT

CHAPTER 3 OUTLINE OF PROJECT

3-1 Objectives

The objectives of this project are to expand production from Grenada's small and coastal fisheries industries, promote commercial fisheries so that tuna can be exported and foreign currency obtained, provide a an inexpensive and stable supply of protein through the improvement of the domestic fish distribution system. In order to achieve these goals: the functions of the existing facilities located at the capital of St. George's will be transferred and expanded, the regional landing facilities constructed with the previous Grant Aid at Gouyave and Grenville will be organically connected with the preceding facilities, and fisheries related facilities—including ice making and ice storage facilities, cold and chilled storage facilities, processing facilities and landing facilities—will be constructed and equipment will be improved.

3-2 Study and examination of the request

3-2-1 Justification of the Project

There was no focus on the fisheries industry in Grenada in the conventional industrial structure centered on agricultural products. The fisheries industry however has been positioned as an industry related to the tourist industry in the national development projects. At the same time, there are high hopes for the development of the fisheries industry with the increased demand for fresh tuna in the North American market. Under these conditions, GCFL which was established in 1992 is starting to specifically promote the export of marine products and make plans for the expansion of domestic demand; however, the fisheries infrastructure which must be at the core has not been improved.

In order to sort, weigh and process fresh fish, the existing facilities (former AFDP facilities) at St. George's are insufficient, and because there is not enough space for processing frozen products, efficient work is not possible. In addition, the ice making capacity is only 1.5 tons/day. This is insufficient if ice is to be provided for fishing vessels, and it is even insufficient for cooling fresh fish when the sales quantities are high. The storage capacity of the cold storage facilities are also not enough to keeping tuna for export fresh. Conversely, the current chilled and cold storage facilities are

ample at 220 cubic meters for the current domestic sales of fish (69.9 tons/year), with the result that the operating efficiency is poor and profitability is low. Furthermore, these facilities do not include dedicated landing facilities, so that a pier mainly used by passenger vessels and located 100 meters away is being used. As a result, landing work, storing work, loading ice on fishing vessels and other work is inefficient.

The current state of the existing facilities described above has created a vicious circle in which there is a significantly detrimental effect on the quality of fresh fish, the motivation of fishermen to work is reduced, the quantity of fresh fish which can be exported is reduced, and, therefore, management conditions deteriorate.

Table 3-1 Comparison of ice making and cold storage capacities of existing and planned facilities

| | Existing facilities | Situation | Planned facilities |
|------------------------|---------------------|------------------|--------------------|
| Ice-making capacity | 1.5 tons/day | (Insufficient) | 10 tons/day |
| Ice storage | 38 m ³ | (Small capacity) | 84 m ³ |
| Chilled storage (0 °C) | 38 m ³ | (Insufficient) | 102 m ³ |
| Cold storage (-20 °C) | 130 m ³ | (Too large) | 102 m ³ |
| Blast freezer (-20 °C) | 90 m ³ | (Too large) | 51 m ³ |

Considering this situation, the construction of the fishing facilities in this project will improve the problem areas. The facilities will play a major role in developing the fishing industry in Grenada, increase the catch, contribute to the stable and improved lives of fishermen, and promote a stable supply of fresh and inexpensive fish to general consumers. Also, by holding down imports of marine products and expanding exports, these facilities will help to save and acquire foreign currency. Therefore, it is believed that these facilities are highly needed and appropriate.

3-2-2 Operation plan

The facilities in this project (Grand Mal), and the fisheries centers built in Gouyave and Grenville, and the insulated fish box manufacturing facilities built in Calliste under the Coastal Fisheries Development Project and which are currently being managed by the Fisheries Division will be managed by GCFL.



GCFL started operation in July 1992 with workers from the AFDP as a tentative measure. During this period, management was conducted with financial support from the Fisheries Division, however, in May 1993 a new operations structure was established and the number of employees was reduced in order to reduce the huge expenses which were the cause of the deficient management under the AFDP.


Therefore, in 1992 because this was a transitional period in which government subsidies were reduced, the old operations structure was maintained, and the management structure was transferred, there was a huge deficit at GCFL. Future plans call for the promotion of the introduction of a commercial management style, and true management activities are scheduled to start when the fisheries facilities in this project are completed (scheduled for 1996), so that the current organization is believed to be appropriate for the management of the implementation of the project.

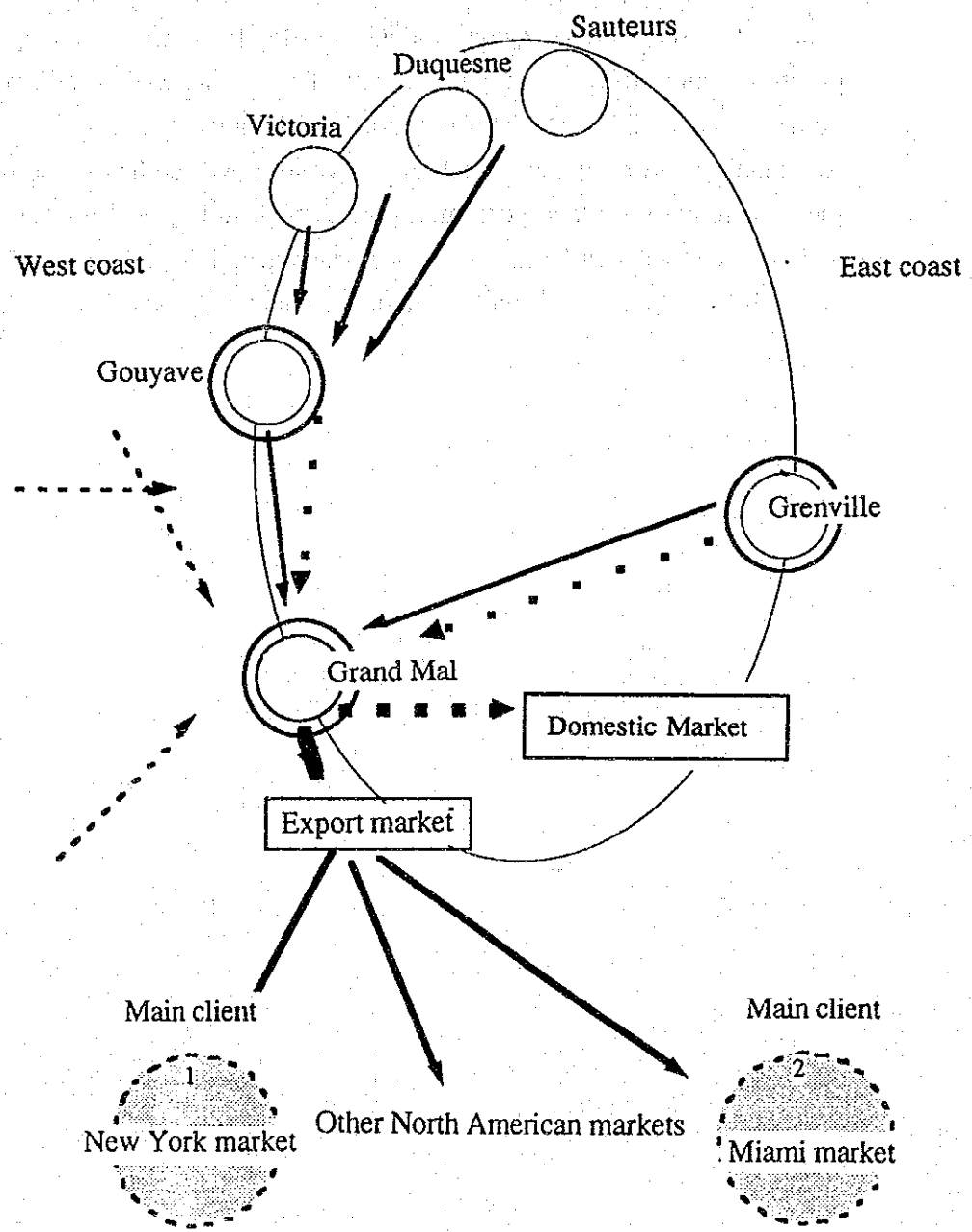
The contents of the business of GCFL are: purchasing, transporting, processing, storing, exporting and selling of the catch, ice making and sales business, and manufacture and sales of insulated fish boxes.

The fish catch will be purchased at three locations, Grand Mal, which will be the central facility, and Gouyave and Grenville. In addition, the quantity of catch purchased and stored quantities at each of the areas will be adjusted, and fish for domestic sales and fresh fish for export will be gathered at the Grand Mal facilities for cleaning and processing. Fish to be exported will be held in storage temporarily, then transported to the airport for export. After fish for the domestic market is frozen and stored, stock will be taken out of storage according to domestic demand, and the needs of batch purchasers such as hotels, restaurants, hospitals and retailers.

Fig. 3-1 GCFL marketing system

 For export
 For domestic use

 Carriacou



3-2-3 Relation to similar projects

In regard to fisheries development projects: the AFDP and the CFDP which have been conducted in Grenada, however, this project is the first attempt to transfer to and promote commercial fisheries. As a result, there are no similar projects at the present time.

Therefore, this project is positioned as the fisheries development foundation improvement project for Grenada, and there are high hopes that this will be a locomotive project which will establish the future direction of fisheries activities.

3-2-4 Study of Project components

The functions of the facilities and equipment which are included in this fisheries facilities construction project are as follows :

- (1) Landing of catch
- (2) Post harvest processing and preservation of catch and landings
- (3) Improving the quality of marine products
- (4) Distributing marine products
- (5) Supporting fishing activities

These functions will work organically with the conventional the AFDP and CFDP executed by the Fisheries Division, and supplement the lacks in the conventional foundation improvements. These functions are indispensable and inseparable for the promotion of the fisheries industry. We believe that the structural elements of this project are suitable from this point of view, also.

3-2-5 Study of scope of facilities and equipment

(1) Landing facilities

The capital area does not have any dedicated fishing vessel landing facilities, and, as was described earlier, the conventional AFDP fisheries facility was actually a slightly separated passenger vessel pier, so that there were problems with the smooth landing of the catch and in quality control. In addition, the Grand Mal district, which is the planned construction site for this project, does not have any landing facilities either. Approximately 23 fishing vessels, including three fiber-reinforced plastic 36-foot fishing vessels, in the area usually anchor in Grand Mal bay. In regard to landing, smaller ships are usually grounded on a beach for landing. For slightly larger vessels, small row boats are used for landing, or the vessels go to the pier near St. George's market for landing. Therefore, in order to make landing of the catch and loading of ice on fishing vessels—which is indispensable for maintaining the freshness of fish—smoother, and also to secure an efficient distribution function, landing facilities near the processing and

storage facilities are indispensable. This is especially true because the main target fish for this plan are tuna which weigh between 50 and 60 kilograms. Because they are so heavy, there must not be a total reliance on manpower. Small crane trucks must be introduced and forklift used in order to make tuna landing work more efficient. Work must be executed quickly and safely, and considerations must be made so that transporting and delivery do not affect quality, even when the temperature is high.

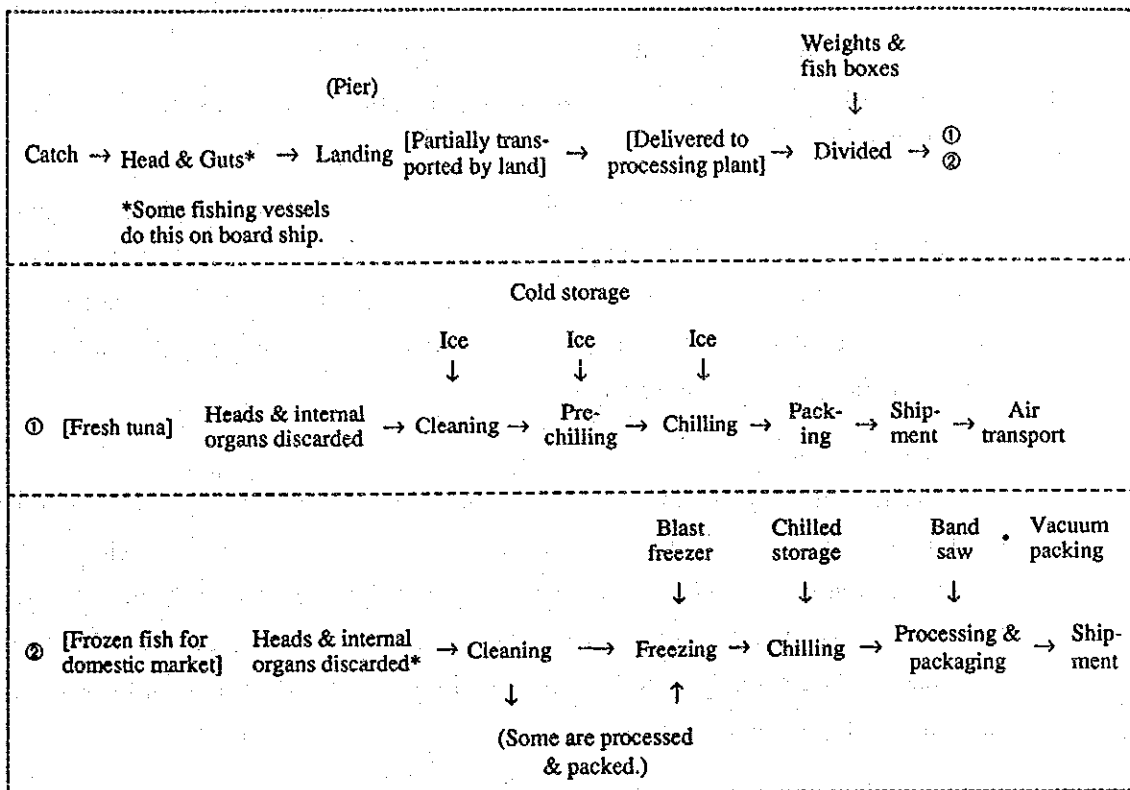
(2) Catch processing and storage facilities

Currently, Grenada has neither public nor private comprehensive fisheries facilities which have the appropriate processing and storage facilities for the catch. Processing and storage facilities for fresh tuna are especially scarce, so that this would be an obstruction to the development of rational and efficient commercial fishing and the expansion of export business. In addition, because there are no facilities which handle domestic sales frozen fish and which have sufficient space for processing equipment, hygienic and efficient sales businesses cannot be expanded.

In Grenada's case, the use of ice on board ships to maintain the freshness of the catch has not expanded sufficiently (excluding the eight 36-foot fishing vessels). Furthermore, many of the fishing vessels are small and do not have enough room on board to process the catch, and because the shape of most vessels is such that water used to clean fish will not be drained, this work is executed after landing.

In the case of large pelagic fish such as tuna, the usual process after catching is as shown in Fig. 3-2 before they are shipped and sold.

Fig. 3-2 Fresh tuna distribution process



In order to conduct this work efficiently, space for processing, cleaning and grading of the catch is necessary, and the layout and positioning of processing equipment must be such to facilitate ① ice-making plant, chilled storage (0 °C) for fresh fish, and ② blast freezers and cold storage for frozen fish.

(3) Facilities and equipment for improving the quality of the catch

In the AFDP and CFDP, the Fisheries Division and AFDP attempted to expand the main fisheries facilities in the capital area and local areas, and installed cold storage and ice making machines, etc. At the same time, they gave instruction on how to maintain the freshness of the catch by using ice. The GCFL has given instruction on maintaining the freshness (quality) of fish for the free market system, and instruction on freshness management for fresh tuna which is a mainstay export fish. At the same time, it has been making efforts to explain to fishermen that fish are graded into different types and degrees of freshness by stating, "Fresh fish can be sold for high prices," and "Fish which are not fresh are not bought." It is GCFL's aim to make this concept understood by not only fishermen, but also by GCFL employees, and all others in the fisheries business, including middlemen, transporters, retailers, and customers. The facilities in this

project must be conceived and planned, so that this GCFL policy will be demonstrated concretely for educational and communications purposes.

When compared with the total catch on Grenada Island, the current ice making capacity is extremely small, so that increasing these facilities in this project is indispensable.

In the case of fresh tuna which will be the main target fish handled in this project, quality control during transporting and processing are important. In order to reduce the percentage of unsuitable tuna for export due to its low quality reject from 70 percent to 50 percent, cranes, forklifts, pre-cooling tanks and quality control inspection equipment are imperative.

(4) Distribution equipment

The facilities in this project will be the foundation of the distribution route which connects Gouyave, Grenville, the airport, and other places. The pickup refrigerated vehicles which were supplied in the previous Grant Aid program are small in capacity, and are inefficient in transporting. Therefore, refrigerated vehicles for transporting fresh fish must be increased in accordance to low quality tuna unsuitable for export.

(5) Fisheries activities support facilities and equipment

Elements which will affect the development of future business as much as the establishment of the public corporation are the increase in the catch and the maintenance of the freshness of the catch. In order to achieve these, improving the level of technique of fishermen, and the appropriate maintenance and care of fishing gear, fishing vessels by fishermen are also required. In regard to these aspects, the Fisheries Division will continue to support fishermen in improving their fishing gear and methods, and in purchasing materials and fishing vessels, as part of the policy of the Ministry of Agriculture. The sales of fishing gear and materials, and repair work on fishing vessels, especially diesel engines, which had been conducted by the AFDP are difficult because of the lack of trained personnel. Conducting this work would increase a burden on the GCFL, so that these elements will not be built into the facilities and organization. In Grenada which does not have sufficient private level fishing gear retailers, engine parts retailers and after-sales service organizations, however, some sort of aid and support for these elements are indispensable. In considering this situation, some sort of fishing gear and fishing vessel maintenance control function must be maintained, so that fishermen can be supported and fisheries activities can be carried out smoothly. These functions must be limited, however, so that they do not become a burden on the GCFL.

This should be carried out by establishing a workshop and warehouse necessary for diesel engines, fishing machinery and fishing gear in the project facilities. These facilities will have general tools, repair tools and special tools and lend them to fishermen as requested. They will also have a necessary manuals and literature on hand, and they will provide information on the procuring and purchasing of necessary materials and equipment.

3-2-6 Technical cooperation

The GCFL is the first commercial public corporation to be established in Grenada, so that the employees have not been trained in working and managing a profit center. Presently, it can be said that the GCFL has inherited the management format of its non-commercial predecessor, the AFDP. The inefficient management structure must be reviewed and employees must be retrained. In addition, the sales policy centered on exporting fresh tuna to North America must be reinforced. In order to do this there are still many difficult problems which must be solved, including creating the appropriate organization, manpower plans, financing plans.

Because this project will establish fisheries facilities at Grand Mal, the quantity of fish handled, operating funds and other business factors will rapidly increase in scale. Therefore, the planned training of management personnel for the facilities in this project is urgent and indispensable. In order to help, Japan should send specialists who have thorough knowledge about fresh fish distribution and profit center management in order to train the managers. At the same time, technology concerning accounting, management, quality control of products, maintenance and repair of machines and equipment which are necessary for the fisheries business must be transferred. In order to raise the general level of employees at the public corporation, a seminar should be held in Japan for them.

3-2-7 Basic policy of implementation of cooperation

In regard to the implementation of this project, the considerations above have confirmed that the effects of the project are desirable, that the project is realistic, and that Grenada has the ability to implement it. In addition, the effects of the project meet the objectives of official Grant Aid. Therefore, we believe that it is appropriate for Japan to provide Grant Aid. Therefore, under the premise that Japan will provide Grant Aid, the overview of the project will be examined and the basic design will be executed.

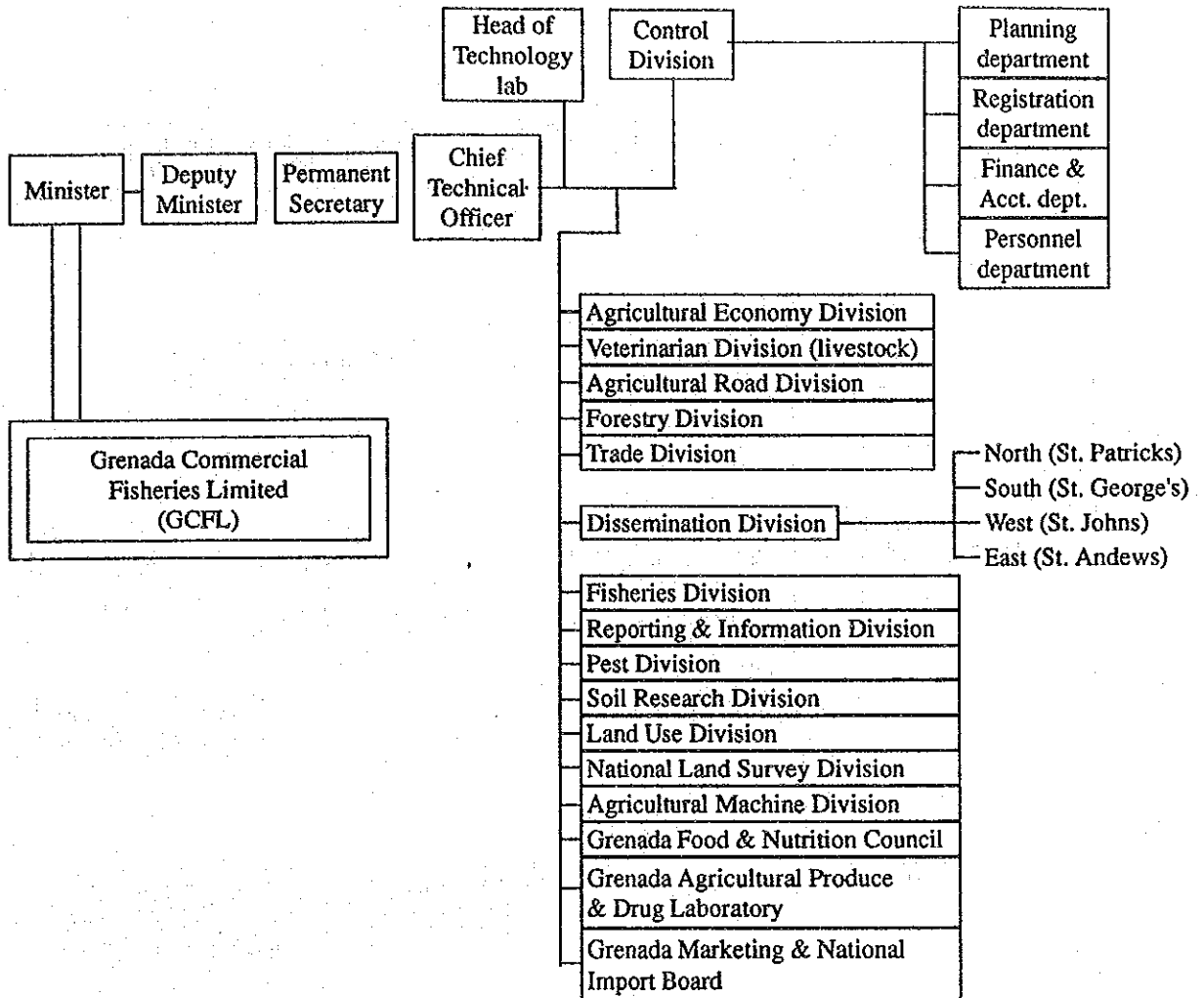
3-3 Project description

3-3-1 Executing organization and person(s) responsible

The ministry responsible for the execution of this project is the Ministry of Agriculture, Trade, Industry, Energy and Production (hereinafter referred to as the Ministry of Agriculture), and the implementing organization will be the Fisheries Division of the Ministry of Agriculture which was in charge of the previous Grant Aid project.

The Grenada Commercial Fisheries Limited which will manage the facilities after they are completed, is also an important organization in the implementation process of this project.

Fig. 3-3 Organization of the Ministry of Agriculture and positioning of GCFL



The Fisheries Division, the executing organization for the project, will not directly be involved in operation of the facility upon its completion. However, it is planned to provide indirect support to GCFL's activities such as educating fishermen, teaching fishing gears and fishing methods in terms of quality control of fish handled and also teaching scientific quality inspection methods to the GCFL staff.

Fig. 3-4 Organization of Fisheries Division and positioning of GCFL

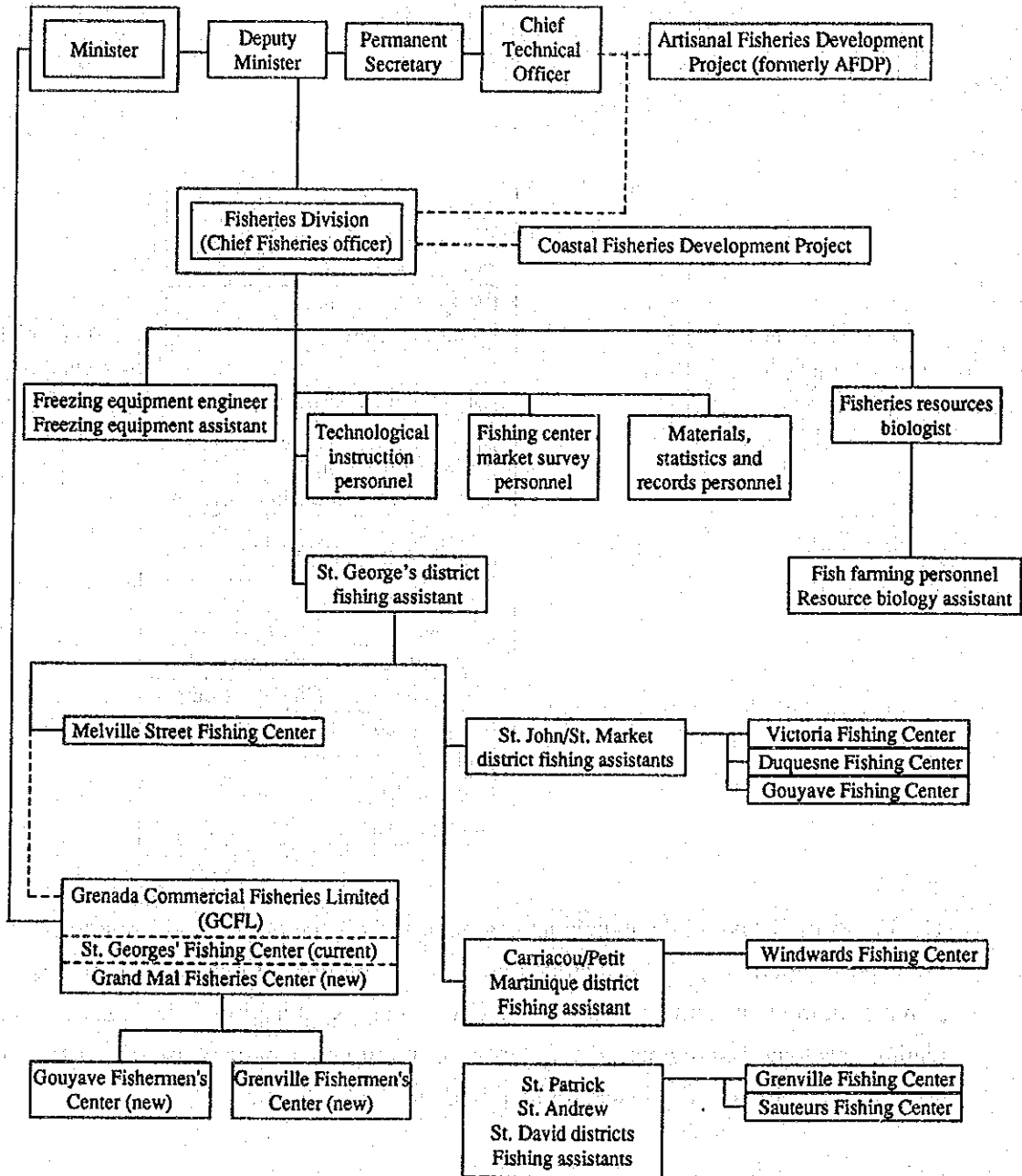
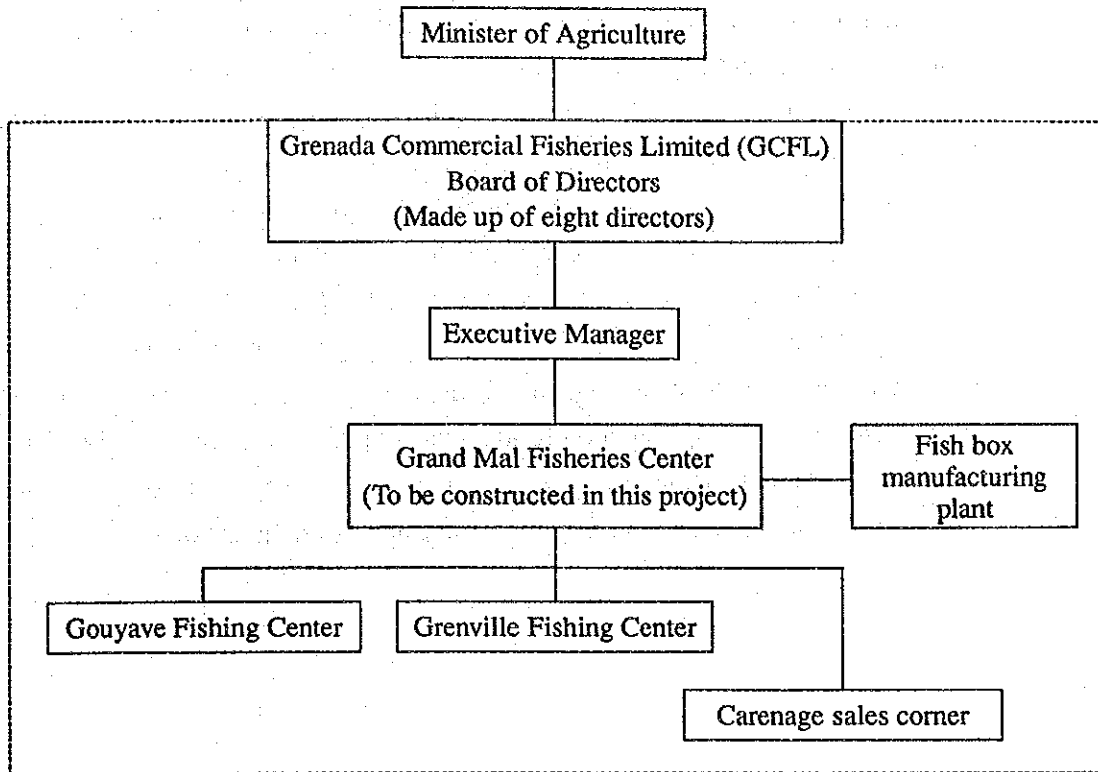


Fig. 3-4 GCFL organization



3-3-2 Location and conditions of the project site

(1) Current conditions

The planned site for the project in Grand Mal is located about five kilometers north of the capital of St. George's. The site is about 200 meters distant from a main road. The land is owned by the government and is 7,500 square meters in area. In front of the northern entrance to the site there is an asphalt plant. The site is not directly connected to a road. On the south there are Texaco and Shell oil storage tanks, and there are residences located on the eastern side between the site and the road. The sea which is on the west side is relatively shallow for a considerable distance and is shaped as an inlet.

(2) Entrance road

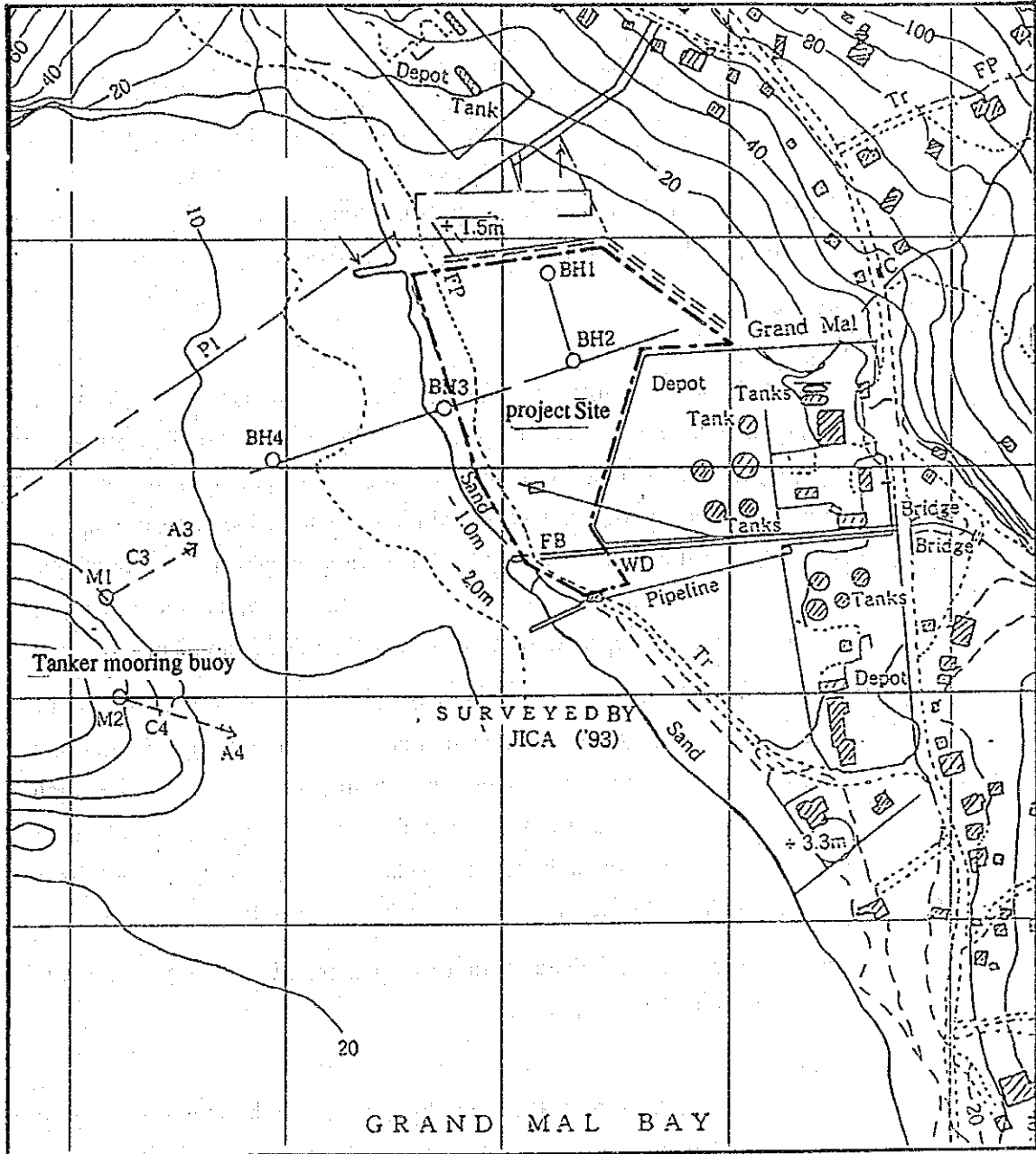
In order to enter the site, the road for the asphalt plant (width 4 meters, two lanes) which branches off the main road (width 5 meters, two lanes, paved with asphalt) on the eastern side can be used. This road is relatively steep with a 1/5 inclination at its top and a 1/10 inclination further down (by the sea). The condition of the asphalt is very bad.

(3) Use of the sea

In regard to the petroleum landing base on the south side of the site, there is a trench (depth 15 meters) about 200 meters offshore on the western side, and two tanker mooring buoys are located there. (Fig. 3-6 Peripheral Map of the Planned Construction Site, M1 and M2.) Tugboats connect tankers with the landing pipelines with a floating hose. Although petroleum and LPG landing work is completed in a day, only one tanker can be moored at a time because the trench is only about 100 meters in width. As a result, Shell and Texaco each use this mooring about twice every week. Also, every year between November and January there are large swells (up to 2.5 meters high) from the west. Even tankers cannot use this mooring when there are such swells. The fishermen living in the Grand Mal area have about 30 large and small fishing vessels. These are currently either landed on the beach to the south of the site, or anchored offshore.

Fig. 3-6 Map of project site

Scale=1:2500



(4) Remaining facilities in the sea

To the northwest of the site off the shore is a concrete jetty which was built for the asphalt plant, but which is now in disrepair. The jetty is about 30 meters long, and it is not expected to be an obstruction to this project.

(5) Requesting permission to use the sea

Because the sea area in Grand Mal Bay, including the sea in front of the site, is under the authority of the Port Authority, before the sea related facilities in this project (jetty, moorings, dredging, etc.) can be constructed, the project plans must be submitted during the planning stage. It is necessary to confirm in writing that these facilities will not obstruct the use of the petroleum base by tankers.

(6) Natural conditions

1) Topography

Grenada island is a volcanic island, and it has a backbone of mountains running north to south in its middle. The highest peak is Mt. St. Catherine (840 meters high). The inclination on the east side of these mountains is gradual, but it is slightly steeper on the western side. The site is located on a small plain which is surrounded by Mt. Moritz, the western peak of the mountains, and Grand Mal Bay. To the east of the site on the slopes are located residences and a national road, and these are part of the city limits of Grand Mal.

The southern half of the beach to the west of the site is a gravel beach, and the northern half is a sand beach. The sand beach has some very small dunes. Most of the site is located in an area where a swamp from Mt. Moritz flows into the sea, so that water drainage is very bad. The drainage gutter which divides the eastern slope and the site only appears to be a ditch, and it is believed that water will overflow into the site when there is a heavy rainfall.

The sea to the west of the site is shallow for about 100 meters offshore, with a depth between 0.5 to 2.5 meters.

2) Weather

This area has a typical tropical ocean climate. Although the wind always blows from the east because of the trade winds, it is very weak at the site because it is protected from the wind by the mountains. There are one to three months every year when the wind blows from the west, and there is nothing to protect the site at this time.

Grenada lies at the southern fringe of the hurricane course, so that it is rarely hit directly by a hurricane. In the past 103 years, there have been only 37 hurricanes which have passed within a radius of 120 kilometers of the capital

of St. George's. This is an average of only one every three years. (See the Hurricane List in the Appendix.) In September 1955, however, Hurricane Janet struck the northern half of the Grenada island, killing 114 people. It also caused considerable damage to land, forests, crops, buildings, fishing vessels, so that the island is not perfectly safe in the event of such a hurricane. Although hurricanes are rare, low pressure areas pass to the east of the island, and these cause strong western winds.

The rainy and dry seasons are distinct. There is also a big difference in rainfall between the mountainous areas and coastal areas. The temperature is very stable between 20 to 30°C year around. Humidity is very high because of the ocean climate.

3) Sea profile

Because the planned site is located at the deepest part of Grand Mal Bay, the currents are very weak. Fluctuations in tides are also very small as in other Caribbean islands, and they are normally between 20 to 30 centimeters. The floor of the sea is mainly made up of sand, seaweed, old coral, stones. It is very stable, and there are no irregular sand formations. Because the wind blow normally from the east, the waves are very small, and the surface is very quiet. When the wind blow from the west, however, waves of between 2.0 to 2.4 meters are likely to form because the bay opens to the west.

4) Nature of the soil

Because the site is located in a swampy area, the surface is peat. The thickness of surface layer is about four to six meters. The bearing capacity of this soil is very weak. The bed is igneous rock which inclines from the north to south, with the rock deepest at the center of the site. At the location where the jetty is planned, there is a layer of sand at a shallow depth and this has a high degree of stability.

5) Miscellaneous

The site is covered with weeds and trees, but there is nothing which must be protected. There is no coral in the sea around the site, and only a few small fish can be seen. There is an active reef in the sea to the north where coral and other sea life is active.

3-3-3 Outline of facilities and equipment

The facilities and equipment which are necessary for implementing the project are as shown in Table 3-2 below.

Table 3-2 List of facilities and equipment

| | Facility/equipment | Shape, specifications, purposes | Quantity |
|---|---------------------------------------|---|-------------------------------------|
| Fishing harbor basic facilities | Jetty | Steel pipe pile construction (water depth -1.5 to -2.7 m) | Length 90 m |
| | | Causeway (armor) | Length 20 m |
| | Revetment | Slope type (armor) | Length 80 m |
| | Road paving | Asphalt | Length 300 m |
| Buildings | Fisheries facility | Reinforced concrete structure/ PC pile foundation | Total floor area 977 m ² |
| Attached equipment | Water supply equip. | Water reservoir tank | 60 m ³ |
| | | Elevated water tank | 4 m ³ |
| | Drainage equipment | Septic tank (for daily waste water) | For 25 people |
| | Electrical equipment | Emergency generator | 40 KVA, 2 units |
| Ice-making equip., storage equip., etc. | Ice-making machine | Flake ice (R-22) | 5 tons/day, 2 units |
| | Ice storage | 0 °C (for ice storage) | 42 m ³ , 2 units |
| | Chilled storage | 0 °C (for fresh fish storage) | 51 m ³ , 2 units |
| | Cold storage | -20 °C (for frozen fish storage) | 51 m ³ , 2 units |
| | Blast freezer | -25 °C (for freezing fish) | 1 ton/day, 1 unit |
| Machinery & equipment | Insulated vehicle | | 2.0 ton capacity, 1 unit |
| | Insulated vehicle | | 1.0 ton capacity, 1 unit |
| | Forklift | | 1.5 ton capacity, 1 unit |
| | Landing equipment | Small crane (for large tuna) | 350 kg (lifting), 2 units |
| | Carts | For transporting tuna | 500 kg, 4 units |
| | Carts | For transporting ice | 300 kg, 5 units |
| | Fish boxes | For transporting ice (with lids & handles) | 100 kg, 20 boxes |
| | Quality inspection equipment | | One set |
| | Fish processing equipment | | One set |
| | Repair tools for Facility & equipment | | One set |
| Repair tools for small fishing vessel engines | | One set | |

3-3-4 Operation plan

After the facilities in this project are completed, GCFL will manage this site along with the facilities in Gouyave and Grenville under the supervision of the Ministry of Agriculture. At this point, the existing facilities at St. George's will be returned to the Port Authority. The business to be conducted by GCFL at this complex are as follows:

(1) Purpose of business

- 1) Purchase high quality fish from fishermen.
- 2) Supply ice to fishermen, so that the quality of the catch can be improved.
- 3) Process fish for export and to be supplied to the domestic market.
- 4) Replace imported marine products with domestic marine products.
- 5) Provide storage facility for fishermen.

The activities policies to achieve the above goals are as follows:

(2) Direction of activities

- 1) The complex will mainly be for the 14 launch type fishing vessels, including the seven 36-foot tuna fishing vessels, and about seventy 28-foot fishing vessels which will provide high quality fresh fish.
- 2) The high quality tuna which are caught by these fishing vessels will be landed at Gouyave, Grenville and Grand Mal. Then, they will be transported to the facilities in this project at Grand Mal, where they will be centrally processed, put in chilled storage and packed for export sales.
- 3) Fish which is not for export will be frozen and processed for the domestic market, and shipped and sold as is necessary.
- 4) In order to maintain freshness of the fish caught, the fishermen will be encouraged fishing methods using ice. In addition, methods to install and modify fishing vessels, so that even small fishing vessels can carry ice will be encouraged to the fishermen.
- 5) Efforts will be made to repair and improve fishing vessels, fishing gear, so that the fishermen will be more willing to work.

With these activities policies, GCFL plans to make work more efficient, so that commercial fisheries will improve the living standards of Grenadian fishermen and contribute to the obtaining of foreign currency.

(3) Buying and selling plans

1) Buying plan

GCFL will buy the catch at the regional facilities at Gouyave and Grenville, as well at the central fisheries complex at Grand Mal. All fish, both for export and

for domestic consumption and including those caught at other areas, will be gathered and sold at Grand Mal. (Refer to Fig. 3-1, Marketing System.) In this plan, the increase in the catch on Grenada island has been estimated at five percent annually from 1993 to 1996, and purchases from various areas are projected as follows based on catch trends and growth rate on Grenada Island:

Table 3-3 Catch totals for Grenada Island (1988 ~ 1992)

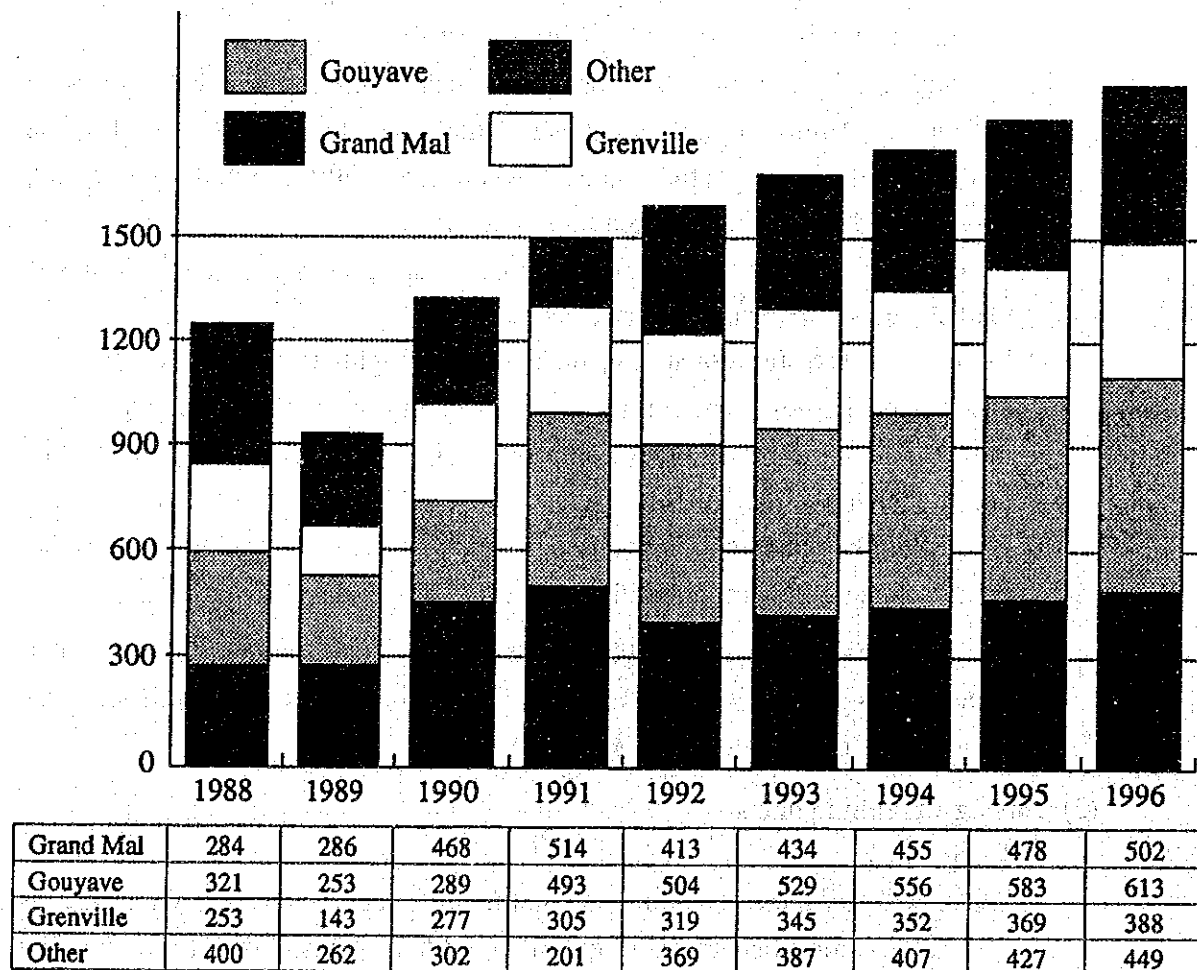
Unit: Tons / year

| | 1988 | 1989 | 1990 | 1991 | 1992 |
|------------------------------------|-------|------|-------|-------|-------|
| Grand Mal | 284 | 286 | 468 | 514 | 413 |
| Gouyave | 321 | 253 | 389 | 493 | 504 |
| Grenville | 253 | 143 | 277 | 305 | 319 |
| Other | 400 | 262 | 302 | 201 | 369 |
| Total for all Grenada | 1,258 | 944 | 1,436 | 1,513 | 1,605 |
| Growth rate from previous year (%) | | -25 | +52 | +5 | +6 |

(The average growth rate for the past five years is +9.5%.)

Fig. 3-7 Catch and forecasted estimates of catch for Grenada Island

[1988 ~ 1992: Actual 1993 ~ 1996: Projected] *Unit: Tons / year*



In this project, based on the change in catch and the growth rate on Grenada Island indicated in Table 3-3, the amount purchased from each area is set as described in Table 3-4 by estimating the annual increase in catch on Grenada Island at 5% per year for the years 1993 to 1996 (see Fig. 3-7).

Table 3-4 Forecasted estimates of catch for Grenada Island and forecasted purchases by GCFL

Unit: Tons/year

| Area | 1992 catch results | Projected 1996 catch results | Planned 1996 GCFL purchases | | | 1996 purchase ratio (%) |
|-----------|--------------------|------------------------------|-----------------------------|--------------------------|-------|-------------------------|
| | | | For export | For domestic consumption | Total | |
| Grand Mal | 413 | 502 | 60 | 30 | 90 | (18) |
| Gouyave | 504 | 613 | 125 | 40 | 165 | (27) |
| Grenville | 319 | 388 | 20 | 20 | 40 | (10) |
| Other | 369 | 449 | 16 | 16 | 32 | (7) |
| Total | 1,605 | 1,951 | 221 | 106 | 327 | |

The GCFL purchase ratio against the 1996 catch for each of the areas is the highest at Gouyave where tuna fishing is most popular at 27 percent, and the ratio for other areas is less than 20 percent. With the assumption that new large fishing vessels will be introduced and fishing vessels will be modified, we believe that these purchasing plans are appropriate.

2) Sales plans

a) Export sales plans

As Table 3-5 shows, the catch of the main export fish types for all of Grenada fluctuates slightly from year to year, however, it is increasing at an annual average of 15 percent. Although details are not clear because accurate data by area is not available, it is assumed that the catch of fish for export in the Carriacou area is not that large from the results of surveys to date. Therefore, these figures are assumed to be the trends in the catch of fish for export on Grenada Island.

GCFL purchases for export and sales results in 1992, and the export quantity by private companies are shown in Table 3-6. Although the total of fresh fish exports is 132 tons, if the shipment yield recovery (the actual percentage of purchased quantity which is exported) is assumed to be 95 percent, then the quantity purchased for export increases to 139 tons. When it is considered that the export yield recovery (the percentage of target fish which are fresh enough to be exported) of the fish catch for export was 30

percent, then the catch of tuna and other fish which could be exported on Grenada Island was 463 tons. This almost meets the projection above.

These plans consider the increase of large fishing vessels which will start operations, improvements to small fishing vessels, and increases in the catch and improvement in freshness through the efforts of fishermen. Because of these factors, it is believed that an increase rate of 7 percent in the catch of fish for export and an increase of 50 percent in export yield recovery are realistic.

In the 1996 sales plans, the catch of fish for export on Grenada Island is set at 607 tons, the export yield recovery at 50 percent, and the shipment yield recovery at 95 percent, so that total fresh fish exports are projected to be 289 tons. GCFL plans to export about 210 tons of that total (about 73 percent). The remaining 79 tons (37 percent) will be exported by several private companies.

Table 3-5 Changes in the catches of main fish for export (all of Grenada)

Unit: Tons/year

| Year | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|-------------|------|------|------|------|------|------|------|------|------|------|
| Tuna | 203 | 252 | 185 | 359 | 326 | 341 | 312 | 470 | 502 | 437 |
| Swordfish | 0 | 0 | 0 | 0 | 0 | 56 | 5 | 1 | 1 | 2 |
| Blue marlin | 4 | 5 | 6 | 17 | 23 | 21 | 23 | 30 | 37 | 30 |
| Total | 207 | 257 | 191 | 376 | 349 | 418 | 340 | 501 | 540 | 469 |

Average annual growth rate = 15%

Source: Fisheries Division.

From the changes in the last ten years in the catch of the top three species of fish for export to North America, GCFL export quantity of 210 tons for 1996 is believed to be very possible because of the growth rate. In this project, the estimation of the growth rate is calculated at 7% annual growth rate which is about 1/2 of the 15% average growth rate measured the previous year.

Fig. 3-8 Change and estimates for catch of fish for export (top three species)
(All of Grenada) 1983-1992-1996

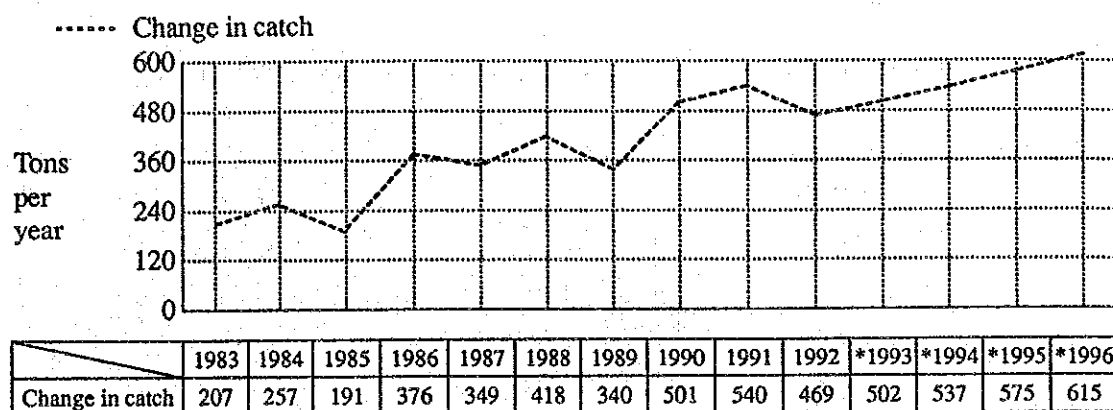


Table 3-6 Export quantities and catches of fish for export
(1992 results/1996 estimates)

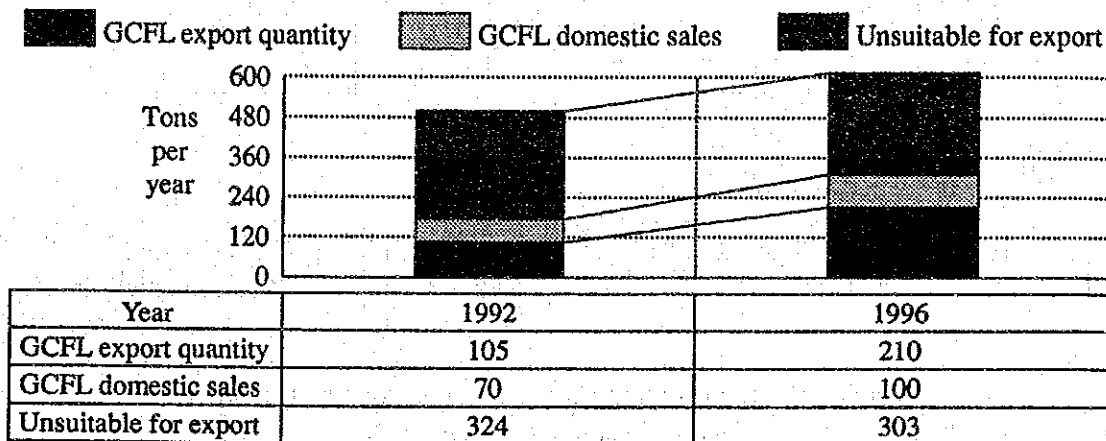
Unit : Tons/year

| | (1) GCFL exports | (2) Private company exports | (3) Total exports | (4) Total of purchases for exports | (5) Fish unsuitable for export | (6) Catch of fish for export |
|-------------------------------|------------------------|--------------------------------------|-------------------------|---|---|---------------------------------------|
| 1992 | 105 | 27 | 132 | 139 | 324 | 463 |
| Percentage of catch | (22.6) | (5.8) | (28.4) | (30) | (70) | (100) |
| Percentage of total export | (79.5) | (20.5) | (100) | | | |
| 1996 | 210 | 79 | 289 | 304 | 303 | 607 |
| Percentage of catch | (34.6) | (13.0) | (47.6) | (50) | (50) | (100) |
| Percentage of total export | (72.7) | (27.3) | (100) | | | |

Note : Item (5) indicates the quantity of fish which cannot be purchased and exported because of poor freshness. The ratio for 1992 is (4) : (5) = 30 : 70, and the estimate for 1996 is (4) : (5) = 50 : 50. Also, (6) is calculated by adding (4) and (5).

Based on the figures in 1992 for total sales and sales of private fish export traders, a breakdown of the above 1996 figures for purchasing and export is estimated to be as shown in Figure 3-9.

Figure 3-9 Projections in GCFL export quantities (1992 - 1996)



b) Domestic sales plans

In the business plans for 1996, the purchase of fish for domestic sales is set at 106 tons and the shipment yield recovery is set at 95 percent, so that the quantity shipped should be 100 tons. This is based on ten percent annual growth for the 69.9 tons of domestic sales by GCFL in 1992 (see Table 3-7). When the increase in total catch (the average yearly growth in catch of fish for domestic sales in the last ten years was 12 percent) and the increase in demand created by the maintenance of freshness and the reinforcing of domestic product purchasing policies are considered, we believe that the aforementioned figures are appropriate.

Table 3-7 GCFL domestic sales results (1992)

Unit: Kilograms

| Month | Total quantity purchased | Total quantity sales | Export quantity | Domestic sales | Inventory (month : month end figures) |
|-------|--------------------------|----------------------|-----------------|----------------|---------------------------------------|
| 1 | 19,944 | 10,358 | 3,501 | 6,857 | (9,586) |
| 2 | 20,745 | 15,024 | 8,717 | 6,307 | (15,308) |
| 3 | 31,512 | 22,940 | 15,147 | 7,794 | (23,879) |
| 4 | 62,200 | 23,978 | 20,397 | 5,396 | (62,102) |
| 5 | 17,596 | 18,665 | 12,735 | 5,929 | (61,033) |
| 6 | 2,005 | 5,367 | 309 | 5,057 | (57,672) |
| 7 | 527 | 6,852 | 525 | 6,327 | (51,347) |
| 8 | 442 | 20,774 | 14,186 | 6,596 | (31,014) |
| 9 | 2,363 | 15,404 | 9,699 | 5,705 | (17,974) |
| 10 | 32,396 | 17,862 | 14,723 | 3,139 | (32,508) |
| 11 | 9,561 | 9,832 | 3,800 | 6,032 | (32,237) |
| 12 | 4,022 | 6,385 | 1,609 | 4,776 | (29,874) |
| Total | 203,314 | 173,441 | 105,349 | 69,914 | |

Table 3-8 GCFL catch results for fish for domestic sales (all of Grenada)

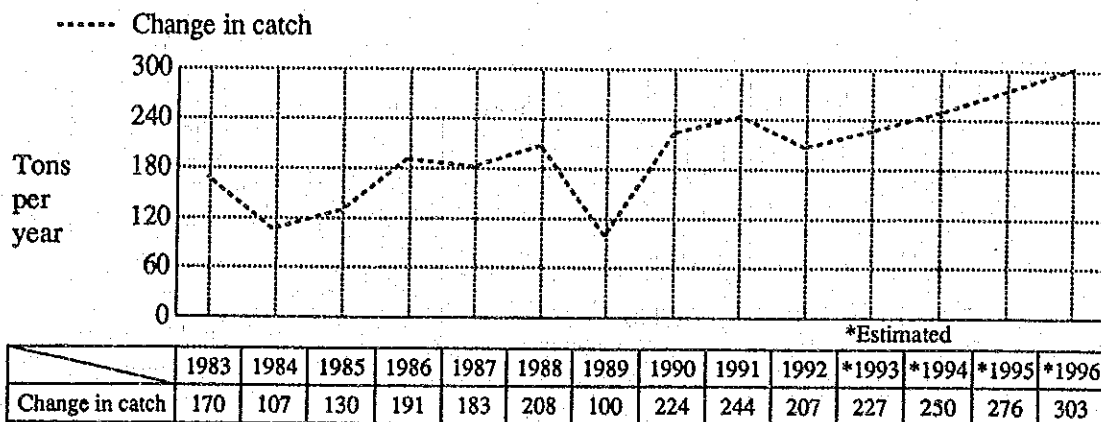
Unit: Tons/year

| Year | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 |
|--------------|------|------|------|------|------|------|------|------|------|------|
| Dolphin fish | 95 | 30 | 37 | 68 | 46 | 71 | 54 | 137 | 155 | 157 |
| Sailfish | 10 | 2 | 3 | 1 | 7 | 11 | 6 | 6 | 5 | 6 |
| Groupers | 65 | 75 | 90 | 122 | 130 | 126 | 40 | 81 | 84 | 45 |
| Total | 170 | 107 | 130 | 191 | 183 | 208 | 100 | 224 | 244 | 208 |

Average annual growth rate = 12% Source: Fisheries Division.

From the changes in catch in the top three species of fish for domestic sales (mainly frozen fish) in the past ten years, GCFL domestic sales quantity of 100 tons/year for 1996 is believed to be achievable because of the growth rate in the catch. (The estimate is based an annual growth rate of 10 percent, calculated by taking into consideration the 12% annual growth rate from the previous year.)

Fig. 3-10 Change and estimates for catch of fish for domestic sales (top 3 species)



3-3-5 Personnel plan

As the table of organization (Fig. 3-4) shows, there are 24 people involved in GCFL: eight board members, 12 employees at Grand Mal, 2 at Gouyave, and 2 at Grenville. The eight board members, however, only determine policy and confirm management decisions when board of directors' meetings are held, so that they will be excluded from the facilities personnel plans.

The assignment of personnel (Table 3-9) is for the 1993 organization, but because the current facilities will be used until the facilities in this project are completed, and because there is a need to reduce expenses, the figures are the same as those for 1996. With the largest catches, however, the number of workers involved in cleaning and processing work will be insufficient, so that about 12 part time workers will be employed. At the same time, because the landing times of fishermen will differ according to the areas fished and fish being caught, and due to Gouyave and Grand Mal may be busy 24 hours a day, a two-shift system, including part time workers, will be used.

Table 3-9 GCFL personnel assignment table

| Position | Grand Mal | Gouyave | Grenville |
|--|-----------|---------|-----------|
| Executive manager | 1 | - | - |
| Plant manager | 1 | 1 | 1 |
| Sales manager (work done by plant manager) | - | - | - |
| Chief engineer | 1 | - | - |
| Accountant | 1 | - | - |
| Laborers/drivers/sales clerk | 8 | 1 | 1 |
| Total | 12 | 2 | 2 |