NO. 1

JAPAN INTERNATIONAL COOPERATION AGENCY
The Republic of Palau
Ministry of Resources and Development

BASIC DESIGN STUDY REPORT ON THE FISH MARKETING IMPROVEMENT PROJECT IN THE REPUBLIC OF PALAU

March, 1995

MARUHA CORPORATION

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PREFACE

In response to a request from the Government of the Republic of Palau, the Government of Japan decided to conduct a basic design study on the Fish Marketing Improvement Project and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Palau a study team headed by Mr. Kiyoshi Sumita, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs and constituted by members of Maruha Corporation, from December 11 to December 27 in 1994.

The team held discussions with the officials concerned of the Government of Palau, and conducted a field study at the study area. After the team returned to Japan, further studies were made, 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 the Republic of Palau for their close cooperation extended to the team.

March, 1995

Kimio Fujita

President

Japan International Cooperation Agency

March, 1995

Mr. Kimio Fujita
President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Fish Marketing Improvement Project in the Republic of Palau.

This study was conducted by Maruha Corporation, under a contract to JICA, during the period December 5, 1994 to March 28, 1995. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Palau 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 Fisheries Agency. We would also like to express our gratitude to the officials concerned of the Ministry of Resources and Development, National Planning Office, Palau Federation of Fishing Associations, Consulate General of Japan in Agana for their cooperation and assistance throughout our field survey.

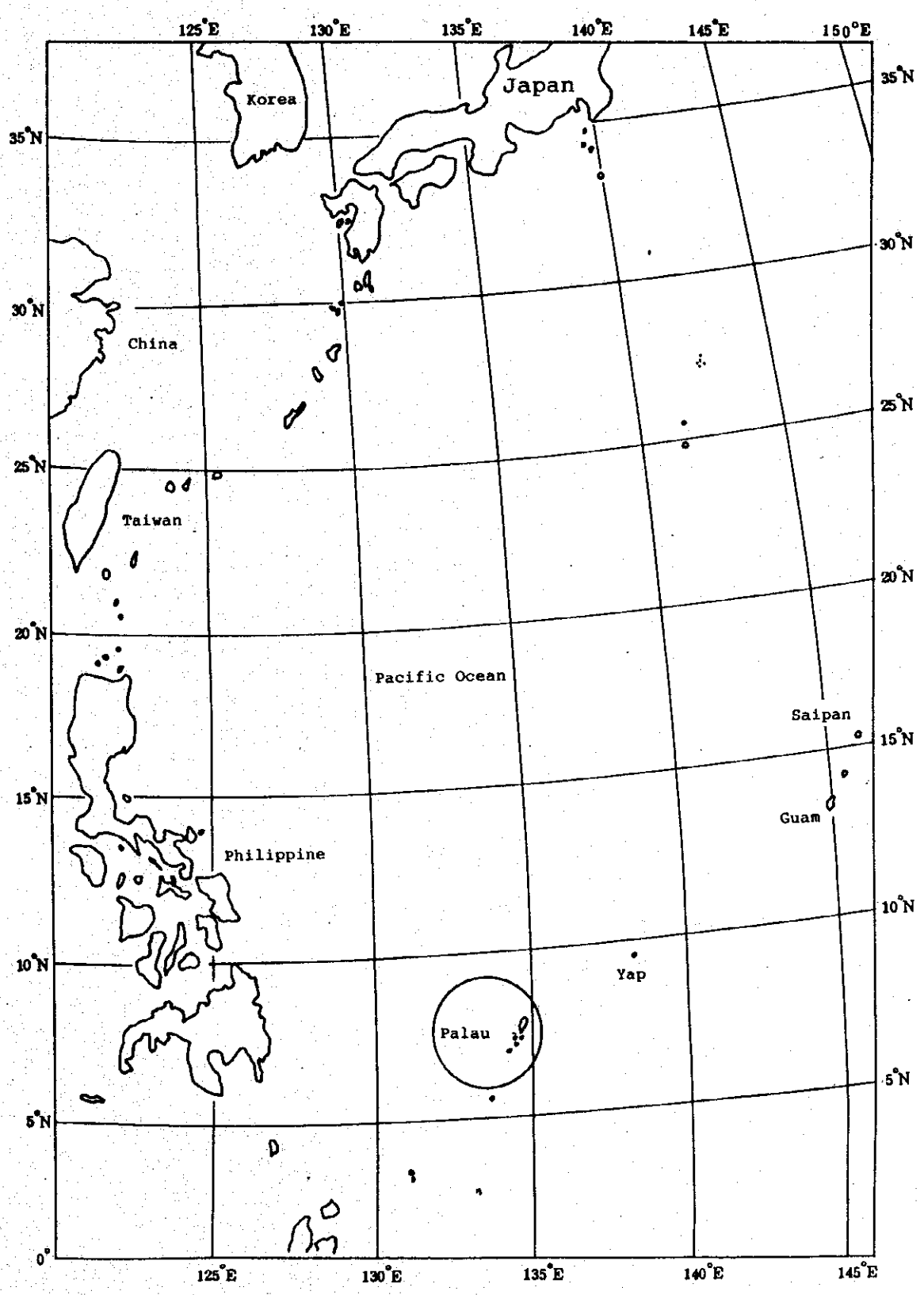
Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

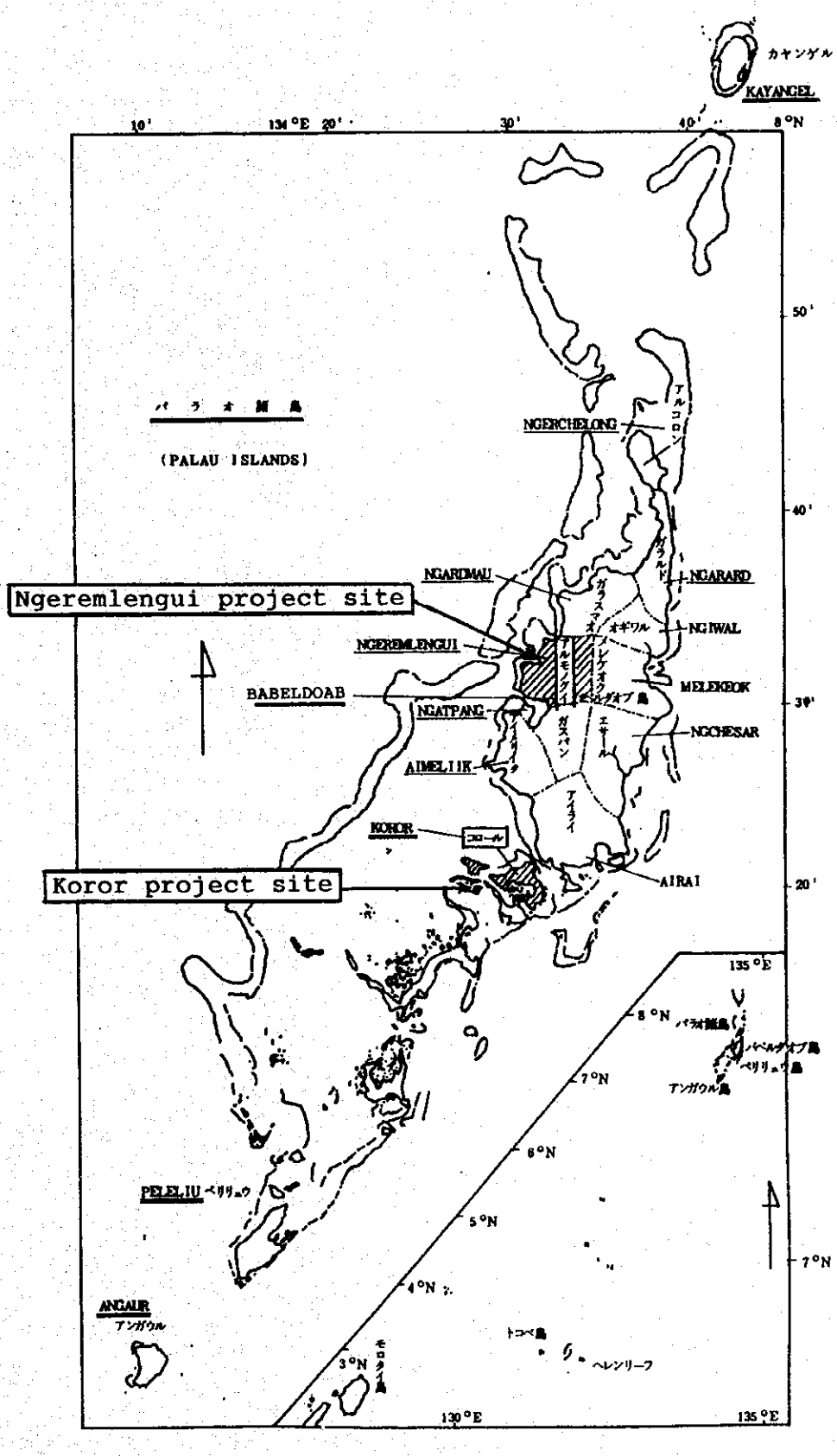
Toshio Hosonuma

Toshio Hosonuma
Project Manager,
Basic design study team on
the Fish Marketing Improvement Project
Maruha Corporation

LOCATION OF THE REPUBLIC OF PALAU



LOCATION OF THE PROJECT SITES
(NGEREMLENGUI & KOROR)



PROJECT SITE IN KOROR
(FISH MARKETING CENTER)

Photo-1
Existing facilities of Ngeremlengui Fishing Co-op.

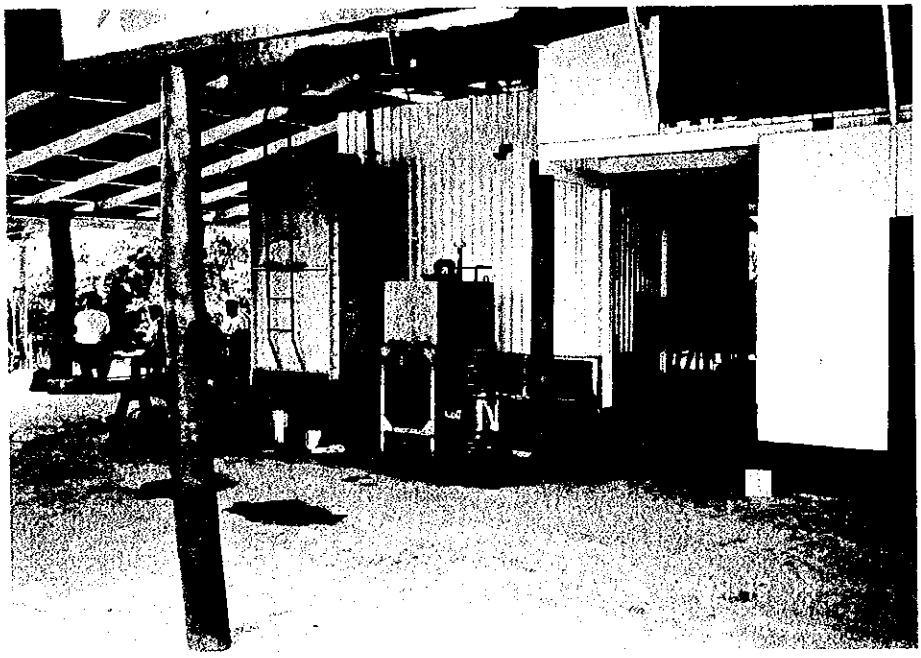


Photo-2
Existing ice making plant belonging to Ngeremlengui Fishing Co-op.

Photo-3
Project site of Ngeremlengui Ice Making Plant.

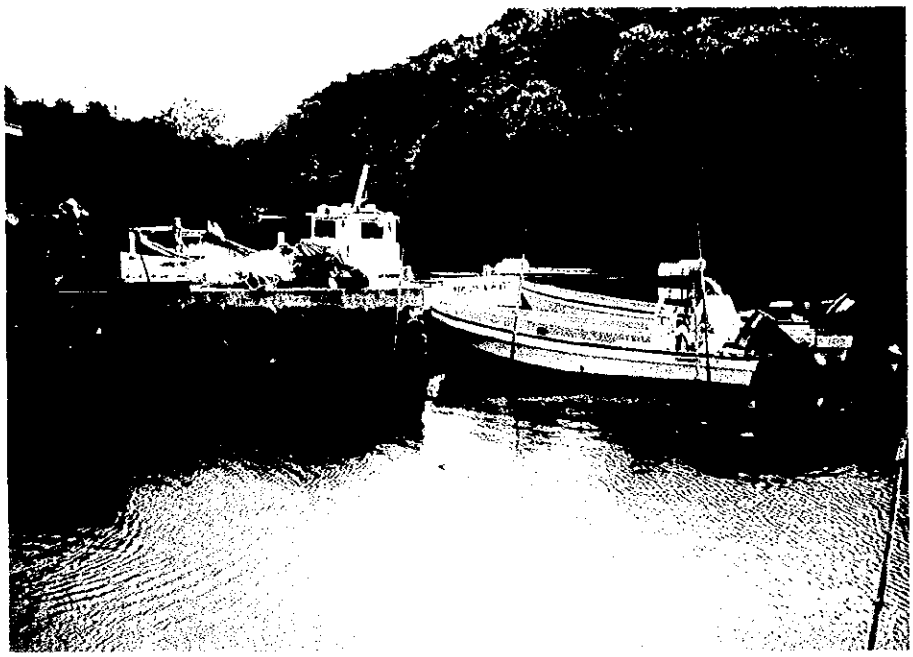


Photo-4
Mooring pier for fishing boats in Ngeremlengui.

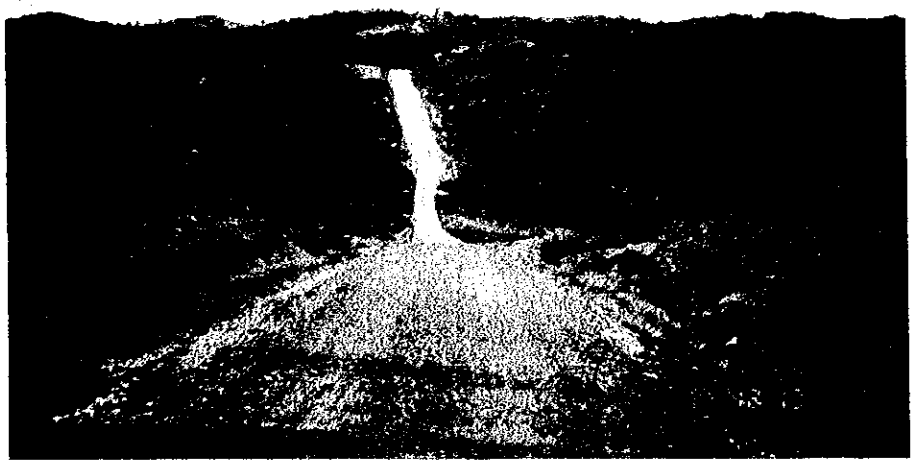


Photo-5
Road between Ngeremlengui and Koror.

Photo-6
Building owned by Palau Federation of Fishing Associations (PFFA).

Photo-7
Fisheries pier and fisheries center managed by PFFA.

Photo-8
Existing fish processing room in the fisheries center.

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Existing fish sales room in the fisheries center.

Photo-10
Fresh fish in the insulated wooden box.

Photo-11
Project site of Koror Fish Marketing Center.

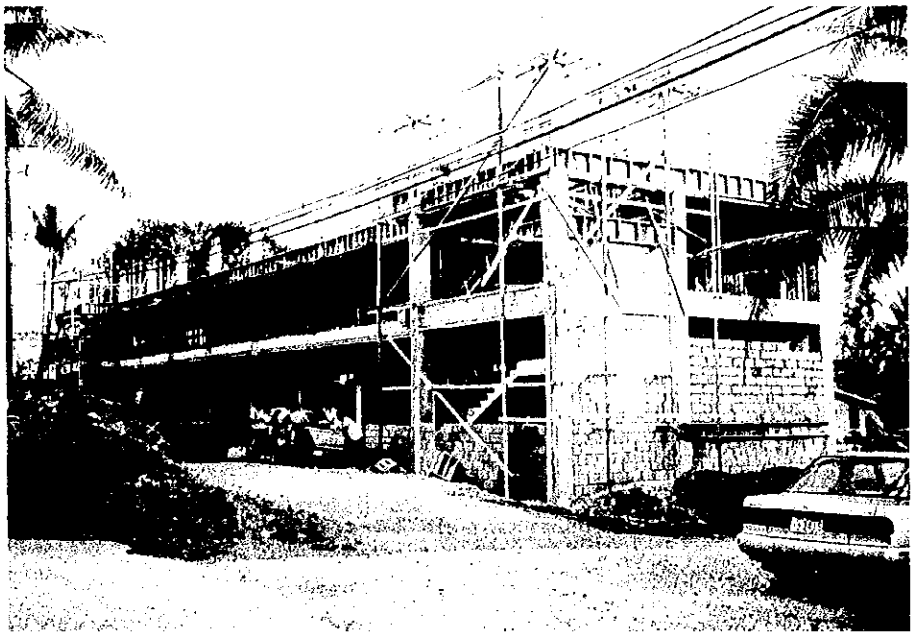

Photo-12
Building constructed by local construction method.

Summary

The Republic of Palau is a island nation at the western end of the Caroline Islands in the South Pacific lying between 3 and 8 degrees North and 132 and 135 East. While the approximately 350 large and small islands Palau occupies provide it with a total of 492km^2 of dry land, it is surrounded by 1,455km^2 of broad lagoons enclosed by approximately 400km of barrier reef. This natural feature forms fishing grounds suitable for coastal fisheries at the same time as its superior diving attracts 40,000 tourists every year. The present population of Palau is estimated to be approximately 17,000 persons, with about 10,000 of them living in the capital city of Koror and the rest scattered through the other 15 states.

In recent years, the rising living standards of its citizens and an increase in the number of tourists visiting its shores have contributed to a growing demand for fishery products. As a consequence, its coastal fishing industry has been transforming from one supplying the immediate needs of the fishermen and their families to a commercial fishing industry. In 1993, the coastal fishing industry employed an estimated 780 persons and operated about 800 fishing boats; most powered by outboard motors. That year, 354 tons of fish were shipped to Koror, but the amount shipped has remained flat for several years because a distribution system has not been established.

In its Five Year Plan for Economic Development (1995–1999) introduced after national independence was achieved, the government of Palau has emphasized the creation of the foundations of economic independence and balanced continuous development of all its states, but in the outlying states there is a shortage of employment opportunities and the coastal fishing industry is one of the few regional industries that provides a cash income. To resolve this problem, the Government of Palau, which has been promoting plans to develop regional fishing villages, has now enacted the Fish Marketing Improvement Project to increase the amount of fish supplied to the capital Koror and nurture regional industry, and has asked the government of Japan for grant-aid to help implement the Project.

In response to this request, the Government of Japan decided to conduct a basic design study, and the Japan International Cooperation Agency despatched a study team to Palau from

December 11 to 27, 1994.

The team held discussions with the officials concerned of the Government of Palau and conducted a field survey at the project site. After the team returned to Japan, it conducted additional analysis, and based on the results, has clarified the following problems that have to be considered in order to create specific plans.

(1) The Maintenance of Freshness in the Producing Regions

A key to preserving the freshness of fishery products is the supply of ice, but right now, ice-making machinery is found in only seven of the country's states. In 1981, Japan provided a grant to install a small ice maker in Ngeremlengui State, a production center on the west side of Babeldoab Island. But because this facility supplies ice to fishermen not only in Ngeremlengui but in neighboring states, the area suffers from a chronic shortage of ice.

(2) Transportation from the Producing Regions to the Consuming Region

The recent opening of a road from the six states in the south part of Babeldoab Island to Koror permits goods to be shipped to the capital from that area by land. Being safer, more reliable, and less expensive than transport by sea, land transport is preferable. But the unpaved mountain roads that form part of this route make it difficult for any vehicles other than four-wheel drive trucks to negotiate the road. Sea transport is the only way to move goods from the four states on the north side of Babeldoab Island which are not yet connected to the capital by road and from three states on remote islands. And because fishermen's associations or individual fishermen in these states now ship their catch independently, the transport process is inefficient and the fishermen are hard pressed to pay for it.

(3) Marketing Facilities in the Consuming Region

In the capital city, Koror, the Palau Federation of Fishing Associations operates a fishery products market housed in a steel frame prefabricated building that, being more than forty years old, has rusted and deteriorated. The processing rooms and sales rooms inside the building have deteriorated in the same way, and are no longer sanitary. It is not a place well suited to the processing of fresh fish.

From the above findings, the study team has concluded that in order to achieve the goals of the Project, the following facilities and equipment must be provided. The initial request included the Ngeremlengui processing facility, but because performing fish processing in a producing region is a source of problems related to the maintenance of freshness of the product during transport to the consuming region, the Ngeremlengui processing facility has been removed from the Project with the approval of concerned officials of Palau.

Facilities: Ngeremlengui Ice Making Plant 1

Reinforced concrete construction, 1-story, floor area of 40 sq. meters, (Ice-making and ice storage space: 28 sq. meters, generator room: 12 sq. meters)

Fish Marketing Center in Koror 1

Reinforced concrete construction, 2-story, floor area of 105 sq. meters

(Breakdown) First story 70 sq. meters (processing room 16 sq. meters, sales room 35 sq. meters, toilets, corridors, etc. 19 sq. meters)

Second story 35 sq. meters (office space 35 sq. meters)

Equipment:

Ice Making Machine 2

Plate ice, 1-ton per day, with water tank and ice storage

Emergency Power Generator 1

44KVA (35KW), diesel engine driven, sound-proof type, with fuel tank

Fish Carrier Truck 1

Capacity 1.5 tons, four-wheel drive, with a hydraulic lift behind the cargo platform

Fish Carrier Boat 1

FRP, full length approx. 12.5 meters, capacity 3 tons, main engine approximately 180 horsepower, speed approximately 13 knots

Fishing Gear and Equipment:			
	Outboard Motors	85 horse power, with spare parts	20
	Insulated Fish Boxes	FRP or polyethylene, 160 liters	50
	Net Baskets	Plastic, 50 liters	100
	Hand Cart	Stainless steel, 150 kg.	5
	Processing Tools	Pointed knives, etc.	1

The construction will take about nine months, including preparation time in Japan and actual on-site construction work. Because of the time required for domestic procurement of the ice making machinery, fish carrier boat, etc., it is expected to take approximately five months to deliver the equipment.

When the Project has been completed, the Ngeremlengui ice making plant will be able to supply roughly 360 tons of ice per year to 211 fishermen in Ngeremlengui State and four adjoining states, making a substantial contribution to the maintenance of the freshness of fish both in storage and during shipping and to increasing the quantity of fish shipped to Koror. The fish carrier boat will deliver about 110 tons of fresh fish per year from the four states on the north side of Babeldoab Island which are inaccessible by road. This boat will carry all the fish products from these states, relieving their fishermen and fishing cooperatives of the need to ship their own catch. This will save the four states a total of $7,300 per year in shipping costs. The charterers (fishing cooperatives) of the small fishing boats operated in these states now have to spend about 50 days each year carrying fish to Koror, but after the Project is completed, they will be able to devote those 50 days to fishing.

The Fish Marketing Center in Koror, will be equipped to provide the city's 22 hotels, 28 restaurants, and approximately 10,000 ordinary consumers with a stable supply of inexpensive fresh fish.

The above findings indicate that by establishing a new fish marketing system, this Project will play a significant role in providing a stable supply of fish and simulate commercial fisheries in outlying fishing villages, and is in all ways, a project suited to the provision of grant aid. The maintenance and upkeep of the facilities and equipment to be

donated will not present any problems; they can all be independently operated by the Palau Federation of Fishing Associations and by the Ngeremlengui State Fishing Cooperative.

The following proposals should be incorporated into the Project plan in order to enhance the effectiveness of the implementation of the Project.

1) Fishing co-ops have only been organized in seven of the nation's 14 principal states. Fishing co-ops must be formed in every state so that the PFFA can be operated with greater efficiency. A fishing co-op should be formed promptly in Ngardmau, one of the four northern states whose catch will be gathered for shipment by sea after the Project has been implemented.

2) The initial request only asked for a fish carrier boat to carry the catch from Ngerchelong. If the service is provided to this single state, it will likely make a deficit. So the service should be extended to the other states to guarantee its profitability. If, however, it makes a deficit, the government will have to subsidize it.

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Chapter 1 Background of the Project

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1-1 Background of the Project

As a result of a referendum held in November 1993, The Republic of Palau decided to ratify the Compact of Free Association with the U.S., a matter which had been the nation's most important pending issue since it established a local governing body in 1981. In October 1994 it formally became an independent country.

The budget proposal tabled by the government for 1995 amounted to $49.5 million. Only 35% of this was to be raised through taxation; the remaining 65% was to be supplied as financial assistance by the United States. Because this financial support will only be provided by America for 15 years, the country must achieve economic independence before the end of that period. For this reason, the Five Year Plan for Economic Development (1995-1999) the government enacted after achieving its independence is intended to establish the foundation for the economic independence of Palau and achieve balanced continuous development in all its states.

Two industries the country is counting on developing are tourism and fisheries, both of which are supported by its rich marine resources. The latter includes both coastal and offshore fisheries. Offshore fishing is dominated by foreign vessels operating inside the 200 nautical mile economic zone, and the fees they pay for this privilege contribute to the country's supply of foreign currency. Its coastal fishing is small-scale fishing carried on by local fishermen inside its reefs, and most of the catch is consumed within Palau. A source of the people's supply of animal protein and a way of stimulating regional industry, it is an important part of economic activity in Palau. For these reasons, the government of Palau has, since 1981, continued to promote plans to stimulate the coastal fisheries. In recent years, it has been changing from an industry whose products are consumed in the fishing communities to a commercial fishing industry supplying fish to the capital Koror. But because a fish marketing system linking the regional fishing villages with Koror has not been established, the shift to commercial fishing has not gone smoothly.

As its response to this situation, the Government of Palau has enacted the Fish Marketing Improvement Project to provide ice making plants, transportation facilities, marketing centers and other components of a fish marketing system in order to stimulate commercial fishing in the regional fishing villages, and has asked the Government of Japan for grant-aid to help implement the Project.

1-2 Outline of the Request and Main Components

The goal of this Project is the stimulation of commercial fishing in outlying fishing villages by providing a fish marketing system. Specifically, improving the ice-making plant in Ngeremlengui State, a center of the fishing industry in the western part of Babeldoab Island, building a fish marketing center in the consuming region at Koror, and establishing sea and land transportation facilities linking the producing and consuming regions.

The Palau Fishing Authority (hereafter the PFA), a non-profit body under the direct control of the President, the Palau Federation of Fishing Associations (hereafter the PFFA), a body that markets fish under the supervision of the PFA, and the Ngeremlengui Fishing Co-op, a member of the PFFA, are the bodies implementing the Project.

The PFFA has purchased fish from fishermen in various states and sold it to ordinary consumers and to large purchasers such as hotels and restaurants in Koror. The PFFA will continue to manage the marketing center to be constructed as part of the Project. The PFFA will also use the new fish carrier boat to periodically gather fish from the four states on the north side of Babeldoab Island in order to guarantee a stable supply of fish at the same time as it reduces the cost in time and money borne by fishermen who bring their catch directly to Koror.

The Ngeremlengui State Fishing Co-op will operate the ice making plant and supply ice to its own fishermen and to those in neighboring states so that their catch can be kept fresh. The Ngeremlengui State Fishing Co-op will also use the fish carrier truck to make regular shipments of fish to Koror in order to contribute to the stabilization of its fish supplies.

The government of Palau has requested the following facilities and equipment to support the implementation of the Project.

(1) Ngeremlengui Ice Making Plant

- Building — Prefabricated steel frame, 1-story, total floor surface area of 40 sq. meters — 1
  (Breakdown) Ice making room 28 sq. meters, generator room 12 sq. meters
- Ice Making Machine
  Flaked or plate ice, 1-ton per day — 2

– Ice Storage Bin	Prefabricated insulated panel, capacity 20 cubic meters	1
– Water Tank	Prefabricated FRP, 3 cubic meters	1
– Generator	50KVA, diesel engine powered	1
– Fuel Tank	Steel, 1,000 liters	1

(2) Fish Marketing Improvement Facilities for Ngeremlengui

– Building	Prefabricated steel frame, 1–story, total floor surface area of 48 sq. meters	1
	(Breakdown) Fish processing room 24 sq. meters, packaging and storage room 24 sq. meters	
– Fish Processing Machinery and Equipment		
	Processing table, etc.	1
– Septic Tank	Single treatment type, 3,500 liters	1
– Transport Equipment		
	Fish carrier truck: capacity: 1.5 tons, four–wheel drive	1
	Insulated Fish Boxes 160 liters	20
	Hand Carts 150 kg, four wheels	5

(3) Fish Marketing Improvement Center in Koror

– Building	Prefabricated steel–frame construction, 2–story, floor area of 84 sq. meters	1
	(Breakdown) First story, fish sales room 28 sq. meters, fish processing room 24 sq. meters, toilets etc. 12 sq. meters, sub–total 56 sq. meters.	
	Second story Office space 28 sq. meters	
– Fish Processing Equipment		
	Processing tables, etc.	1
– Septic Tank	Single treatment type, 5,000 liters	1
– Fish Marketing Equipment		
	Refrigerated show–cases, 500 liters, 0 to 20 degrees Celsius	3
– Furniture	Office desks and office equipment, etc.	1

(4)	Fish Carrier Boat		1
	- Material	FRP	
	- Length	Approx 10.0 meters	
	- Main Engine	Approx 110 horsepower, diesel engine	
	- Cruising speed	Approx. 10 knots	
(5)	Fishing Machinery and Equipment		
	- Outboard Motors	85 horsepower, with spare parts	20
	- Insulated Fish Boxes		
		FRP or hardened plastic, 160 liters	30
	- Net Baskets	Hardened plastic, 50 liters	100

1-3 Project and/or Program of Other Donors

There are no other fisheries development projects and/or programs supported by other donors.

Chapter 2 Outline of the Project

Chapter 2 Outline of the Project

2-1 Objective of the Project

The fish marketing system in Palau is plagued by the following problems.

[1] A shortage of ice to keep fish fresh during storage and transport.

[2] A shortage of land transportation equipment to operate between states served by the road system and Koror.

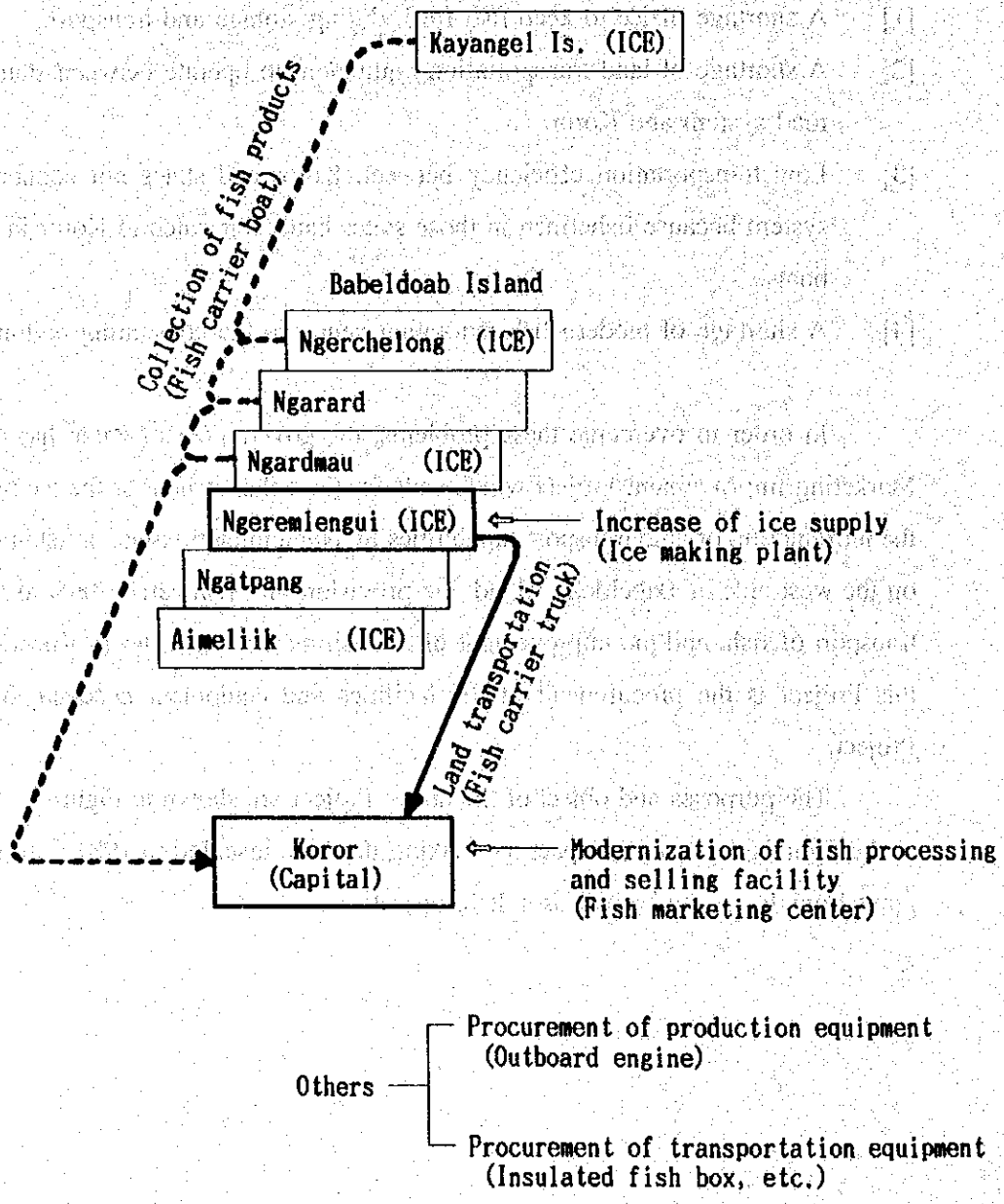
[3] Low transportation efficiency between Koror and states not connected to the road system because fishermen in those states haul their catch to Koror in their own small boats.

[4] A shortage of modern fish marketing center in the consuming region of Koror.

In order to overcome these problems, the government of Palau has enacted the Fish Marketing Improvement Project which calls for the enhancement of the ice making plant and the introduction of land transport capabilities in Ngeremlengui State, a fishing industry center on the west side of Babeldoab Island, the provision of a fish carrier boat to handle all ocean transport of fish, and the improvement of the fish marketing center in Koror. The purpose of this Project is the procurement of the facilities and equipment necessary to carry out the Project.

The purposes and object of the above Project are shown in Figure 1. The word "ICE" in the figure refers to a compact ice making machine installed in 1981 with the support of a grant from Japan, and which is still in operation.

Figure 1. Purposes and Objects of the Project



2-2 Study and Examination on the Request

As a result of the lack of a fish marketing system in Palau, residents of the outlying fishing villages consume most of the fish their fisherman catch. This Project is intended to promote commercial fishing in the outlying villages by improving the fish marketing system.

Fish marketing in Palau is hampered by a shortage of the ice needed to keep fish fresh, a lack of fish carrier trucks that can travel on bad roads, the low efficiency of transport activities as a consequence of the fact that fishermen or fishing cooperatives in each of these states deliver their fish to market in their own boats, and the lack of modern fish marketing facilities.

To resolve these problems, this Project will be implemented to improve the ice making plant in Ngeremlengui State, which is a production center on the west side of Babeldoab Island, and to provide a fish carrier truck permitting land transport to Koror. For the northern part of Babeldoab Island where there are no roads, the PFFA will periodically send a fish carrier boat to collect fish in order to end the uneconomical practice of having fishermen bring their catch to market in their own boats, thereby lightening their economic burden. And in Koror, fish marketing facilities operated by the PFFA will be modernized so that it can supply consumers with a supply of inexpensive fresh fish.

The requested items listed in Chapter 1 have been examined one-by-one in line with the above basic project concepts. The results of this examination follow.

(1) The Ngeremlengui ice making plant, which is located in Ngeremlengui State, a fish industry center on the western side of Babeldoab Island, supplies ice not only to its own fishermen, but to fishermen in neighboring states, and we consider it necessary to preserve the freshness of fish during both storage and transport. Operated by the Ngeremlengui State Fishing Co-op, it is self-supporting thanks to the profits it earns selling ice.

(2) As a result of considerations of the processing and shipping equipment maintained in Ngeremlengui State, we have decided that land transport equipment is essential so that the Ngeremlengui State Fishing Co-op can periodically transport fish to Koror. But with regards to processing facility, because it is possible to carry out simple fish processing with the existing facility and when fish is processed in a production area, there is a danger of it losing its freshness while being transported, we have, with the approval of the Palau officials, removed the Ngeremlengui processing facility from the

Project plan.

(3) Because the Fish Marketing Center in Koror are deteriorated and unsanitary and demand for fish is high in Koror, we believe it is necessary to reconstruct these facilities. We have also concluded that under the management of the PFFA, the new marketing center will be self-supporting thanks to profits from the sale of fish.

(4) We consider a fish carrier boat to be essential because by collecting all the fish caught in the four states on the north side of Babeldoab Island, an area with no road link to Koror, it will eliminate the need for individual fisherman to deliver their fish to the market in their own boats, thereby reducing their transport costs at the same time as it will help stabilize Koror's fish supply. Managed by the PFFA, it can operate independently from fees charged for carrying fish.

(5) Turning to fishing gear and equipment, etc., we have determined that outboard motors are essential production equipment for small fisherman and that insulated boxes and net baskets are also necessary for the distribution of both fish and ice. If these types of equipment, machinery, etc. are distributed free of charge, their owners might fail to take responsibility for their upkeep. The PFA and the PFFA will, therefore, sell them at a discount to impartially selected fishermen.

As a result of the above examination of the Project plan, we have confirmed that the Project will be effective, feasible, and within the capabilities of Palau, and that it conforms to the grant-aid system. Therefore the provision of grant aid by Japan has been adjudged appropriate. Consequently, on the premise that it will receive financial support from Japan, we have conducted the following study of the outline of the Project and prepared a basic Project design. We have determined that it is appropriate to revise some of the details of the Project as it was requested, as we have already explained in the study of the details of the elements, facilities, and equipment that comprise the Project.

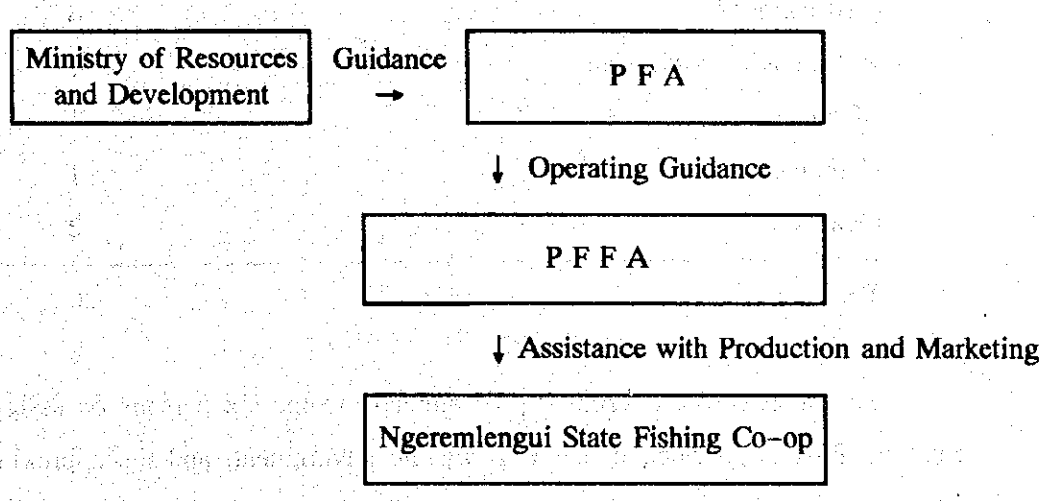
2-3 Project Description

2-3-1 Executing Agency and Operational Structure

(1) Organization

The government bureau in charge of the Project is the Ministry of Resources and Development, and the bodies implementing the Project are the Palau Fishing Authority (PFA), the Palau Federation of Fishing Associations (PFFA), and the

Ngeremlengui State Fishing Co-op. The relationships between these groups is shown on the following chart.



(2) Palau Fishing Authority

Consisting of seven directors appointed by the President, its principle responsibility is leading and overseeing the project management activities of the PFFA. Five of the seven directors are members of regional fishing Co-ops and the other two are ordinary citizens. It does not have a permanent office, but its directors are required to hold meetings every three months. The statute establishing the PFA stipulates that it can hire staff needed to run the PFFA, and in fact, it has assigned six persons to the PFFA including a manager.

(3) Palau Federation of Fishing Associations

The PFFA now employs 20 persons, including six assigned by the PFA. The following list shows the duties each employee performs.

Manager	1
Fishing experts (ship's captain and chief engineer)	2
Secretary and chief accountant	1
Fish marketing manager	1
Fuel marketing manager	1
(The above are despatched by the PFA)	
Fish export manager	1

Sales persons	2
Accountant	1
Office staff	1
Fish handlers	3
Refrigeration technician	2
Mechanic	1
Carpenter	1
Guards	2
Total	20

The approximately $70,000 paid annually to the six persons on assignment from the PFA is provided to the PFA by the government, and the approximately $80,000 in annual wages paid to the other 14 employees is taken from profits earned on the operations of the PFFA.

In addition to selling fish, the PFFA also sells fuel oil and ice to the fishermen, exports fish, and so on. It earns a small profit every year.

When this Project is completed, the PFFA will manage the new fish marketing center and operate a new fish carrier boat, but will not have to hire new personnel. Because the new fish marketing center will replace an existing facility, it will not require new staff. And because the PFFA now employs two fishing experts, both of whom double as captain and chief engineer, the organization will not need to hire any new personnel to operate the new fish carrier boat.

(4) Ngeremlengui State Fishing Co-op

There are 42 fishermen in Ngeremlengui State, and all of them are members of the Ngeremlengui State Fishing Co-op. The co-op employs three full time workers including its manager. Its present activities include operating a small ice making machine, selling the ice to the fishermen, buying fish from the fishermen, and transporting fish to Koror either by truck or in a small fishing boat. This is handled by its three full-time workers.

The Project plan calls for the introduction of two small ice making machines and one fish carrier truck in the district, but the present staff of three will be able to operate these new facilities with the support of co-op members.

2-3-2 Plan of Operation (Activity)

The Ngeremlengui State Fishing Co-op will operate an ice making plant that will supply ice to fishermen in both Ngeremlengui State and four nearby states and a truck which will carry fish to Koror.

The PFFA will manage a Fish Marketing Center that supplies the residents of Koror with fish and a boat that carries fish from four states on the north side of Babeldoab Island to Koror. It will also be in charge of outboard motors and other fishing equipment that will be distributed to small fishermen.

2-3-3 Location and Condition of the Project Site

(1) The Ngeremlengui Ice Making Plant

The new plant will be located beside the fishing co-op office and the existing ice making plant on land loaned free of charge to the co-op by the State Government.

The State Government has installed water pipes to provide water to the site. The water is pumped from a mountain river to a storage tank installed on top of a mountain, then supplied from the tank. Electric power is transmitted to the site from a State Government owned generator (150KVA, 220V, 60Hz). But because the power will only be available for 12 hours at night (18:00 to 06:00), the ice making plant must be provided with an emergency generator.

The road from Ngeremlengui to Koror was opened two years ago, but as it is an unpaved mountain road with many grades, only four-wheel drive vehicles can use the road without difficulty. It takes about 1.5 hours to drive to Koror.

(2) Fish Marketing Center in Koror

The site in Malakal in Koror State is occupied by the PFFA based on a rental contract with the government of Koror State. The new facility will share the site with the PFFA office, an ice making plant, refrigeration plant, and so on. A mooring quay used for unloading boats and the existing fish marketing center, both operated by the PFFA, occupy the side of the site facing the ocean.

Water is provided to the site by a water supply system operated by the central government. Sewage pipes to carry water to a central water processing site will be constructed in the near future, but because this has not been done yet, it will be necessary to construct a septic tank. A power station operated by the central

government supplies power to the site in two voltages, 115V and 220V. It provides 24-hour service.

The trunk roads in this state are almost completely paved, and traffic is heavy.

2-3-4 Outline of Facilities and Equipment

The following is a summary of the facilities and equipment deemed necessary to complete the Project.

Facilities: Ngeremlengui Ice Making Plant 1

Reinforced concrete construction, 1-story, floor area of 40 sq. meters, (Ice making and ice storage space 28 sq. meters, generator room 12 sq. meters)

Fish Marketing Center in Koror 1

Reinforced concrete construction, 2-story, floor area of 105 sq. meters

(Breakdown) First story 70 sq. meters (processing room 16 sq. meters, sales room 35 sq. meters, toilets, corridors, etc. 19 sq. meters)

Second story 35 sq. meters (office space 35 sq. meters)

Equipment:

Ice Making Machine 2

Plate ice, 1-ton per day, with water tank and ice storage bin

Emergency Power Generator 1

44KVA (35KW), diesel engine driven, sound-proof type, with fuel tank

Fish Carrier Truck 1

Capacity 1.5 tons, four-wheel drive, with a hydraulic lift behind the cargo platform

Fish Carrier Boat 1

FRP, full length approx. 12.5 meters, capacity 3 tons, main engine approximately 180 horsepower, speed approximately 13 knots

Fishing Gear and Equipment:

Outboard Motors 85 horsepower, with spare parts 20

Insulated Fish Boxes	FRP or polyethylene, 160 liters	50
Net Baskets	Plastic, 50 liters	100
Hand Cart	Stainless steel, 150 kg.	5
Processing Tools	Pointed knives, etc.	1

2-3-5 Operation and Maintenance Plan

(1) Ngeremlengui Ice Making Plant

No problem is anticipated with the operation or maintenance of the new ice making machinery because the state is still operating an ice making plant installed in 1981 with financial support from Japan. If it breaks down, the refrigeration technician employed by the PFFA will be able to go to the site to repair it. It will be necessary to have spare parts needed to repair the equipment shipped from Japan, but the operators of the plant will be able to pay for them with money set aside from the profits it earns selling the ice.

The ice making machines will operate 240 days a year, but only during the night. Two people will be needed to operate the plant. The anticipated annual income and expenditures are shown below. The State Government will actually provide subsidies to cover labor costs, electrical charges, and the cost of water, but even if this subsidization is discontinued sometime in the future, the plant will be able to support itself. Although the lifetime of such machinery is usually 10 years, depreciation expenses will not be appropriated.

Income (Dollars)		Expenditures (Dollars)	
Ice Sales 1,000kg×240 days×@$0.10/kg=$24,000		Personnel costs @$600×12 months×2=$14,400 Electric Power 20KW×12H×240 days×@$0.09/kwh=$5,184 Water 1 ton×240 days×@$0.22/T=$53.00 Maintenance @$100.00/month×12 months×2 units=$2,400	
Total Income	$24,000	Total Expenditures	$22,037
Anticipated Income and Expenditures: $24,000-$22,037=$1,963/year			

(2) Fish Carrier Boat

In 1981, 11 small fishing boats (3 gross tonnage) were purchased with financial assistance from Japan. These boats are over lifetime of 10 years, but seven boats are still in use. The PFFA loans these small fishing boats to fishing co-ops in the various states, but services them all in its own service shop. This fish carrier boat (4 gross tonnage) will be a little larger than these small fishing boats, but it will have the same basic structure, so the PFFA service shop will be able to take care of it. While the PFFA will have to order parts from Japan, it will be able to pay for them with funds set aside from the profits earned from its fish transport service.

The fish carrier boat will, in principle, make a round trip every other day, three times a week, 150 trips per year carrying a total of 110 tons (244,000 pounds) of fish per year to Koror from the northern states of Kayangel, Ngerchelong, Ngarard, and Ngardmau. Five cents per pound of the 15 cents per pound the fishermen pay to the fishing co-ops for handling their catch will be paid to the PFFA as a fee for hauling the fish on the boat.

The boat will also be used to carry 10 drums of fuel oil for the fishing boats from Koror to the four states fifty times per year. This means it will deliver a total of 500 drums every year. The following is an estimate of annual income and expenditures involved in this service. Because two existing PFFA personnel can operate the service, no money need be set aside to cover personnel costs. Although the lifetime of such machinery is usually 10 years, depreciation expenses will not be appropriated.

Income (Dollars)		Expenditures (Dollars)	
Fish transport fees @$0.05/pound×244,000 pounds=$12,200 Fuel oil transport fees @$5.30/drum×500 drums/year=$2,650		Fuel costs @$80/trip×150 trips/year=$12,000 Maintenance @$100.00/month×12 months=$1,200	
Total Income	$14,850	Total Expenditures	$13,200
Anticipated Income and Expenditures: $14,850-$13,200=$1,650/year			

(3) Fish Marketing Center in Koror

The maintenance and operation of the fish marketing center are not expected to present any problems, because they will replace an existing facility, and will not require any special equipment. The present center sells about 120 tons of fish per year. According to a forecast of the benefits of providing improved processing and marketing facilities, after the Project, sales will increase by 20 tons to reach approximately 140 tons (approximately 310,000 pounds). Based on this projection, the following estimated annual income-expenditure figures have been prepared. Personnel expenses provide for a total of five employees: two sales persons, one processor, and two fish handlers. The building is a reinforced concrete structure with an estimated lifetime of 50 years, and depreciation expenses have been included in the estimates.

Income (Dollars)		Expenditures (Dollars)	
Fish sales @$1.50/pound×310,000 pounds=$465,000		Cost of fish @$1.30/pound×310,000 pounds=$403,000 Personnel costs @$600.00/month×12 months×5 persons= $36,000 Maintenance @$500.00/month×12 months=$6,000 Depreciation Expenses $370,000/50 years=$7,400	
Total Income	$465,000	Total Expenditures	$452,400
Anticipated Income and Expenditures: $465,000-$452,000=$12,600/year			

2-4 Technical Cooperation

It will not be necessary to offer technical cooperation during the implementation of the Project, because all the facilities and equipment are at the same technical level as the existing facilities and equipment, and local technology is up to the task of handling the facilities, equipment, etc.