MINISTRY OF AGRICULTURE,
ANIMAL HUSBANDRY AND FISHERIES
REPUBLIC OF SURINAME

BASIC DESIGN STUDY REPORT ON THE PROJECT FOR THE IMPROVEMENT OF FISHING GEAR AND EQUIPMENT IN THE REPUBLIC OF SURINAME

FEBRUARY, 1996

JAPAN INTERNATIONAL COOPERATION AGENCY
OVERSEAS AGRO-FISHERIES CONSULTANTS CO., LTD.

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PREFACE

In response to a request from the Government of the Republic of Suriname, the Government of Japan decided to conduct a basic design study on the Project for the Improvement of Fishing Gear and Equipment and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Suriname a study team from September 24 to October 22, 1995.

The team held discussions with the officials concerned of the Government of Suriname, 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 Suriname for their close cooperation extended to the team.

February, 1996

Kimio Fujita
President
Japan International Cooperation Agency

February, 1996

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for the Improvement of Fishing Gear and Equipment in the Republic of Suriname.

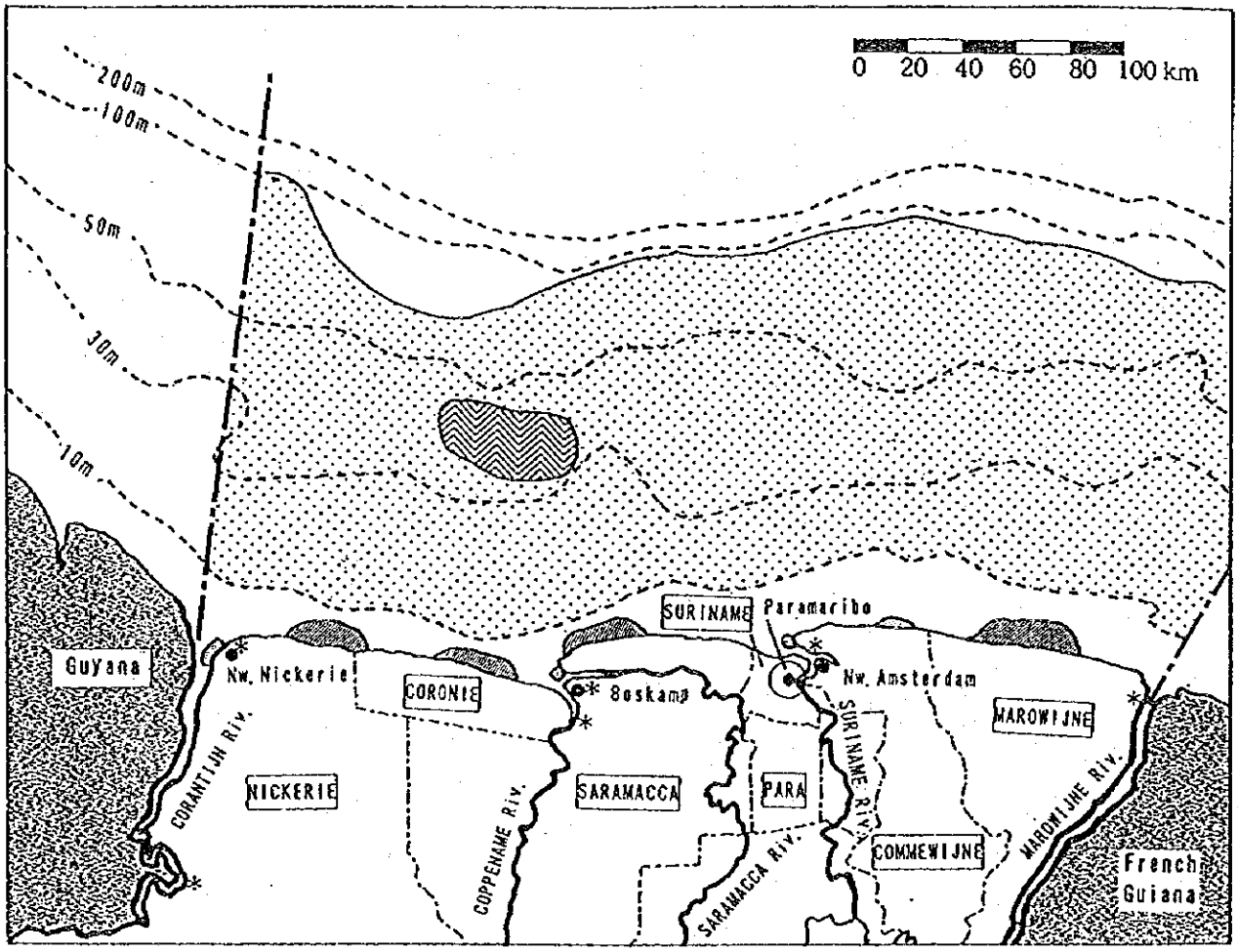
This study was conducted by Overseas Agro-Fisheries Consultants Co., Ltd., under a contract to JICA, during the period from September 18, 1995 to February 9, 1996. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Suriname and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

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

Very truly yours,

Munehiro Shimada
Project manager,
Basic design study team on the Project for the
Improvement of Fishing Gear and Equipment
Overseas Agro-Fisheries Consultants Co., Ltd.

LOCATION MAP



Shrimp Trawl

Snapper Handline

Drift Gill Net, Bottom Longline

Chinese Seine

* Fishing Village

National Boarder

Province Boarder

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CHAPTER 1 BACKGROUND OF THE PROJECT

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1-1 Background of the Project

The Republic of Suriname is located in the north coast of South America. The northern part of the country faces the Atlantic Ocean. The boundary between French Guiana and Suriname is marked by the Marowijne river on the east and the boundary between Guyana and Suriname is by the Corantin river on the west. The deeply forested mountains are bounding Brazil and Suriname on the south. Its population is approximately 400,000. The majority of people live along the coast, and especially 70 % concentrate in Paramaribo, the capital of Suriname, and its suburbs.

The Republic of Suriname declared the independence from the Netherlands in 1975. An aluminum industry has been the most significant industry to its economy, replacing agriculture, since bauxite was found in the early 20th century. The exports of alminium and alumina account for 80-90% of the total exports in Suriname. Agriculture products such as rice and bananas and fisheries products such as shrimp and fish follow the aluminium industry and contribute to the exports as well. However, the depression of economy is inevitable, because the price of aluminium is globally depreciatory and the productivity of bananas and rice decreases. Despite those tendencies, fisheries are comparatively improved and the further improvement is expected.

The Guiana current that contains nutrient salts flows west over the continental shelf up to the 100 meter in depth and the abundant waters of the Corantijin river, the Coppename river, the Suriname river and the Marowijne river flow into the Atlantic Ocean. That forms good fishing grounds for shrimp and demersal fish, and the fishing grounds are rich in fishery resources. Offshore shrimp fisheries have been developed and contributed to gainings of foreign currency for years, but the fishing ground has consequently been exhausted. Demersal fish and pelagic fish along the coast were not utilized even though there were the possibilities of development. However, the development and utilization were advanced since the Government of Suriname took small scale fisheries development measures such as the construction of the fishing infrastructures. Small scale fisheries were strikingly developed after the latter half of 1980s. Fishing boats were motorized, introduced diesel engines, enlarged and increased in numbers. The yield of fish landings from small scale for the latter half of 1980s registered 4,000 tons, but the annual yield increased to more than 8,000 tons in recent years. Small scale fisheries contributed to the supply of animal protein for people and gainings of foreign currency.

However, the exchange rate turmoil after 1993 became one of the causes of extreme inflation. Artisanal fishermen are forced to have difficulties in operation and maintenance, because despite the inflation the price of fish does not rise adequately, compared to those of other products. They are not able to finance new equipment to replace exhausted fishing gear and decrepit marine

engines. The numbers of operational fishing boats decrease and the efficiency of operation declines, and the decrease of fishery production becomes a matter of concern. Under these circumstances, the Government of the Republic of Suriname has requested the Government of Japan for the grant aid assistance to procure fishing gear and marine engines in order to support the artisanal fishermen by selling fishing equipment.

1-2 Contents of the Request

1)	Materials for drift gillnets (Net panel 1,600 pcs., Rope 1,240 coils, Floats 9,000 pcs., Twine 1,080 spools)	1	lot
2)	Materials for Chinese seine (Net panel 380 pcs., Rope 325 coils, Twine 600 spools)	1	lot
3)	Materials for gillnets (Net panel 2,730 pcs., Rope 1,200 coils, Float 58,500 pcs., Twine 4,680 spools)	1	lot
4)	Materials for longline (Hook 300,000 pcs., Rope 375 coils)	1	lot
5)	Marine engines		
	• Gasoline outboard type and spare parts	180	units
	• Diesel outboard type and spare parts	5	units
	• Diesel inboard type and spare parts	25	units
	• Tools for repair and maintenance		
	For Gasoline outboard type	5	units
	For Diesel outboard type	1	unit

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2-1 Objectives of the project

The small scale fisheries development measures taken by the Government of Suriname intend to maintain and increase the related fisheries production through the promotion of construction of fishery infrastructures such as the Fishery Centers and the improvement of circumstances for the production by means of ensuring the procurement of fishing equipment. This project is situated for ensuring the procurement of the fishing equipment, which is positioned in the measures as the improvement of the circumstances for the production. The objectives of this project are to support and secure small scale fishing activities in order to realize the maintenance and the increase of the related production, through assistance from the Department of Fisheries by sale of equipment to the related fishermen with regard to their procurement of equipment that requires renewal and partly new boat construction.

The small scale fisheries in this country are significant industries and contribute not only to the supply of animal protein and employment for people but also to gainings of foreign currency by 20-30 % of fish landings being exported. Although the exchange rate turmoil in recent years caused inflation, the price of fish does not rise adequately, compared to those of other products. Artisanal fishermen are consequently forced to have difficulties in operation and maintenance, because fuel oil, fishing gear and marine engines are only obtained from imports and artisanal fishermen are not able to finance new fishing gear and marine engines required for their operation. As the renewal of marine engines is stagnant, the operational fishing boats decreased in numbers. However, in 1993 assistance from the Department of Fisheries to artisanal fishermen for the procurement of fishing gear contributed to the increase of efficient fishing operation and actual increase of its production. Despite the assistance, the operation of fishery is still tight, and the renewal of the related equipment is continuously in arrears. It becomes a matter of concern that those situations may cause affect on the decrease of the production in the near future.

To deal with the deterioration of the circumstances for fisheries production, the Government of the Republic of Suriname intends to maintain and reinforce the operation system of small scale fisheries for a year and the Department of Fisheries intends to assist the related fishermen by procuring and selling the equipment that requires renewal and new boat construction. The aims of this project are to procure necessary equipment such as fishing gear, gasoline outboard engines and diesel inboard engines, and to procure maintenance tools for marine engines to improve the utilization of the equipment.

2-2 Basic Concept of the Project

An outline of study and examination on the request by the basic design study team is as follows:

1)Fishing gear

Even though fishing gear is essential to operation and production, the supply of materials depends on imports except for a few such as sinkers. It is difficult for artisanal fishermen to obtain these materials except for a few such as thin rope and twines, under such economic circumstances as the lack of foreign currency and the unstableness of exchange rate. In the view of the importance of small scale fisheries for people's living, it is considered important that the Government of Suriname assists artisanal fishermen in the procurement of the fishing gear required, at least, to maintain the present production.

2)Gasoline outboard engines

Gasoline outboard engines are equipment for the artisanal fishermen who operate comparative small scale fisheries, and the operation by the related fishermen is particularly tight. This equipment is also obtained through imports. From the same viewpoint as the fishing gear, it is considered important that the Government of Suriname assists artisanal fishermen in the procurement of the equipment required, at least, to maintain the present production.

3)Diesel outboard engines

Diesel outboard engines are equipment to be used by the Department of Fisheries through the Fishery Centers for the scheme of experiment to test its utilization as an energy-saving device, replacing gasoline outboard engines, for large Suriname type boats and open Guyana type boats. The advantages of diesel engines over gasoline engines are durability in general, less fuel consumption and a lower price of fuel. However, there is little difference between the prices of diesel fuel and gasoline in Suriname, so that there are less advantages on this point. Furthermore, diesel outboard engines have not been introduced in Suriname, and the Fishery Centers have not yet carried out any related experiments on them.

Taking this background into account, it is considered significant to carry out those experiments in the long term as it is expected to introduce more diesel engines into fishing boats for small scale fisheries. However, the scheme will not be managed properly in the present situation. It is recommended that the experiments of diesel outboard engines should

be on a hold until the system for the management and the operation is established and the implementation should be simultaneous with technical assistance. Therefore, diesel outboard engines should be excluded from this project.

4)Diesel inboard engines

Diesel inboard engines are equipment for the renewal of decrepit equipment and new construction of closed Guyana type boats. For the same reasons as the fishing gear and the gasoline outboard engines aforementioned, the Department of Fisheries intends to assist artisanal fishermen by sales of this equipment. These boats are operated in an offshore sea area where are comparative potentialities for development, and are regarded as the main fishing boats for small scale fisheries. As their roles in the fisheries are recognized important because of the beneficial operation, it is expected to increase the numbers of the operational boats. Although the capability of installation is dubious upon the supply of only engines, it is confirmed that fishermen and mechanics in Suriname have technical bases and experiences in installation work. Therefore, it is considered essential that the Government of Suriname assists artisanal fishermen in the procurement of this equipment.

5) Maintenance tools for marine engines

The three Fishery Centers, planned to be provided with maintenance tools for marine engines, have basic maintenance facilities for marine engines, but maintenance tools there are incomplete. As relatively high technique for the maintenance of marine engines is acquired in Suriname, the introduction of these tools is considered to improve the environment for utilization of existing engines and the new engines to be provided by this project and contributes to small scale fisheries development.

6)The scale of the project to assist the procurement of equipment

This project intends to assist in selling the equipment required for the operation of small scale fisheries for a year. The renewal of fishing equipment relevant to small scale fisheries in Suriname is outstandingly stagnant. Under that situation, the number of operational boats decreased and efficiency of the production declined. It is considered important to implement assistance by selling equipment to maintain the fishery operation. As the exchange rate is gradually stabilized, it is presumed that the procurement and the renewal of equipment will be handled by means of local measures, as long as the maintenance of operation for a year is guaranteed. Therefore, the scale of the project to assist the procurement is considered adequate to maintain the operation of those fisheries for a year.

The followings are the outlines of this project based on the results of items aforementioned:

1) Assistance by sales of fishing gear

The operation of small scale fisheries in Suriname exhausts fishing nets in 3 years and longlines in 2 years on average and the renewal of fishing gear is required to continue the operation. It is difficult for artisanal fishermen to procure this fishing gear locally. Therefore, it is considered appropriate that artisanal fishermen should be assisted by sales of the fishing gear requiring the renewal within a year for the purpose of continuing the fishing activities and maintaining the production for the time being. Regarding the operation of fisheries, the datum issued in 1994 is classified by fishing method and the latest one, so that it is proper that this datum should be referred for the calculation of the fishing gear requiring procurement and renewal. The statistics of operation by fishing method in 1994 are as follows:

(Fishing boat type • method)	(Numbers)	(Standard specifications per unit)
Closed Guyana type boats		
• Big scale drift gillnet operation	69 units	Length 4,000 m, Depth 4 m, Mesh size 20 cm
Open Guyana type boats		
• Middle scale drift gillnet operation	164 units	Length 2,000 m, Depth 4 m, Mesh size 20 cm
• Pin-seine operation	23 units	Length 2,000 m, Depth 2 m, Mesh size 1-4 in.
• Longline operation	6 units	Length 2,000 m, Branch line length 1.5 m, Fishing hook 1,000 pcs.
Suriname type boats		
• Chinese seine operation	357 units	Length 10 m, Mesh size 1-4 in.
• Longline operation	89 units	Length 2,000 m, Branch line length 1.5 m, Fishing hook 1,000 pcs.
• Other gillnet operation	137 units	Length 1,000 m, Depth 2.5 m, Mesh size 2-6 in.
• Spannet operation	50 units	Length 50 m, Depth 1.5 m, Mesh size 2-6 in.
• River seine operation	19 units	Length 100 m, Depth 3 m, Mesh size 2-6 in.
• Sleepnet operation	9 units	Length 50 m, Depth 1.5 m, Mesh size 2-6 in.

• Lagoon gillnet operation	162 units	Length 50 m, Depth 1 m, Mesh size 2-6 in.

2) Assistance by sales of gasoline outboard engines

The operation of small scale fisheries in Suriname wears out gasoline outboard engines in 4 or 5 years and the procurement of those engines for renewal is required to maintain the run of fishing boats. For the same reason as the fishing gear, artisanal fishermen hardly procure them locally on their own. Therefore, it is considered appropriate that artisanal fishermen should be assisted by sales of the gasoline outboard engines requiring renewal within a year for the purpose of continuing the fishing activities and maintaining the production for the time being. Regarding the data on the operation of fishing boats in Suriname, the datum issued in 1994 is classified by type of fishing boats and the latest one, so that it is proper to be referred for the calculation of those engines requiring procurement for renewal. The following are operated boats classified by type of fishing boat and engine in 1994.

(Fishing boat type)	(No. of registered boats)	(No with engines)	(Size of engine)
Open Guyana type boats	193	193	40-60 Hp.
Suriname type boats			
• Chinese seine, gillnet, longline operation, etc.	661	605	8-40 Hp.
• Lagoon gillnet operation	162	17	8 Hp.

3) Assistance by sales of diesel inboard engines

Diesel inboard engines are utilized for closed Guyana type boats and the operation of those boats are active. The running time of engines is 5,000 hours per year. Every 5,000 hours, in general, diesel inboard engines will be overhauled. In Suriname, diesel engines have been replaced in 4 years, comparatively short period, probably because of the frequency of runs. It will be possible to continue the operation after 4 years (20,000 hours) by a large scale overhaul, but those engines need to be replaced because each of systems such as fuel supply and lubrication is outstandingly decrepit and the run of the engines becomes less reliable. Therefore, it is proper to assist by selling the engines, which require renewal within a year, for existing fishing boats.

As closed Guyana type boats are positioned as the main fishing boats for small scale fisheries, the Department of Fisheries promotes to increase the number of them. As a matter of fact, about 12 boats were constructed annually in the early 1990. The cost of engines accounts for 38 % of the total expenses of construction of the boats and it is a key factor to obtain inboard engines for the construction. Those engines are hardly obtained by artisanal fishermen in Suriname because they are only obtained by procuring foreign currency. Therefore, it is significant to assist by selling those engines which are required for new boat construction within a year. The new construction of the boats will contribute to the increase of fishery production.

4) Strengthening maintenance tools for marine engines

As the Department of Fisheries has been putting emphasis on the improvement of facilities such as the Fishery Centers which support small scale fisheries, the system of maintenance is being established. However maintenance tools there still seems to be insufficient. the reinforcement of maintenance system of each Fishing Center by the improvement of maintenance tools for marine engines is considered to back up the development of small scale fisheries technically. The fishing boats equipped with diesel inboard engines come to mainly Paramaribo, so that the Commewijne Fishery Center should be equipped with the maintenance tools for both diesel inboards engines and gasoline outboard engines, and the other Fishery Centers should be equipped only with the maintenance tools for gasoline outboard engines.

As the result of the study and the examination, the basic concept of this project is targeted for the regions of small scale fishing activities such as Paramaribo, Commewijne, Nickerie, Saramacca, Marowijne and Coronie and to maintain and partly increase the production, through assistance by sales of the fishing gear and the marine engines required within a year to replace those of exhaustion and decrepitude and the equipment which is necessary to increase the numbers of boats such as closed Guyana type boats. In addition, it includes the reinforcement of the system of maintenance by means of improving the maintenance tools in order to promote the effective utilization of the related equipment.

2-3 Basic Design

2-3-1 Design Concept

(1)Design Policy

The basic policy for the basic design is as follows:

1) The policy for natural conditions

The equipment procured by this project is mainly utilized for small scale fisheries operated on the sea and around estuary areas. The coastal areas in Suriname are very shallow and it is 10m in depth even at the distance of 10 nautical miles from the shore. Each river is a tidal river up to several tens km, and it vehemently runs upstream and downstream. These natural conditions should be taken into account for the design and the selection of equipment.

2)The policy for the utilization of local materials

The equipment procured by this project is not manufactured locally in Suriname. Though some of the equipment can be imported from the western countries and adjacent countries, it is necessary to make a special order and there is not any stable and common market formed. The obtainable equipment in Suriname such as sinker for fishing gear is excluded from the request. Therefore, the utilization of local materials should not be considered.

3) The policy for the capabilities for management and maintenance as the organization for implementation

The design and the selection of equipment to be procured are determined in consideration of the related experience and the technical levels of the Department of Fisheries of the Ministry of Agriculture, Animal Husbandry and Fisheries that are planned to be an implementation body. The Department of Fisheries has had experiences on the implementation of the similar project to assist artisanal fishermen by selling the related equipment and established the basic system of management for storage, distribution and fund formulated by sales. The human resources in Suriname seems to be insufficient and those in the Department of Fisheries are also limited. However, the system for the

implementation of assistance by selling equipment in this project does not require many personnel. The Department of Fisheries has already had experience on handling the equipment to be procured in this project and the technical levels are within their experiences.

4)The policy for the scope and the levels of equipment

Considering that it is significant to maintain and partly increase the production of small scale fisheries, which is the objectives of this project, the project should apply to the equipment that is not obtained in Suriname at present but required within a year to maintain the present fishing activities of small scale fisheries.

The policy for determining the level of equipment is as follows:

a)Fishing gear

The specifications of fishing gear are determined in accordance with the present local specifications. Materials for fishing gear are selected based on the conditions to provide materials and be assembled by the users. Regarding the specifications of fishing gear, it should be considered that both the Department of Fisheries and artisanal fishermen expect products with higher quality to be selected, because the materials manufactured in Taiwan, South Korea, China and Brazil are used at present but do not receive good reputation among fishermen due to mesh break and weak strength.

b)Gasoline outboard engines

The selection of engines is determined in accordance with the present specifications (Hp. etc.) by type of boat.

c)Diesel inboard engines

Diesel inboard engines are sold for closed Guyana type boats. Engines of around 115 Hp. should be selected in consideration that the size is appropriate for that type of boat in Suriname.

d)Maintenance tools for marine engines

The selection will be determined based on the suitability to the equipment procured by this project, although the related equipment used at present will be taken into consideration.

e)The policy for a period of the project implementation

A period of the project implementation is determined in consideration of appropriateness to the system of Japan's grant aid assistance.

(2) The determination of the scale

1) Basic Policy

a)The numbers of equipment applicable to the assistance by sales which are required for renewal

The numbers of equipment required for the renewal within a year are calculated by multiplying the following necessary renewal rate per year against the total operated equipment in 1994.

Fishing gear	
Fishing nets:	33% (Considered exhaustion in 3 years on average)
Longline:	50% (Considered exhaustion in 2 years on average)
Gasoline outboard engines:	22.5%(Considered decrepitude in 4-5 years on average)
Diesel inboard engines:	20%(Although it is replaced every 4 year, it should be utilized for 6 years, 30,000 hours by strengthening the system of maintenance in the future. The period of depreciation is counted as 5 years for the time being.)

b)The numbers of diesel inboard engines required for the new construction of closed Guyana type boats

The numbers are calculated based on the construction results of 12 same type boats performed in the early 1990s.

c)Maintenance tools for marine engines

The Commewijne Fishery Center will be equipped with the general and special maintenance tools to be capable of the overhauls of diesel inboard engines and gasoline outboard engines and the other Fishery Centers will be equipped with the general and

special maintenance tools to be capable of the daily maintenance of gasoline outboard engines.

2) The policy for the supply of spare parts

It is considered necessary to provide spare parts, based on the standards below, to strengthen the environment of the operation of the equipment after its sales.

Fishing gear	(Spare parts as the main equipment such as net panel and mainline are not considered)
Fishing net:	Twine for repair required in a year. (e.g. Big scale drift gillnet per unit requires 100 kg per year, middle scale drift gillnet per unit requires 50 kg per year and other gillnet per unit requires 1-5 kg per year.)
longline:	Fishing hooks for 2 rounds in a year are required for replacement because of rust and fall
Outboard engines:	Parts such as fuel and oil filters, spark plugs, propellers, etc. necessary for one year maintenance of the equipment procured in the project.
Inboard engines:	Parts such as fuel filters, fuel injection nozzles, piston rings, etc. necessary for one year maintenance of the equipment procured in the project and for the existing engines partially.

3)The calculation of the scale

a)Fishing gear

[The numbers of existing fishing gear to be required for renewal within a year because of exhaustion]

(Type of fishing gear)	(No. of operation)	(% of renewal)	(No. to be procured)
For closed Guyana type boats			
Big scale drift gillnet	69 units	33 %	23 units
For open Guyana type boats			
Middle scale drift gillnet	164 units	33 %	54 units

Pin-seine	23 units	33 %	8 units
Longline	6 units	50 %	3 units
For Suriname type boats			
Chinese seine	357 units	33 %	118 units
Longline	89 units	50 %	45 units
Other gillnet	137 units	33 %	45 units
Spannet	50 units	33 %	17 units
River seine	19 units	33 %	6 units
Sleepnet	9 units	33 %	3 units
Lagoon gillnet	162 units	33 %	53 units

b)Gasoline outboard engines

[The numbers of engines to be required for renewal within a year because of decrepitude]

(Type of boat)	(No. of operation)	(% of renewal)	(No. to be procured)	(Ref.)
Open Guyana type boats	193 units	22.5 %	43 units	40-60 Hp.
Suriname type boat				
Operation of Chinese seine, drift gillnet, longline, etc.	605 units	22.5 %	136 units	8-40 Hp.
Operation of lagoon gillnet	17 units	22.5 %	4 units	8 Hp.

c) Diesel inboard engines

[The numbers of engines to be required for the renewal within a year because of decrepitude]

(Type of boat)	(No. of operation)	(% of renewal)	(No. to be procured)
Closed Guyana type boats	69 units	20 %	14 units

[The numbers of engines for the new construction of fishing boats]

(numbers) = (No. of boats constructed in the early 1990) - (No. of boats constructed recently)

= 12 boats - 5 boats = 7 boats

Therefore, the numbers of engines required are 7 units.
In total, 21 units are needed.

d) Maintenance tools for marine engines

For the Commewijne Fishery Center

General maintenance tools for outboard engines	1 lot	(overhaul level)
Special maintenance tools for outboard engines	1 lot	(overhaul level)
General maintenance tools for inboard engines	1 lot	(overhaul level)
Special maintenance tools for inboard engines	1 lot	(overhaul level)

For the Boskamp Fishery Center

General maintenance tools for outboard engines	1 set	(daily maintenance level)
Special maintenance tools for outboard engines	1 set	(daily maintenance level)

For the New Nickerie Fishery Center

General maintenance tools for outboard engines	1 set	(daily maintenance level)
Special maintenance tools for outboard engines	1 set	(daily maintenance level)

2-3-2 Basic Design

(1) Overall plan

This project includes the equipment for assistance by selling to artisanal fishermen and the equipment for the activities of the Department of Fisheries. The purpose of the utilization of each equipment is as follows:

1) Fishing gear, gasoline outboard engines, diesel inboard engines and their related spare parts

They are used for the assistance by sales to artisanal fishermen and the Department of Fisheries will manage the storage and the sales in Paramaribo.

2) Maintenance tools for marine engines.

The three Fishery Centers in Commewijne, Boskamp and New Nickerie under the control of the Department of Fisheries maintain and utilize the maintenance tools for marine engines.

(2) Equipment plan

A. Fishing gear

I) The components for fishing gear

Regarding fishing gear, materials will be sold to artisanal fishermen and they will assemble them to complete fishing gear. The quantity of each material is necessary to be calculated to meet the numbers of units of fishing gear to be procured for the renewal. The components of materials of each fishing gear follow the specifications of existing fishing gear.

II) The specifications of each existing fishing gear

1) Big scale drift gillnet (for closed Guyana type boats)

Dimensions:	4,000 m in length x 4 m in depth, Float branch line 10 m in length and at intervals of 20 m
Net structure:	Net panel 80 pcs.; mesh size 20 cm, 40 md., 380d/27, stretched length 100 yard (hanging size 50 m), polyethylene

Ropes:	Float branch line	10 coils; 200 m/coil, 12 mm in diameter, polyethylene
	Float line	20 coils; 200 m/coil, 10 mm in diameter, polyethylene
	Sinker line	20 coils; 200 m/coil, 8 mm in diameter, polyethylene
Floats:	200 pcs.; buoyancy 2,800 g, cylindrical type, PVC	
Sinker:	Lead plate, etc.	
Twine for webbing:	5 kg; 380d/27	
Twine for repair:	100 kg/year; 380d/27	

2) Middle scale drift gillnet (for open Guyana type boats)

Dimensions:	2,000 m in length x 4 m in depth, Float branch line 10m in length and at intervals of 20 m	
Net structure:	Net panel 40 pcs.; mesh size 20 cm, 40 md., 380d/27, stretched length 100 yard (hanging size 50 m), polyethylene	
Ropes:	Float branch line	5 coils; 200 m/coil, 12 mm in diameter, polyethylene
	Float line	10 coils; 200 m/coil, 10 mm in diameter, polyethylene
	Sinker line	10 coils; 200 m/coil, 8 mm in diameter, polyethylene
Floats:	100 pcs. ; buoyancy 2,800 g, cylindrical type, PVC	
Sinker:	Lead plate, etc.	
Twine for webbing:	2.5 kg; 380d/27	
Twine for repair:	50 kg/year; 380d/27	

3) Pin-seine (for open Guyana type boats)

Dimensions:	2,000 m in length x 2 m in depth	
Net structure:	Net panel 40 pcs.; mesh size 1-4 in., 100 md., 380d/21, stretched length 100 yard (hanging size 50 m), polyethylene	
Ropes:	upper line	10 coils; 200m/coil, 10 mm in diameter, polyethylene
	lower line	10 coils; 200m/coil, 8 mm in diameter, polyethylene

Twine for webbing:	2.5 kg; 380d/21
Twine for repair:	50 kg/year; 380d/21

4) Longline (for open Guyana type boats)

Dimensions:	2,000 m in length, Branch line 1.5 m in length and at the intervals of 2 m, Fishing hook 1,000 pcs.
Main line:	Rope 10 coils; 200 m/coil, 3 mm in diameter, polyethylene
Branch line:	2 kg; 380d/21, 1,600 in length
Fishing hook:	1,000 pcs.; Size No. 4, No. 6, No. 7
Spare branch line:	2 kg/year; 380d/21, 1,600 m in length
Spare fishing hook:	2,000 pcs.; 2 rounds/year

5) Chinese seine (for Suriname type boats)

Dimensions:	10 m in length
Net structure:	Net panel 1 pc.; mesh size 1-4 in., 100 md., 380d/21, stretched length 100 yard (hanging size 50 m), polyethylene
Ropes:	upper line 0.25 coils; 200 m/coil, 10 mm in diameter, polyethylene
	lower line 0.25 coils; 200 m/coil, 8 mm in diameter, polyethylene
Twine for webbing:	0.5 kg; 380d/21
Twine for repair:	2 kg/year; 380d/21

6) Longline (for Suriname type boats)

Dimensions:	2,000 m in length, Branch line 1.5 m in length and at the intervals of 2 m, Fishing hook 1,000 pcs.
Main line:	Rope 10 coils; 200 m/coil, 3 mm in diameter, polyethylene
Branch line:	2 kg; 380d/21, 1,600 m in length
Fishing hook	1,000 pcs.; Size No. 4, No. 6, No. 7
Spare branch line:	2 kg/year; 380d/21, 1,600 m in length
Spare fishing hook:	2,000 pcs.; 2 rounds/year

7) Other gillnet (for Suriname type boats)

Dimensions:	1,000 m in length x 2.5 m in depth
Net structure:	Net panel 20 pcs.; mesh size 2-6 in., 100 md., 210d/6-24 stretched length 100 yard (hanging size 50 m), nylon
Ropes:	Float & sinker line 10 coils ; 200 m/coil, 3-6 mm in diameter, polyethylene
Floats:	667 pcs.; buoyancy 152 g, 830 g, 880 g, synthetic rubber
Sinker:	Lead plate, etc.
Twine for webbing:	1.5 kg; 210d/6-24
Twine for repair:	25 kg/year; 210d/6-24

8) Spannet (for Suriname type boats)

Dimensions:	50 m in length x 2.5 m in depth
Net structure:	Net panel 1 pc; mesh size 2-6 in., 100 md., 210d/6-24 stretched length 100 yard (hanging size 50 m), nylon
Ropes:	Float & sinker line 0.5 coils ; 200m/coil, 3-6 mm in diameter, polyethylene
Floats:	33 pcs.; buoyancy 152 g, 830 g, 880 g, synthetic rubber
Sinker:	Lead plate, etc.
Twine for repair:	2 kg; 210d/6-24 (incl. twine for webbing)

9) River seine (for Suriname type boats)

Dimensions:	100 m in length x 3 m in depth
Net structure:	Net panel 2 pcs.; mesh size 2-6 in., 100 md., 210d/6-24 stretched length 100 yard (hanging size 5 m), nylon
Ropes:	Float & sinker line 1 coil; 200 m/coil, 3-6 mm in diameter, polyethylene
Floats:	67 pcs.; buoyancy 152 g, 830 g, 880 g, synthetic rubber
Sinker:	Lead plate, etc.
Twine for repair:	5 kg/year; 210d/6-24 (incl. twine for webbing)

10) Sleepnet (for Suriname type boats)

Dimensions:	50m in length x 1.5m in depth
Net structure:	Net panel 1 pc.; mesh size 2-6 in., 100 md., 210d/6-24 stretched length 100 yard (hanging size 50 m), nylon
Ropes:	Float & sinker line 0.5 coils; 200 m/coil,

	3-6 mm in diameter, polyethylene
Floats:	33 pcs.; buoyancy 152 g, 830 g, 880 g, synthetic rubber
Sinker:	lead plate, etc.
Twine for repair:	2 kg/year; 210d/6-24 (incl. twine for webbing)

11) Lagoon gillnet (for Suriname type boats)

Dimensions:	50 m in length x 1 m in depth
Net structure:	Net panel 1 pc.; mesh size 2-6 in., 100 md., 210d/6-24 stretched length 100 yard (hanging size 50 m), nylon
Ropes:	Float & sinker line 0.5 coils; 200m/coil, 3-6 mm in diameter, polyethylene
Floats:	33 pcs.; buoyancy 152 g, 830 g, 880 g, synthetic rubber
Sinker:	Lead plate, etc.
Twine for repair:	2 kg/year; 210d/6-24 (incl. twine for webbing)

III) The contents of materials for fishing gear

The detail numbers and the specifications of materials for each fishing gear are determined as follows, by calculation from the necessary units of the renewal of fishing gear and the present specifications of the corresponding fishing gear as aforementioned above.

1) Materials for drift gillnet

[Corresponding fishing gear]

1) big scale drift gillnet and 2) middle scale drift gillnet as shown in II) have the same specifications of materials, so that the materials required for those two items are summed up as follows:

• Net panel

[Numbers required]	4,000 pcs. (80 pcs./unit x 23 units + 40 pcs./unit x54 units)
[Specifications]	Mesh size 20 cm, 40 md., 380d/27, stretched length 100 yards, polyethylene

• Rope

[Numbers required] For float branch line 500 coils, 12 mm in diameter
(10 coils/unit x 23 units + 5 coils/unit x 54 units)
For float line 1,000 coils, 10 mm in diameter
(20 coils/unit x 23 units + 10 coils/unit x54 units)
For sinker line 1,000 coils, 8 mm in diameter
(20 coils/unit x 23 units + 10 coils/unit x54 units)

[Specifications] 200 m/coil, polyethylene, Z-twist, medium hard lay, three strand

• Float

[Numbers required] 10,000 pcs. (200 pcs./unit x 23 units + 100 pcs./unit x 54 units)

[Specifications] Buoyancy 2,800 g, cylindrical type, PVC

• Sinker To be obtained by artisanal fishermen on their own

• Twine for webbing and repair

[Numbers required] 5,250 spools
(105 kg/unit x 23 units + 52.5 kg/unit x 54 units)
+ 1 kg/spool

[Specifications] 1 kg/spool, 380d/27, polyethylene

2) Materials for pin-seine for Guyana type boat and Chinese seine for Suriname type boat

[Corresponding fishing gear]

3) pin-seine for Guyana type boat and 5) Chinese seine for Suriname type boat as shown in II) have the same specifications of materials, so that the materials required for those two items are summed up as follows:

• Net panel

[Numbers required] 381 pcs.
These type of fishing gear are composed by several kinds of different mesh sizes. Far larger mesh sizes net are

used by cutting in a half or one-third. Though 483 pcs. (40 pcs./unit x 8 units + 1 pc/unit x 118 units) are temporarily calculated, the numbers required are divided by the mesh size are determined as follows:

Mesh size 1.0 in. 132 pcs. (438 pcs. + 5 kinds x 1.5)
(Incl. the spares for bagnet of Chinese seine)
Mesh size 1.5 in. 88 pcs. (438 pcs. + 5 kinds)
Mesh size 2.0 in. 88 pcs. (438 pcs. + 5 kinds)
Mesh size 3.0 in. 44 pcs. (438 pcs. + 5 kinds + 2)
Mesh size 4.0 in. 29 pcs. (438 pcs. + 5 kinds + 3)
Total 381 pcs.

[Specifications] 100 md., 380d/21, stretched length 100 yards, polyethylene

• Rope

[Numbers required] For upper line 110 coils, 10 mm in diameter
(10 coils/unit x 8 units + 0.25 coils/unit x 118 units)
For lower line 110 coils, 8 mm in diameter
(10 coils/unit x 8 units + 0.25 coils/unit x 118 units)

[Specifications] 200 m/coil, polyethylene, Z-twist, medium hard lay, three strand

• Twine for webbing and repair

[Numbers required] 715 spools
(52.5 kg/unit x 8 units + 2.5 kg/unit x 118 units)
+ 1 kg/spool

[Specifications] 1 kg/spool, 380d/27, polyethylene

3) Materials for other fishing net

[Corresponding fishing gear]

7) other gillnet, 8) spannet, 9) river seine, 10) sleep net and 11)lagoon gillnet for Suriname type boat as shown in II) have the same specifications of materials, so that the materials required for those 5 items are summed up as follows:

• Net panel

[Numbers required] 751 pcs.

These types of fishing gear are composed by several kinds of net with different mesh sizes. Far larger mesh size net is used by cutting in a half or one-third. Though 985 pcs. (20 pcs./unit x 45 units + 1 pc./unit x 17 units +2 pcs./unit x 6 units + 1 pc./unit x 3 units + 1 pc./unit x 53 units) is temporarily calculated, the numbers required by the mesh sizes are determined as follows:

Mesh size 2.0 in.141 pcs. (985 pcs. + 7 kinds)
210d/6
Mesh size 2.5 in.141 pcs. (985 pcs. + 7 kinds)
210d/6
Mesh size 3.0 in.141 pcs. (985 pcs. + 7 kinds)
210d/9
Mesh size 3.5 in.141 pcs. (985 pcs. + 7 kinds)
210d/15
Mesh size 4.0 in. 70 pcs. (985 pcs. + 7 kinds + 2)
210d/18
Mesh size 5.0 in. 70 pcs. (985 pcs. + 7 kinds + 2)
210d/24
Mesh size 6.0 in. 47 pcs. (985 pcs. + 7 kinds + 3)
210d/24
Total 751 pcs.

[Specifications] 100 md., stretched length 100 yards, nylon

• Rope

[Numbers required] 492 coils

These types of fishing gear are composed by several kinds of diameter size. Though 493 coils (10 coils/unit x 45 units + 0.5 coils/unit x 17 units + 1 coil/unit x 6 units + 0.5 coils/unit x 3 units + 0.5 coils/unit x 53 units) are temporarily calculated, the numbers required by diameter size are determined as follows:

6 mm in diameter123 coils (493 units + 4 sizes)
5 mm in diameter123 coils (493 units + 4 sizes)
4 mm in diameter123 coils (493 units + 4 sizes)

3 mm in diameter123 coils (493 units + 4 sizes)
Total 492 coils

[Specifications] 200 m/coil, polyethylene, Z-twist, medium hard lay three strand

• Float

[Numbers required] 32,826 pcs.
(667 pcs./unit x 45 units + 33 pcs./unit x 17 units + 67 pcs./unit x 6 units + 33 pcs./unit x 3 units + 33 pcs./unit x 53 units)

These types of fishing gear are composed by floats with several kinds of buoyancy weight. The numbers required by buoyancy weight are determined as follows:

Buoyancy about 152 g 10,942 pcs.
(32,826 pcs. + 3 types)
Buoyancy about 830 g 10,942 pcs.
(32,826 pcs. + 3 types)
Buoyancy about 880 g 10,942 pcs.
(32,826 pcs. + 3 types)
Total 32,826 pcs.

[Specifications] synthetic rubber

• Sinker To be obtained by artisanal fishermen on their own

• Twine for webbing and repair

[Number required] 5,474 spools
(26.5 kg/unit x 45 units + 2 kg/unit x 17 units + 5 kg/unit x 6 units + 2 kg/unit x 3 units + 2 kg/unit x 53 units)
+ 250 g/spool

These types of fishing gear are composed by several kinds of twine sizes. The numbers required by 4 twine size are determined as follows:

210d/6	1,564 spools	(2/7 of 5,454 spools)
210d/9	782 spools	(1/7 of 5,474 spools)
210d/15	782 spools	(1/7 of 5,474 spools)
210d/18	782 spools	(1/7 of 5,474 spools)
210d/24	1,564 spools	(2/7 of 5,454 spools)

Total 5,474 spools

[Specifications] 250 g/spool, nylon

4) Materials for longline

[Corresponding fishing gear]

4) longline for Guyana type boat and 6) longline for Suriname type boat as shown in II) have the same specifications of materials of materials, so that the materials required for those 2 items are summed up as follows:

• Rope for main line

[Number required] 480 coils
(10 coils/unit x 3 units + 10 coils/unit x 45 units)

[Specifications] 3 mm in diameter, 200 m/coil, polyethylene, Z-twist, medium hard lay, three strand

• Twine for branch line (incl. twine for spare)

[Number required] 192 spools
(4 kg/unit x 3 units + 4 kg/unit x 45 units) + 1 kg/spool

[Specifications] 1 kg/spool, 380d/21, polyethylene

• Fishing hook (incl. fishing hooks for spare)

[Numbers required] 144,000 pcs.
(3,000 pcs./unit x 3 units + 3,000 pcs./unit x 45 units)
This fishing gear is composed by 3 different sizes of fishing hooks, so that the numbers required are divided by the sizes as follows

No. 7	48,000 pcs.
No. 6	48,000 pcs.
No. 4	48,000 pcs.

[Specifications] Kirbay Sea Hook Model

B. Gasoline outboard engines

I.) The components for gasoline outboard engines

Regarding gasoline outboard engines for sales to artisanal fishermen, as posed in the determination of scale, 43 engines are required for open Guyana type boats (40-60 Hp.) and 140 engines are required for Suriname type boats (8-40 Hp.). The engines of 8 Hp., 15 Hp., 25 Hp., 40 Hp. and 60 Hp. are selected in consideration of their frequent use by artisan fishermen. The numbers of engines with each Hp. are determined by the percentage of uses of each Hp. for small scale fisheries as follows:

1)Open Guyana type boats	40 Hp. class (45.2 %), 60 Hp. class (54.8 %)
2)Suriname type boats	8 Hp. class (15.4 %), 15 Hp. class (25.1 %), 25 Hp. class (43.3 %), 40 Hp. class (16.2 %)

II.) Contents of gasoline outboard engines

a)	8 Hp. class	21 units	(140 units x 15.4 %)
b)	15 Hp. class	35 units	(140 units x 25.1 %)
c)	25 Hp. class	61 units	(140 units x 43.3 %)
d)	40 Hp. class	42 units	(140 units x 16.2 % + 43 units x 45.2 %)
e)	60 Hp. class	24 units	(43 units x 54.8 %)
f)	Spare parts	15 % of the value of engines	

C. Diesel inboard engines

I.) The components for diesel inboard engines

Diesel inboard engines, after sales to artisanal fishermen, are installed in closed Guyana type boats by the purchasers on their own. To install these engines, accessories such as stern arrangement, starter equipment, cooling system and control device are required as well as the engines.

II.) Contents of diesel inboard engines

a) Body of engines 21 units

about 115 Hp., without turbo charger, fresh water cooling

b) Accessories 21 sets

stem arrangement	propeller shaft, stem tube, propeller, installation materials
starter equipment	battery drive
cooling equipment	cooling system, bilge cock, installation tools
control device	manual wiring control

c) Miscellaneous materials

standard tool kits, spare parts, user manual, etc.

d) spare parts

20 % of the value of engines

D. Maintenance tools for marine engines

I.)The components for maintenance tools for marine engines

Maintenance tools for marine engines are provided to each of the Fishery Centers and unitized for repair and maintenance services.

II.) Contents of maintenance tools for marine engines

1) Tools for the Commewijne Fishery Center

a) General maintenance tools for outboard and inboard engines 1 lot

work table, parts pans, oil syringe, wrenches and spanners, tool stand, battery testers, vice, plug cleaner, soldering iron, files, carts, surface plate kit, gauges, etc.

b)Special maintenance tools for outboard engines 1 lot

outboard engine stands, small hydraulic press machine and special tool kits

c) Special maintenance tools for inboard engines 1 lot

2)Tools for the Boskamp Fishery Center

a) General maintenance tools for outboard engines 1 set (General tool kit)

b) Special maintenance tools for outboard engines	1 set	(Special tool kit)
3) Tools for the New Nickerie Fishery Center		
a) General maintenance tools for outboard engines	1 set	(General tool kit)
b) Special maintenance tools for outboard engines	1 set	(Special tool kit)

CHAPTER 3 IMPLEMENTATION PLAN

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3-1 Implementation plan

3-1-1 Implementation concept

(1) Basic policy

The implementation plan for this project is determined according the following policy:

1) The equipment which has durability and of which operation is simple should be selected.

2) The equipment which has many similarities with the existing equipment used for small scale fisheries and is accepted by artisanal fishermen should be selected.

3) The equipment of which spare parts and technical assistance in case of breakdown are available should be selected.

4)The proper technical advice will be given upon installation of diesel inboard engines in the wooden fishing boats in Suriname.

(2) The system for the implementation of the Republic of Suriname

1) The Ministry of Planning and Development Cooperation is a responsible ministry for evaluation on consistency of the contents of the project with its nationwide development policy.

2) The Department of Asia-African Affairs of the Ministry of Foreign Affairs is a responsible ministry for management of diplomatic matters such as the Exchange of Notes.

3) The Ministry of Agriculture, Animal Husbandry and Fisheries and the Department of Fisheries of that Ministry are responsible for the storage and distribution of the equipment and the management of the counterpart fund.

4) Agriculture Bank of Suriname will be a responsible bank for banking arrangement.

3-1-2 Implementation Conditions

1) To procure the spare parts of equipment, it should be considered what kinds of parts are actually needed in Suriname.

2) The equipment should be shipped with being installed in a shipping container, by being considered transshipment in overseas transport and the insufficient conditions for storage in Suriname.

3-1-3 Scope of Works

The scope of works of this project is as follows:

1) To procure materials for fishing gear, outboard engines, inboard engines and maintenance tools for marine engines

2) To execute overseas and inland transport of the equipment and to bear the export insurance premium

3) To render consultant services including assistance to detail design, tender assistance and technical supervision

4) To store and distribute the materials and equipment to artisanal fishermen

5) To install inboard engines in the wooden fishing boats in Suriname

Regarding the scope of work above, the obligations of 1), 2), & 3) are shared by Japan and the obligations of 4) & 5) are shared by the Republic of Suriname.

3-1-4 Consultant Supervision

After signing the consulting services agreement with the Government of Suriname, the consultants shall make a detail design study and a final discussion with Suriname, and prepare detail design drawing, the tender specifications and documents required for the tender. After the tender documents are finalized and approved, the contractor is selected through tender qualification review, tender announcement, tendering and tender evaluation and report according appropriate procedures under Japan's grant aid system. After signing the contracts for supply of equipment, the consultants shall perform inspection and approval of specifications and the design drawings of equipment submitted by the contractor, manufacturing inspection, attendance on test run and shipping

inspection. Upon the arrival of the equipment in Suriname, they shall perform inspection of the equipment, supervision of inland transport, storage inspection and delivery as well as the technical advice on installation of inboard engines in fishing boats.

3-1-5 Procurement Plan

1) Materials for fishing gear

Despite the frequent use of the fishing gear manufactured in Taiwan, South Korea, China and Brazil at present, they are not reputed well among fishermen because the mesh is easily broken and the strength is not enough. In addition, there are no such permanent traders to deal with import so that fishermen remain without means to obtain it freely. It is considered to procure the fishing gear in Japan since the Department of Fisheries and artisanal fishermen prefer to using fishing gear with high quality.

2) Gasoline outboard engines

The present use of Japanese gasoline outboard engines accounts for 33 % of total use. Those engines are recognized as ones with high quality in Suriname and the more of its use is expected, if it is possible. The recent figures of total sales shares of outboard engines in Suriname indicate that the sales of Japanese engines accounted for 49 % in 1993 and 63 % in 1994 of its total and there exists preference of purchaser on the Japanese engines. Three local sales agents have been established for American products of European or American manufacturers and one local sales agent has been established for a Japanese manufacturer. Therefore, it is considered to procure gasoline outboard engines in Japan.

3) Diesel inboard engines

More than 70 % of diesel inboard engines used in Suriname are manufactured in America by European or American companies and the rest of them are manufactured in Brazil, China and Japan. There are two local sales agents and one is for an American manufacturer and the other for a Japanese manufacturer. The quality of the Japanese engines are reputed well and the Department of Fisheries and fishermen expect the Japanese engines to be introduced, but it seems to be appropriate to use the American engines under present situations of use of engines. Therefore, it is considered to procure the diesel inboard engines manufactured in America or Japan.

3-1-6 Implementation Schedule

This project requires 2 months for the detail design, 1.5 month for the tendering and 7.5 months from approval of specifications and drawings, manufacture and procurement of equipment, transport, inspection through delivery as shown in Table. 1.

3-1-7 Obligations of Recipient Country

The obligations of the recipient country upon the implementation of this project are as follows:

1) To ensure prompt unloading and customs clearance at ports of disembarkation in Suriname and internal transportation therein of the products purchased under the Grant;

2) To exempt Japanese nationals from customs duties, internal taxes and fiscal levies which may be imposed in Suriname with respect to the supply of the products and services under the verified contracts.

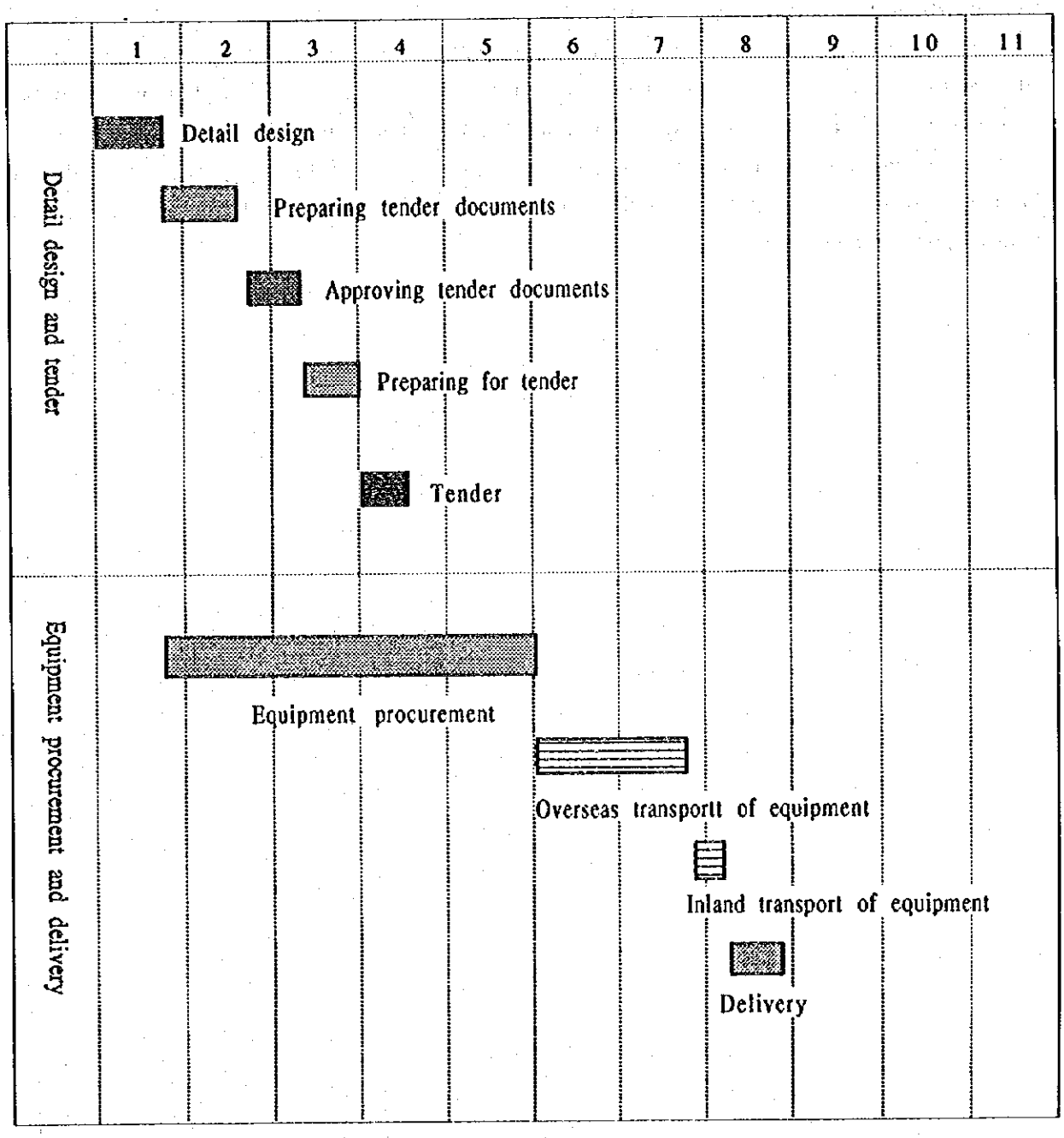
3) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such as facilities as may be necessary for their entry into Suriname and stay therein for the performance of their work;

4) To bear commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement (B/A);

5) To ensure that the equipment under the Grant be maintained and used properly and effectively for the Project; and

6) To bear all the expenses other than those covered by the Grant, necessary for the project.

Table 1 Implementation Schedule



3-2 Operation and Maintenance Plan

The Department of Fisheries is responsible for management for sales of materials for fishing gear, outboard engines and inboard engines to artisanal fishermen. The three Fishery Centers, in Commewijne, Boskamp and New Nickerie are responsible for utilization and management of maintenance tools for marine engines. Though artisanal fishermen who purchase the equipment are supposed to repair and maintain it on their own, the Department of Fisheries manages sales to artisanal fishermen of necessary spare parts and Fishery Centers give them advice on repair and maintenance procedures and lend them maintenance tools. Sales of the equipment is possible to be implemented by the present system of the Department of Fisheries with additional expenses such as transportation and communications.

CHAPTER 4

PROJECT EVALUATION AND RECOMMENDATION

CHAPTER 4

PROJECT EVALUATION AND RECOMMENDATION

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4-1 Project Effect

The followings are effects by the implementation of this project:

1)Under the present situation of small scale fisheries in Suriname, the renewal of fishing equipment such as fishing gear and marine engines is stagnant, in spite of exhaustion and decrepitude. This stagnation is affected by the less growth of fish price, while those of other products prices increased by the recent inflation and accordingly artisanal fishermen are forced to face hardship on their operation. It becomes a matter of concern that the production of small scale fisheries will decrease owing to the stagnation of fishing activities. The following effects are expected by the implementation of this project which supports the Government of Suriname in assistance to artisanal fishermen by the procurement of fishing equipment:

a) The production of small scale fisheries will be prevented from decreasing by sales of marine engines such as outboard engines and inboard engines to replace decrepit engines which show the apparent decrease of efficiency and require renewal within a year, although the production is supposed to decrease if those engines become unworkable. That production supposed to decrease is estimated at about 1,130 tons annually based on recent results of annual average catch by the relative fishing boats.

b) The production of small scale fisheries will be expected to be maintained, combined with sales of marine engines aforementioned above, by the maintenance of the operation of 375 units which account for 35 % of the total operation of small scale fisheries. The maintenance of the operation will be enabled by sales of materials of fishing gear to replace exhausted fishing gear which show the apparent decrease of efficiency and require renewal within a year.

2) It is a key task to promote the operation of closed Guyana type boats in reference to the small scale fisheries in Suriname. Although around 12 units of those type boats increased annually in the early 1990s, only around 5 boats has been increased annually since the economy deteriorated. This situation has affected the smooth growth of fishery production. By the implementation of this project, the Government of Suriname will assist artisanal fishermen by sales of inboard engines required for new construction of 7 boats and the relative production will be expected to be increased partially by the operation of new boats. That production supposed to be increased is estimated at about 218 tons annually based on recent results of annual average catch by the relative fishing boats.

3) The procurement of maintenance tools for marine engines will not only contribute to ensuring the operation of the existing related equipment, but promoting the effective utilization of the marine engines provided by this project, while supporting the fishing activities of small scale fisheries.

It is considered appropriate to implement this project by Japan's grant aid, for the following points:

1) Artisanal fishermen in Suriname are generally indigent, and engaged in severe jobs on the sea. This project is aimed to stabilize their management of their fisheries and improve their living standard.

2) Even though, in Suriname, most of items for the evaluation of the living standard in 1994 rank between 50th and 100th among 191 countries, the item of caloric intake per day ranks 170th. Fish supplied by small scale fisheries prices lower than meat and provides major sources of animal protein to national diet. The maintenance and the extension of the production is considered to contribute greatly to the self-sufficiency of provisions and the improvement of the economy of the living standard in terms of nutrition. They also contribute to the improvement of economy of Suriname, as 20-30 % of the production is exported and contributes to gainings of foreign currency.

3) The counterpart fund formulated by the implementation of this project will be allocated for the improvement of fishery infrastructures such as the Fishery Centers, which is the basic policy of small scale fishery development measures taken by the Government. This will contribute to achieving the development of fisheries in the mid and long term.

4) The organization to implement this project has smoothly performed the management of the similar project in the past, and the system of implementation is well organized.

The present situation, effects and measures are summarized in the following Table

Present situation and problems	Measures taken by this project	Degrees of effects and improvement by this project
1. The production of small scale fisheries is supposed to decrease due to the stagnation of the renewal of equipment such as fishing gear and marine engines.	• The procurement of 183 outboard engines for renewal. • The procurement of 14 inboard engines for renewal. • The procurement of 375 units of fishing gear. • Assistance to artisanal fishermen by sales of this equipment for the renewal.	• The production, which is supposed to be prevented from decreasing, is estimated at about 1,130 tons annually as follows ; (4.80 tons/yr. x 140 boats = 252.0 tons 10.31 tons/yr. x 43 boats = 443.33 tons 31.10 tons/yr. x 14 boats = 435.4 tons)
2. The new construction of closed Guyana type boats, which is desirable for the small scale fisheries development, is stagnant.	• Assistance to artisanal fishermen by sales of inboard engines required for the new construction of 7 boats.	• Ensuring the preferable new construction of those boats • The production, which is expected to be increased by the operation of these 7 boats, is estimated at about 218 tons annually as follows ; (31.10 tons/yr. x 7 boats =217.7 tons)
3. The further improvement of small scale fisheries is desired to improve nutrition of people and increase gainings of foreign currency.	• The maintenance and the extension of the small scale fishery production through assistance by sales of the equipment above. • The further improvement and maintenance of the fishery infrastructures by the counterpart fund formulated by this project.	• Contribution to the achievement of small scale fisheries development to meet the overall fishery development. • Contribution to ensuring the supply of animal protein resources to a nation. • Contribution to gainings of foreign currency by extending exports of small scale fisheries products.
4. It is necessary to utilize the equipment only obtained by import.	• Strengthening the system of repair and maintenance by the improvement of maintenance tools.	• Contribute to the effective utilization of the engines procured by this project. • Contribute to the effective utilization of existing engines.

4-2 Recommendation

The appropriateness of the implementation of this project by Japan's grant aid is confirmed since the great effects aforementioned are expected and this project widely contributes to the improvement of basic human needs. Furthermore, the system of Suriname is sufficient to perform the implementation and the management of this project from the viewpoints of both human resources and finance. However, this project will be implemented far more smoothly and effectively when the following points are improved:

1)The fishing gear and the outboard engines provided by this project for assistance of sales to artisanal fishermen will require renewal again after several years. The Government of Suriname now intends to utilize the counterpart fund formulated by this project for strengthening the fishery infrastructure prior to others. The equipment for the renewal in the future is anticipated to be obtainable, as it used to be, by artisanal fishermen from the private markets if the economic situations such as the stabilization of exchange rate are improved. Although the exchange rate seems to be gradually stabilized, as a matter of fact, the economic situations in the future are also unpredictable. Therefore, it is recommended that the counterpart fund should be utilized for the reprocurement of fishing gear and marine engines, when it is foreseen that artisanal fishermen still have difficulties in operation, and renewal and the procurement of equipment are in arrears, even after this project are implemented.

2) The system of collaboration between fishermen in Suriname is not as well established as those in adjacent countries like Guyana. This is one of the causes that hinder them from stabilizing the operation of fishery. To encourage them to be self-supporting against these situations, it is recommend that entrepreneurship should be developed and the organization of cooperation among fishermen should be founded.

APPENDICES

APPENDICES

Appendix 1 Member List of the Survey Team

Mr. Kazuo SENGA	Team leader	Forestry & Fisheries Development Cooperation Dept. Japan International Cooperation Agency (JICA)
Mr. Kenji MATSUMOTO	Technical Advisor	Deputy Director of Fishing Boat Division, Oceanic Fisheries Dept., Fisheries Agency
Mr. Munehiro SHIMADA	Fishery Development (Chief Consultant)	Overseas Agro-Fisheries Consultants Co., Ltd.
Mr. Nobuo ITOI	Equipment Planner	Overseas Agro-Fisheries Consultants Co., Ltd.
Mr. Naohiko WATANUKI	Cost Estimation	Overseas Agro-Fisheries Consultants Co., Ltd.

Appendix 2 Survey Schedule

Order	Date	Day	Activities
1	Sep. 24	Sun	Tokyo to Miami.
2	Sep. 25	Mon	Miami to Suriname. Arrive to Paramaribo.
3	Sep. 26	Tue	Courtesy call to Japanese Embassy, the Ministry of Foreign Affairs, the Ministry of Planning and Development Cooperation and the Ministry of Agriculture, Animal Husbandry and Fisheries.
4	Sep. 27	Wed	Detail discussions on the contents of the Project with the Department of Fisheries.
5	Sep. 28	Thu	Survey on the Boskamp Fishery Center and fishing villages in that vicinity.
6	Sep. 29	Fri	Survey on the Commewijne Fishery Center and the Suriname central fishing port.
7	Sep. 30	Sat	Survey on fish distribution systems in Paramaribo.
8	Oct. 1	Sun	Team meeting.
9	Oct. 2	Mon	Discussions on detail items of the project with the Department of Fisheries.
10	Oct. 3	Tue	Discussions on the contents of Minutes of Discussions.
11	Oct. 4	Wed	Signature on the Minutes of Discussions. Reporting to Japanese Embassy.
12	Oct. 5	Thu	Survey on the New Nickerie Fishery Center and fishing villages in that vicinity.
13	Oct. 6	Fri	Mr. K. Senga and Mr. K. Matsumoto leave Paramaribo. Survey on offshore fishery.
14	Oct. 7	Sat	Additional survey on the management of the Commewijne Fishery Center.
15	Oct. 8	Sun	Survey on and interview with fishermen in Paramaribo. Documents review.
16	Oct. 9	Mon	Survey on the conditions of the equipment procurement.
17	Oct. 10	Tue	Detail discussions on project items with the Fishery Department.
18	Oct. 11	Wed	Detail discussions on project items with the Fishery Department.
19	Oct. 12	Thu	Survey on fishing villages in the vicinity of Paramaribo.
20	Oct. 13	Fri	Survey on fish distribution facilities such as a fish market.
21	Oct. 14	Sat	Survey on fish distribution in Paramaribo.
22	Oct. 15	Sun	Survey on fishing grounds in the vicinity of Paramaribo. Document review.

23	Oct. 16	Mon	Additional detail discussions with the Department of Fisheries. Survey on and interview with fishermen (the utilization of fishing gear and outboard engines).
24	Oct. 17	Tue	Additional detail discussions with the Department of Fisheries. Survey on and interview with fishermen (the utilization of inboard engines).
25	Oct. 18	Wed	Additional detail discussions with the Department of Fisheries. Survey on the construction of wooden fishing boats.
26	Oct. 19	Thu	Final discussions with the Department of Fisheries and courtesy call to other relevant agencies.
27	Oct. 20	Fri	Reporting to Japanese Embassy. Leaving Suriname and arriving in Miami.
28	Oct. 21	Sat	Leaving Miami.
29	Oct. 22	Sun	Arriving in Japan.

Appendix 3 List of Party Concerned in the Republic of Suriname

1. Ministry of Foreign Affairs

Mr. HEHK ALIM AHOMED	Permanent Secretary
Mr. EDGAR S. R. AMANH	Assistant Permanent Secretary, Head of Asia/African Division
Mr. WILFRED CHRISTOPHER	Deputy Head of Asia/African Division

2. Ministry of Planning and Development Cooperation

Mr. STUART TJON A JOE	Deputy Director
Mr. TJONG A HIN. S.	Acting Director
Mr. RAMBHARSE. I	Coordinator of Productive Projects

Bureau of Statistics

Mr. JOHNY T. SONTOSOEMARTO	Deputy Director for Scientific Research and Planning

3. Ministry of Agriculture, Animal Husbandry and Fisheries

Mr. JOHAN S. SISAL	Minister
Mr. ROBBY G. H. M. LIEUW A JOE	Permanent Secretary
Mr. M. AKKERMAN	Director of NV Cevihas

Department of Fisheries

Dr. RENE B.L. LIEVELD	Director
Mr. LIETAR CARLOS	Head of Division for Management and Development
Mr. PIERRE CHARLIER	Head of Division for Statistics and Research
Mr. JOLANDA BABB	Deputy head of Statistics and Research
Mrs. JULIETTE COLLI	Head of Quality Control
Mr. ZOJINDRA ARJUNE	Co-worker, Quality Control
Miss NASRIEN HABIEB	Co-worker, Management and Development
Mr. KENS WIL AUGUST	Head of the Administration
Mr. MORINO H. MADARIE	Director of the Commewijne Fishery Center
Mr. CENKY SODIKROMO	Director of the New Nickerie Fishery Center

5. STIVI

Mrs. H. JESSURUN	Acting Director

6. S.A.I.L.

Mr. ERROLL K. MANNES	Managing Director

7. Embassy of Japan in Suriname

Mr. ISAMU YAMADA	Chargé d'Affaires ad Interim
Mr. HIDEKI MIYATA	Assistant Attaché