

**BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR BUILDING
OF
A COASTAL TRANSPORT VESSEL
FOR FISHING PRODUCTS
IN
THE PEOPLE'S REPUBLIC OF MOZAMBIQUE**

MARCH 1989

**JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)**

G.R.S

89 31

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR BUILDING
OF
A COASTAL TRANSPORT VESSEL
FOR FISHING PRODUCTS
IN
THE PEOPLE'S REPUBLIC OF MOZAMBIQUE

JICA LIBRARY



1076056191

MARCH 1989

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)

国際協力事業団

19616

P R E F A C E

In response to the request of the Government of the People's Republic of Mozambique, the Government of Japan has decided to conduct a Basic Design Study on the Project for Building of a Coastal Transport Vessel for Fishing Products in Mozambique and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Mozambique a survey team headed by Mr. Hidenobu Sobashima, Assistant Director, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs from 28th November to 23rd December, 1988.

The team exchanged views on the Project with the officials concerned of the Government of Mozambique and conducted a field survey in Maputo and other proposed ports of call. After the team returned to Japan, further studies were made and the present report has been prepared.

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

I wish to express my sincere appreciation to the officials concerned of the Government of the People's Republic of Mozambique for their close cooperation extended to the team.

March, 1989

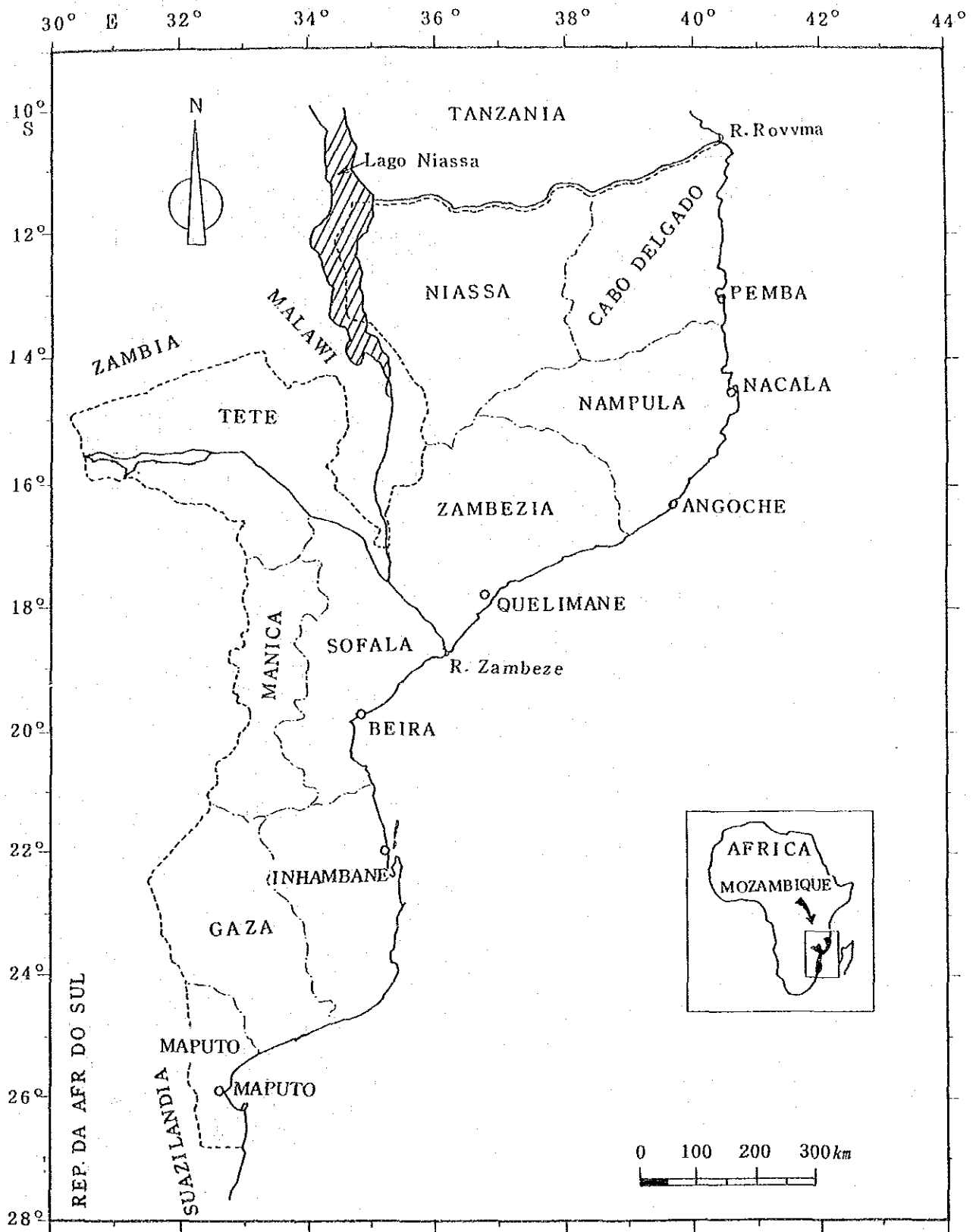


Kensuke Yanagiya

President

Japan International Cooperation Agency

Land of Mozambique



SUMMARY

The fisheries in the People's Republic of Mozambique (hereinafter referred to as "the Country" or "Mozambique") can be classified into the industrial fishery executed by the national fisheries corporations and foreign joint venture fisheries companies, the small scale fishery conducted by the coastal fishermen and the licensed fishery implemented by foreign fishing vessels within the country's exclusive economic zone. The catch is approximately 50,000 tons a year (1987).

However, the domestic production does not satisfy the home demand. Therefore, the country needs to import about 10,000 tons of fishing products a year.

The survey conducted in 1986 by the Nordic Support gives estimation of 220,000 to 310,000 tons of MSY in the country's waters. There is a high potential to increase the fishing production.

Mozambique is now implementing the National Economic Rehabilitation Plan (1988 to 1991) of which the basic policies of the fisheries development plan are aiming at "Increase in fishing product supply to people", "Grade up of fishermen's life level" and "Enlargement of export".

Since the country has historically been developing as the port for shipping of trade goods from southern African inland countries and landing of goods for such countries, the east-west land transport network to link the country's coastal area and inland countries such as roads and railways is well developed, but the north-south one is behind in development. This condition is a large obstacle for the transport and distribution of fishing products which in the same time makes a barrier for the fisheries.

On the other hand, although the country has a refrigerated transport vessel for fishing products, RIGEL 2, operated by a Mozambique-Japan joint venture, as it is made by reconstruction of a fishing boat and has more than 20 years of use, it suffers from a severe deterioration and is not good for satisfactory use. It is the time to scrap it.

Under such circumstance, the Government of Mozambique considers that the resolving the above-mentioned problem is an important task in order to achieve the targets of the fisheries development plan and to activate the fisheries. The country's Government realized that the early consolidation of transport vessel for fishing products is important.

On this consideration, the Government of Mozambique made the Project for Building of a Coastal Transport Vessel for fishing products (hereinafter referred to as "the Project"), and then requested to the Government of Japan for the Grant Aid.

In response to the request of the country, the Government of Japan has decided to conduct a Basic Design Study, and the Japan International Cooperation Agency sent to Mozambique a Basic Design Study Team headed by Mr. Hidenobu Sobashima, Assistant Director, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs, from November 28th to December 23rd, 1988.

The team had a series of discussions on the Project with the officials concerned of the Government of Mozambique, and conducted a project-site survey for understanding the actual condition and problems of the country's fisheries, the background, objectives and contents of the Project. As a result of the study and discussions, the team confirmed the necessity and appropriateness of cooperation for the Project. Moreover, the discussions between both sides were arranged in the Minutes of Discussions which the both parties have signed and exchanged.

The objectives of the Project are to increase the fishing catch by raising the operation ratio of fishing boats, to improve the life level of coastal fishermen by increasing their earnings and to increase the supply of fishing products to the domestic market through promoting the transport of fishing products to the consumers' area and exporting ports and the equipment and materials to fishing areas by means of providing a vessel and related equipment and materials for transporting fishing products and materials. On a basis of the project-site survey and further studies in Japan, it is judged that the provision of a transport vessel and related equipment and materials of the following specifications is appropriate for achieving the above-mentioned objective.

(1) Coastal Transport Vessel for Fishing Products

1

Principal Particulars:

Length overall	approx.	55 m
Lpp	approx.	50 m
Breadth	approx.	10 m
Depth	approx.	4.5 m
Draft	approx.	3.9 m
Cruising speed	approx.	10 knots
Main engine power	approx.	1,000 HS
Refrigerated cargo hold	approx.	300 m ³
Dry cargo hold	approx.	300 m ³
Fuel oil tank	approx.	150 m ³
Fresh water tank	approx.	100 m ³
Complement		24

(2) Onshore Supporting Equipment

Refrigerated truck	Max. carrying load	4 tons	2 sets
Fork lift	Max. carrying load	2 tons	2 sets
Tank lorry	Max. carrying load	4 tons	1 set
Uncovered truck	Max. carrying load	4 tons	2 sets
Truck crane	Max. carrying load	15 to 20 tons	1 set

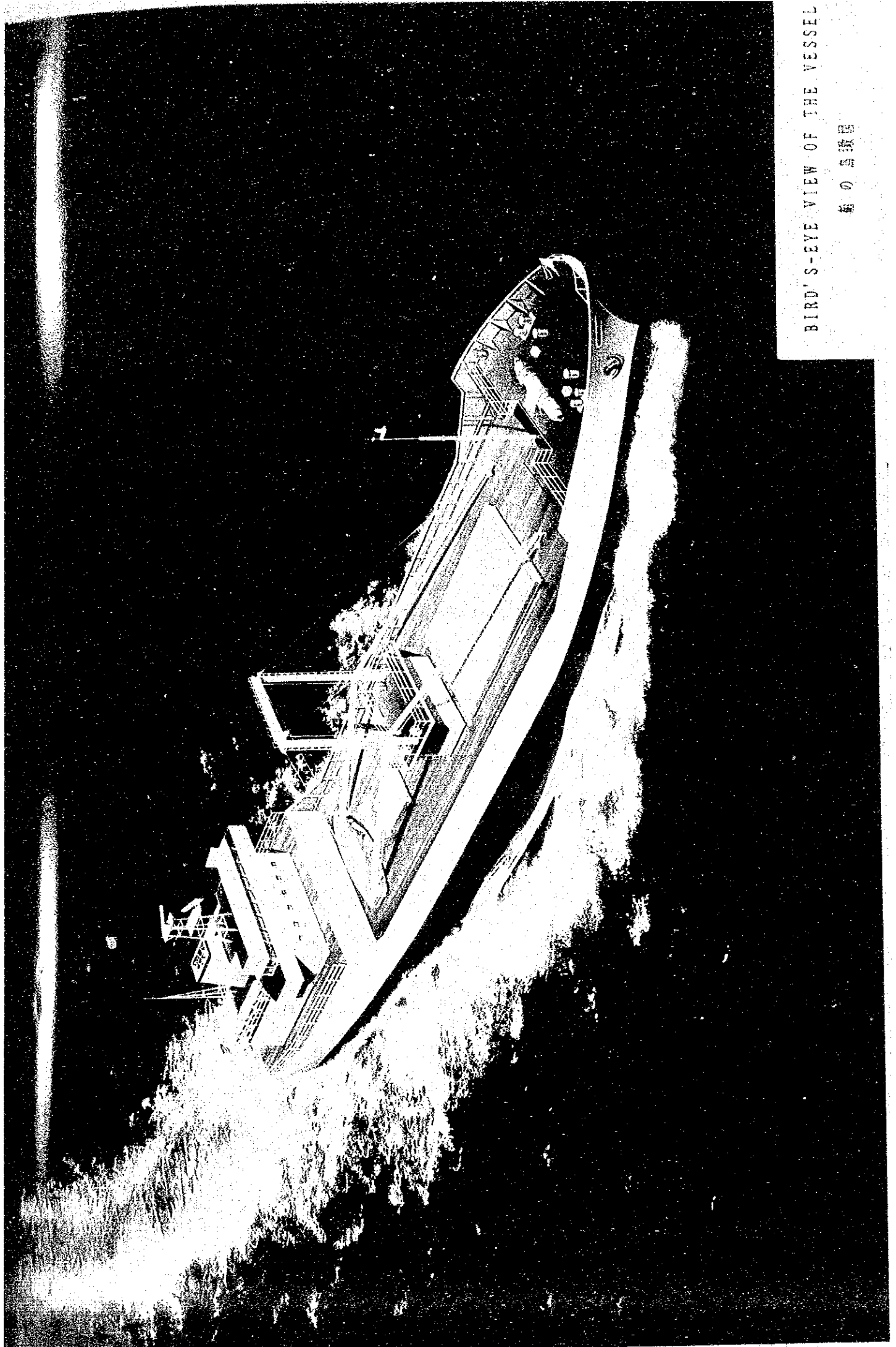
The Project will be implemented under the responsibility of the Secretariat of State for Fisheries. The Project vessel and related equipment and materials will be operated by EQUIPESCA which is a public corporation and is engaged in the provision and supply of equipment and materials for fisheries of the country under the control of the Secretariat of State for Fisheries. For the beginning, as the operation of the Project vessel by only Mozambique crew is considered somehow difficult, foreign officers and engineers will be assigned for technical assistance. In such manner, a necessary operation and management organization will be arranged.

The period for building and delivery of the vessel of the Project is estimated as follows:

After the signature of E/N between the Government of two countries,

- 2 months for detailed design,
- 2 months for tender and contract,
- 8 months for building and
- 1 month for sea transportation and delivery,
- totally 13 months.

The implementation of the Project will facilitate the transport of fishing products to consumers' areas and exporting ports and the supply of equipment and materials for fisheries and improve the cargo work of the fishing products. It will result in the increase in fishing production and the improvement in the quality of fishing products and will allow the fishermen to learn the vessel operation techniques. In the same time, it should lead to the grade up of the coastal fishermen's life level, the enlargement of the supply of animal protein to the people and the acquisition of foreign currencies by the increase of export. Therefore, the grant aid of the Government of Japan for the Project is highly significant.



BIRD'S-EYE VIEW OF THE VESSEL

船の鳥瞰図

CONTENTS

PREFACE

MAP

SUMMARY

BIRD-EYE VIEW OF VESSEL

CHAPTER 1	INTRODUCTION	1
CHAPTER 2	BACKGROUND OF THE PROJECT	4
2-1	Outlines of Mozambique	4
2-2	Fisheries Condition	12
2-2-1	Fisheries Environment	12
2-2-2	Types of Fisheries	17
2-2-3	Fishing Production	28
2-2-4	International Trade	29
2-2-5	Fisheries Related Service Corporation	31
2-2-6	Fisheries Education System	32
2-2-7	Fisheries Administration and Organization	33
2-3	Fisheries Development Plan	36
2-4	History and Contents of the Request	41
2-5	Actual State of Existing Transport Vessel	44
CHAPTER 3	CONTENTS OF THE PROJECT	47
3-1	Necessity of Implementation of the Project ...	47
3-2	Objectives of the Project	48
3-3	Study on the Contents of the Request	49

3-4	Contents of the Project	51
3-4-1	Conditions of Ports of Call	51
3-4-2	Plan for Transportation of Fishing Products ..	64
3-4-3	Implementation Organization.....	76
3-4-4	Operation System.....	78
3-4-5	Fueling and Water Loading Plan	79
3-4-6	Provision Plan of Onshore Supporting Equipment	79
3-5	Necessary Conditions for Transport Vessel	82
3-6	Technical Assistance	83
CHAPTER 4	BASIC DESIGN	84
4-1	Policies for Basic Design	84
4-2	Study on Conditions for Basic Design	86
4-3	Basic Design	90
4-3-1	Details	90
4-3-2	Basic Design	106
4-4	Building Plan	115
CHAPTER 5	OPERATION AND MAINTENANCE PLAN	121
5-1	Operation and Maintenance System	121
5-2	Maintenance and Control System.....	122
5-3	Operation and Management Cost	123

CHAPTER 6	EVALUATION OF THE PROJECT.....	129
6-1	Effects Expected from the Implementation of the Project	129
6-2	Appropriateness of the Project	131
CHAPTER 7	CONCLUSION AND SUGGESTIONS	132
7-1	Conclusion	132
7-2	Suggestions	134

APPENDICES

1. Member List of Study Team
2. Study Schedule
3. List of Counterparts in Mozambique
4. Minutes of Discussions
5. Materials
 - (1) Port Maps
 - (2) Ship Building and Repair Facilities
 - (3) Organization Chart of EQUIPESCA
 - (4) Operation and Management Cost Calculation of
the Project Vessel
 - (5) List of Literature Cited

CHAPTER 1 INTRODUCTION

CHAPTER 1 INTRODUCTION

The People's Republic of Mozambique is located in the south-eastern area of the African Continent. The country has a long coastal line of 2,470 km facing the Indian Ocean. Its exclusive economic zone extends up to approx. 900,000 km² including a continental shelf of approx. 71,000 km² of which the longest distance from the coast is 70 to 80 nautical miles. Abundant fisheries resources are estimated in the country's exclusive economic zone.

The fisheries in the People's Republic of Mozambique can be classified into the industrial fishery, the small scale fishery and the licensed fishery implemented by foreign fishing vessels within the country's exclusive economic zone. The fisheries in the country play an extremely important role for supplying foods to the people and acquiring foreign currencies.

Especially, the export of shrimps and prawns caught by the industrial fishery shares about 50% of the country's foreign currencies acquisition and is considered as one of basic industries which support its national economy.

Japan has extended its fisheries grant aid for the Fisheries Promotion Plan (1982) and the Quelimane Fishing Port Consolidation Plan (1986). The facilities constructed by such cooperation are now effectively employed and contributing to the development and promotion of the fisheries in Mozambique.

However, the east-west land transport network to link the country's coastal area and inland countries such as roads and railways is well developed but the north-south one is behind in development. This condition is a large obstacle for the transport and distribution of fishing products.

On the other hand, although the country uses a refrigerated transport vessel, RIGEL 2, converted from a fishing boat especially for transporting the fishing products of the small scale fishery to fisheries combinats, because it has been for more than 20 years in use, it suffers from severe deterioration, its refrigerating capacity reduced to half of its initial capacity and it results in a very low operation rate also because of insufficient maintenance and repair facilities. Now it hinders the fishing activities.

On this consideration, the Government of Mozambique made a project for building of a coastal transport vessel for fishing products for the main purpose of the further development and promotion of the fisheries by the improvement of the means of transport for fishing products to the consumers' areas and the exporting ports and of the equipment for fishing. Then the Government of Mozambique made a request to the Government of Japan for the Grant Aid for building of a coastal transport vessel for fishing products and the provision of onshore supporting equipment.

In response to the request of the Government of the People's Republic of Mozambique, the Government of Japan has decided to conduct a Basic Design Study on the Project for Building of a Coastal Transport Vessel for Fishing Products in Mozambique, and the Japan International Cooperation Agency (JICA) sent to Mozambique a survey team headed by Mr. Hidenobu Sobashima, Assistant Director, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs, from 28th November to 23rd December, 1988.

The team had a series of discussions on the Project with the officials concerned of the Government of Mozambique for understanding the background of the request and the contents of the Project, and conducted a project-site survey on fishing ports, port facilities and transport activities together with the collection of necessary data and materials.

After the team returned to Japan, the team examined and analyzed

the materials and contents of discussions to evaluate the effects of the Project to the development and promotion of the fisheries of the People's Republic of Mozambique. Further studies were made for determining optimal fishing products, equipment for fishing in order to make a basic design on the scale and details of the facilities of the coastal transport vessel for fishing products.

This report has been prepared to present the basic design considered to be optimal, the project cost, the project evaluation and the suggestions and advises of the team based on all the above discussions.

The Minutes of Discussions including the contents of the Project discussed and confirmed by the both parties during the project-site survey, the members of the team, the counterparts of Mozambique and the survey schedule are attached to this report.

CHAPTER 2 BACKGROUND OF THE PROJECT

CHAPTER 2 BACKGROUND OF THE PROJECT

2-1 Outlines of Mozambique

(1) Natural Environment

① Geography

Mozambique is located on the east coast of the African Continent between long. 30°12'E and 40°51'E, lat. 10°27'S and 26°12'S, sharing borders with Tanzania in the north, Malawi, Zimbabwe and Transvaal of South Africa in the west, and Nataal of South Africa and Swaziland in the south, while the east of the country is a coastline of as 2,470 km facing the Indian Ocean. The land area reaches 799,380 km².

Terrain of the land generally descends from the west toward the Indian Ocean in the east. With the Monte Binga of 2,436 m above the sea level on the borders with Zimbabwe in the north-west at the highest point and descending toward the coastal areas in the south-east. 45% of the land is covered by the areas of less than 1,000 m above the sea level.

There are as many as 25 major rivers crossing the country, of which the largest one is the Zambezi River which originates from the east of Angola and flows into the Indian Ocean for a distance of 820 km.

② Meteorology

The northern region of the country off the central area is in the tropical zone and the southern region in the subtropical zone. The climate is divided into a dry season and rainy season. Monsoons in the rainy season from October to April bring about adequate

precipitation throughout the country and contribute to the agriculture.

Heavy precipitations are normally recorded in the coastal areas with a decreasing tendency toward higher lands. The temperature is relatively high with an annual average of 27°C to 30°C except for the hilly areas in the east. However, it decreases below 20°C in many areas of the south especially in June and July of winter.

Luxuriant colonies of mangroves are often observed along the coastlines while the mountainous and hilly areas are savannas with limited vegetation.

(2) Social Environment

① Population

According to a national census taken in August, 1986, the population of the country is 14,174,000 of which 6,918,000 are males and 7,256,000 are females with a population density of 17.7#people/km².

For the breakdown in age of the population, 46.4% are below 14 years old and 29.3% are between 15 and 29 years old. As many as 70.3% of the populations are under 30 years of age. The rate of population increase is 2.6% a year, and it is estimated that the population of the country will exceed 20 million in the year 2000.

(3) Economic Condition

① Economic Environment

Because of its long coastlines along the Indian Ocean, since its early days in the history Mozambique has provided important access to the sea for Zambia, Zimbabwe and other inland countries. Revenue from ports, roads, railways and other facilities for transporting the merchandise of inland countries largely contributes to the acquisition

of foreign currencies in the form of invisible earnings.

The climate is tropical and subtropical making it suitable for the production of cashew nuts, cotton, sugar, tea and other agricultural products. The availability of adequate conditions for the development of national economy such as the fisheries resources in its vast exclusive economic zone and on its continental shelves and the subterranean energy resources are observed.

The production activities of the country was forced to be limited because of the damages caused by bad weather conditions such as droughts, cyclones, floods and other disasters taking place one after another since the independence of the country. Such circumstances eventually generated many victims from the food shortages in 1983 and 1984. In addition to the aids given by the Soviet Union, East Germany and other East European countries, Mozambique has been receiving food aids from EEC, America, Japan and other countries to ensure its recovery.

Mozambique has abundant mining resources. Tete district in the north-west has chromium, tantalum, vanadium and tungsten while natural gas was discovered off the coast of Maputo.

For the development of Mozambique's economy, however, it will be required to take proper measures against such economic problems as mentioned below.

- A. Because its structure is geared for exports of products, the self-subsistence ratio of agricultural production is potentially limited.
- B. Despite affluent energy sources and other subterranean resources, deterioration of foreign currency reserves has become a bottle-neck in the development of those resources.
- C. As the country's roads and railways have been developed to link the coastline and the inland area, roads to link the

south with the north are not consolidated. Therefore, the non-development of means of north-south land transportation makes an obstacle for the productive activities.

Especially, the fisheries related transport is obliged to depend on the sea transportation.

- D. Repetition of droughts and floods due to unseasonable weather has damaged agricultural production of the country and brought about serious food shortage. Approximately 4 million people were in shortage of food in 1987.

Mozambique has formulated the National Economic Rehabilitation Plan and made every endeavor to reconstruct the economy. It should be noted that the fisheries alone have made surplus when almost all the other industries have been suffered from deficit.

Table 1 Gross Social Product (GSP) of Mozambique

(As of 1980)(Unit: Meticais)

	1975	1980	1981	1982	1983	1984	1985	1986
Agriculture	24.8	30.8	31.1	30.8	24.0	24.4	24.6	25.0
Industry	28.0	32.6	33.6	29.0	23.2	18.3	14.9	14.8
Construction	4.0	4.8	4.7	4.9	5.0	4.5	4.3	6.2
Transport and Communications	9.1	8.1	9.0	8.3	6.6	5.1	4.5	4.6
International Trades & Others	5.5	5.9	5.8	5.8	5.5	5.9	5.5	5.6
Total	71.4	82.1	84.1	78.8	64.4	58.2	53.9	56.2

Source: GPIE "Investor's Guide to Mozambique" published in 1988 by (Gabinete Promocao do Investimento Estrangeiro). (Hereinafter GPIE means the same.)

② International Trade

Mozambique suffers from an adverse balance of trade. The amounts of export and import as of 1986 were US\$79.1 million (3.2 billion

Meticais) (on FOB basis) and US\$542.7 million (21.9 billion Meticais)(on CIF basis), respectively, with a visible trade deficit of US\$463.6 million (18.7 billion Meticais), while deficit of total balance reached US\$542.2 million (21.9 billion Meticais). 86% of the total deficit is due to the trade deficit.

Table 2 Balance of Visible Trade

(Unit: US\$ million)

Item	1975	1980	1981	1982	1983	1984	1985	1986
Export (FOB)	185.4	280.8	280.8	229.2	131.6	95.7	76.6	79.1
Import (CIF)	394.5	800.0	801.1	835.9	636.4	539.7	423.8	542.7
Balance	-209.1	-519.2	-520.3	-606.7	-504.8	-444.0	-347.2	-463.6

Source : GPIE

As shown in Table 3, major products for import are general consumer goods, raw materials and equipment, out of which general consumer goods take 43% and raw materials 29%. Further, 67% of general consumer goods are food and one third of raw materials are oil and petroleum.

Table 3 Major Products for Trade (Import)

(Unit: US\$ million)

Products	1975	1980	1981	1982	1983	1984	1985	1986
Consumer goods	114.8	203.4	178.3	168.4	177.6	182.0	166.0	231.2
Food	57.1	108.0	114.4	115.7	130.9	134.7	121.0	149.1
General materials	57.7	95.4	63.9	52.7	46.6	47.3	45.1	82.1
Raw Materials	163.5	387.4	367.1	378.4	231.7	193.2	162.3	156.6
Chemical products	32.6	63.4	72.0	78.2	47.9	25.1	25.1	38.5
Metal products	28.0	46.5	52.4	29.6	31.5	19.1	18.9	21.8
Crude oil, petroleum products	58.2	219.3	167.1	212.0	96.7	100.7	69.1	47.9
Electricity	-	6.9	5.3	7.8	9.0	8.6	5.7	6.5
Others	44.8	57.3	70.1	49.7	46.6	39.7	43.5	41.8
Auxiliary products	50.1	56.7	104.4	107.5	105.5	71.0	46.8	67.7
Equipment	66.1	152.5	151.3	181.6	121.6	93.5	48.7	87.2
Total	394.5	800.0	801.1	835.9	636.4	539.7	423.8	542.7

Source: GPIE

Major products for export are shrimps, cashew nuts, cotton, sugar and tea, and except shrimps whose annual export volume has been stable in the range from 4,000 tons to 5,000 tons, all the other products dropped sharply in export volume against the results of 1980.

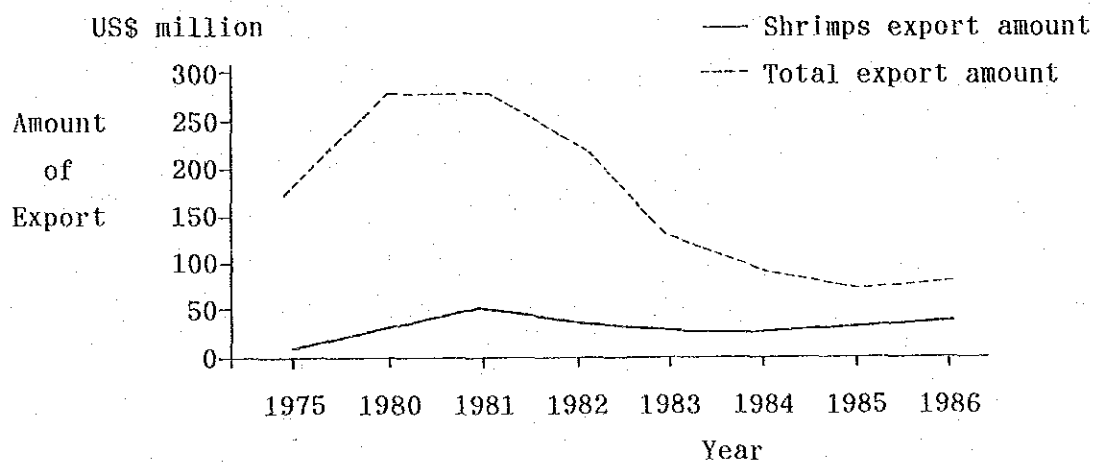
Table 4 Major Products for Trade (Export)

(Unit: US\$ million)

	1975	1980	1981	1982	1983	1984	1985	1986
Cashew Nuts	28.4	64.7	53.5	43.6	16.1	15.3	11.5	16.7
Shrimps	10.1	31.8	52.4	38.5	31.2	28.3	33.4	38.3
Cotton	16.0	8.2	24.9	17.3	17.0	8.0	5.3	0.5
Sugar	21.0	24.6	25.1	8.8	8.6	5.8	6.8	8.1
Tea	6.5	29.0	14.2	25.7	14.7	10.8	2.4	1.3
Others	103.4	122.5	110.7	95.3	27.9	27.5	17.2	14.2
Total	185.4	280.8	280.8	229.2	131.6	95.7	76.6	79.1

Source: GPIE

Table 5 Transition of Shrimp Export Amount



The fisheries have a large share in Mozambique's international trade as the shrimps export represents about 50% of the total export amount (1986) as shown in the Table 4 and is contributing much to foreign currency acquisition. It is positioned as an important industry supporting the country's economy.

However, at the same time the country imports 10,000 tons of fish a year in its import foods. It is done for supplying animal protein to the people. Moreover, the item to be exported is limited only to shrimp. Therefore, in the view of the international trade, the country's fisheries have some problems. The Secretariat of State for Fisheries formulated the Fisheries Development Plan to increase the fishing catch and diversify the fishing products by developing potential fisheries resources which are estimated at 220,000 to 310,000 tons a year.

2-2 Fisheries Condition

2-2-1 Fisheries Environment

(1) Natural Environment

The coastline of Mozambique reaches 2,470 km long between lat. 10°S and 27°S with lots of coves, shoals and small islands. The Mozambique Current, a branch current of the Equatorial Current, flows southward and forms a strong littoral current.

It flows at a speed of 0.5 to 4.0 knots, joins the Equatorial Current at the southern end of Madagascar Island and becomes the stronger Agulhas Current.

The marine temperature ranges from 16°C to 25°C between June and October and as high as from 26°C to 32°C between November and March off the coast of Maputo and the southern area. It is around 30°C throughout the year on the northern coastal area.

The temperature of surface water is between 22°C and 30°C. Because of existence of water masses whose salt concentration in the surface water is 35.2 ‰ or less, it is assumed that low salt water of tropical zone flows southward with the Equatorial Current.

Near the coasts of the country, there are water masses of low salt concentration caused by in-flowing river water and the concentration decreases below 30 ‰ off the central coast especially in the rainy season between February and March.

The range of ebb and flow tides reaches as large as 5 meters and more in the central and northern areas while it is 1.5 meters to 2.0 meters in the southern areas.

As many as 25 major rivers of the country carry much silt base light mud and nutrients from the interior areas to the Indian Ocean. They have a significant influence upon biological resources on the

continental shelves and form estuaries around the mouths of the rivers to create luxuriant colonies of mangroves extending about 1,700 km².

The continental shelves of the country reach maximum 70 to 80 nautical miles off the coast and those which are at 200 meters deep or shallower cover an area of approximately 71,000 km².

The northern continental shelf is as narrow as several hundred meters wide and there are submarine ravines off the shore.

There are also St. Lazarus Bank in the north-east of Pamba, Almirante Leite Bank off the coast of Maputo and the largest Sofala Bank of the country off the coast of Beira.

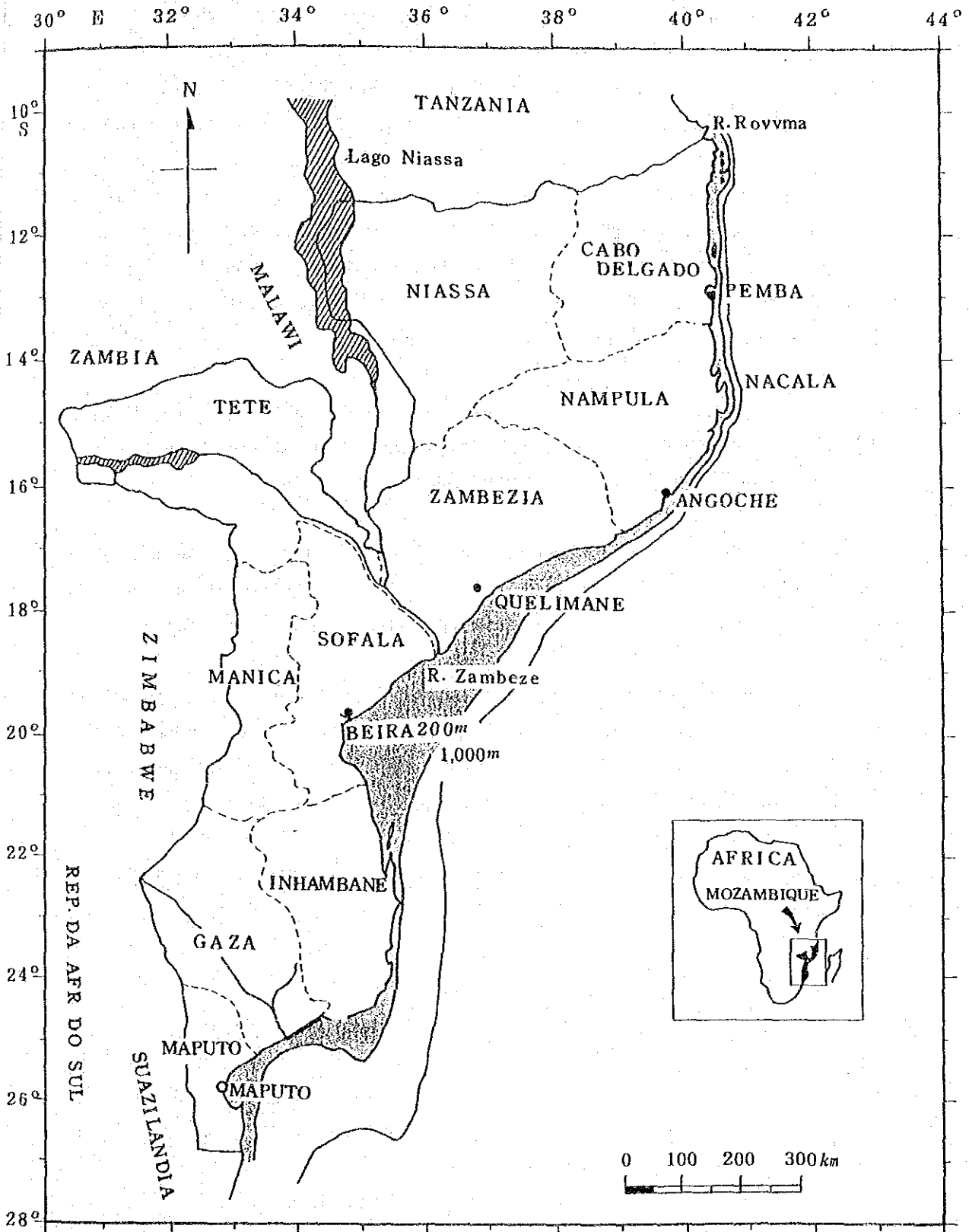
(Refer to Table 6 and Fig. 1)

Table 6 Continental Shelves of Mozambique

(Unit: km²)

Water Area Water Depth	Northern	Sofala	Bazarute	Delagao	Inhaca	Total
10- 50 m	Includ- ing St. Lazavus Bank (133 km ²)	38,020	4,240	4,570	320	
51-100 m		7,380	1,350	3,020	290	
101-150 m		490	960	1,280	160	
151-200 m		490	960	1,280	160	
10-200 m	6,190	46,380	7,510	10,150	930	71,160
200-400 m						

Figure 1 Continental Shelves of Mozambique



(2) Fisheries Resources

The water areas of the country at relatively high temperatures are estimated to have limited fisheries stock in comparison with the fishing grounds off the coast of Angola in West Africa or Chile in South America.

According to the surveys lately conducted by foreign research institutes, as shown in Table 7, the MSY is estimated to be 220,000 tons to 310,000 tons including 10,000 tons to 15,000 tons of shrimps and 30,000 tons to 100,000 tons of sardines. However, fisheries stock in deep waters is yet to be surveyed.

However, the current annual catch of approximately 45,000 tons (excluding a catch of approximately 5,000 tons in inland waters) is only 20 to 25% of the above-mentioned potential stock.

For sardines which have not been fully exploited, there are possibilities to drastically increase the catch by introducing fishing gears and methods along with the development of markets.

For the species of shrimps (mainly Penaeidae) which are actually exported, the ratio of stock exploitation has already reached 100%, but the whole catch of shrimps can be increased through the exploitation of non-developed resources of deep sea shrimps.

Table 7 Catch and Resources

(Unit : ton)

Fish Species	Current Catch	Catchable Stock
Shrimps	10,000 to 15,000	10,000 to 15,000
Demersal Fish	15,000 to 20,000	44,000 to 54,000
Surface Water and Pelagic Fish		
Small Fish	16,000	100,000
Sardines	0	30,000 to 100,000
Large Fish	3,000 to 4,000	5,000 to 6,000
Inland Waters	5,000	40,000
Total	49,000 to 60,000	229,000 to 315,000

Source : Estudo do Sector Pesqueiro em Mozambique (According to the investigation conducted by the Nordic Support in 1986)

(3) Aquaculture

① Inland Waters Aquaculture

Out of approximately 20,000 km² of Mozambique's inland waters, about 60% are Lake Niassa (6,500 km² territorial area and 400 km shore length), Lake Cahora Bassa (2,700 km² territorial area and 1,000 km shore length) and other lakes and marshes. About 25% are the Zambezi River (820 km territorial length), the Rovuma River (650 km territorial length), the Limpopo River (560 km territorial length) and other rivers, and the remaining approximately 15% are irrigation canals.

In the Provinces of Zambezia, Nampla, Niassa, Maputo and Manica, aquaculture used to be conducted by private enterprises in and after the 1950s during the colonial era, but it has been interrupted since the independence of the country.

With a good quality of inland water, there is a great possibility of resuming aquaculture and marking it a prospective industry for the

future on condition that aquacultural specialists will be trained and that the relevant infrastructures will be provided. The aquaculture in those inland waters will provide prospective supply sources of animal protein for the interior areas of the country.

Among other species for aquaculture, *Tilapia Mozambica* (*Srotheresdon Mossambicua*) survivable in brackish water and carp species particularly raise the possibility of industrialized dual aquaculture.

Administration of inland waters (fresh water) aquaculture was transferred from the Secretariat of State for Fisheries to the Ministry of Agriculture in October, 1984 and separated from seawaters aquaculture which is still under the control of the Secretariat of State for Fisheries.

② Sea Waters Aquaculture

Although experimental aquaculture has been carried out with mussels since 1977 and new aquaculture projects also have been proposed, none of them had ever been industrialized.

There are favorable natural conditions available for culturing shells and crustaceans and the boglands covering 170,000 hectares along the coast are especially suitable for aquaculture farming.

The most important matter for the development of the aquaculture is how to obtain seeds. Therefore, it is very essential to establish an optimal method for taking natural seeds for growing aquaculture as a stable industry.

2-2-2 Types of Fisheries

Fisheries of Mozambique are classified into three types as shown below.

- o Industrial Fishery

- o Licensed Fishery
- o Small Scale Fishery

(1) Industrial Fishery

① Characteristics

The industrial fishery is a general naming of the capitalized fisheries conducted by the National Fisheries Corporations (3 corporations) belonging to the Secretariat of State for Fisheries, foreign joint enterprises (3 companies including 1 Japanese company) and other private companies. Those fishing companies are mainly engaged in trawling.

Since December, 1988, the industrial fishery is put under the control of the National Fisheries Corporations (EMOPESCA) of the Secretariat of State for Fisheries.

The following is the general characteristics of this type.

- A. Fisheries by fishing boat of 20 meters long or more.
- B. Fisheries by fishing boat which has refrigerating facilities on board and can make a trip about 60 days including fishing for 15 to 30 days.
- C. Fisheries managed by corporate body whose principal office is situated in Mozambique and has piscary in the territorial sea of the country.
- D. Fisheries whose catches are mainly for export (like shrimps) as well as domestic consumption in Mozambique's inland areas (like common fish).

② Composition

Aiming at the acquisition of foreign currencies indispensable for the national economy by exports and the reduction in imports of marine products by supplying catches for domestic consumption, the industrial fishery of the country is composed of local companies and the foreign

joint enterprises. 2,470 employees (Table 8) work for national corporations and foreign joint enterprises and 87 fishing boats are engaged in this category of fishery (excluding licensed fishery, Table 9) in 1985.

Table 8 Employees of Industrial Fishery

(as of 1985)

Name of Corporation	Mozambicans	Foreigners	Total
EMOPESCA (National Corporations)			
EMOPESCA BEIRA	445	4	449
EMOPESCA QUELIMANE	303	8	311
EMOPESCA ANGOCHE	318	2	320
EFRIPEL (Japan-Mozambique)	497	61	558
PESCAMAR (Spain-Mozambique)	346	205	551
MOSOPESCA (Soviet-Mozambique)	140	141	281
Total	2,049	421	2,470

The following discussions are the abstract of those national corporations, foreign joint enterprises and local private companies.

③ National Corporation (EMOPESCA)

EMOPESCA is a national fisheries corporation which was formed in 1977 having its principal office at Maputo and its base stations at Beira, Quelimane and Angoche.

The corporation was divided in 1980 into three local corporations of EMOPESCA Beira, EMOPESCA Quelimane and EMOPESCA Angoche whose principal offices are located at each former base station of the corporation. Those three local corporations have been engaged in the catching of shrimps under the administration of the Secretariat of

State for Fisheries and they have their own cold stores and processing shops at each base station.

Although the three corporations have 27 trawlers, the operation efficiency of the vessels is far behind that of foreign joint enterprises due to the super-annuation.

④ Foreign Joint Enterprises

A. EFRIPEL (Japan-Mozambique Joint Venture)

EFRIPEL was originally formed in 1974 as a joint venture of Taiyo Fisheries Co., Ltd. of Japanese and Portuguese capital to undertake shrimp fishing in Mozambique. It was reorganized in 1977 as a joint enterprises with EMOPESCA having a capital investment ratio of 49% (Taiyo) vs 51% (EMOPESCA) based on the guidance of the Secretariat of State for Fisheries.

17 trawlers including 1 transport vessel of the enterprise have been engaged mainly in shrimp trawling with its base station placed at Quelimane where it has cold stores and repair shop.

B. PESCAMAR (Spain-Mozambique Joint Venture)

PESCAMAR is a joint enterprise which was formed in 1980 by a Spanish fisheries company and EMOPESCA. It placed the base station at Beira and has been operating with 18 trawlers including 1 transport vessel.

C. MOSOPESCA (Soviet Union-Mozambique Joint Venture)

Soviet trawlers started fishing activities in 1978 beyond 12 nautical miles off the coast of Mozambique on condition that they pay 15% of the catch to the country as a license fee. However, for the replacement of such a license agreement, EMOPESCA and Soviet Union established MOSOPESCA as a joint enterprise in 1980. There are 7 trawlers of the enterprise currently engaged mainly in the trawling of

bottom fish.

⑤ Local Private Companies

There are 14 shrimp trawlers belonging to local private companies and their base stations are located at Beira. Those private companies are treated in accordance with the administrative standards applicable to EMOPESCA.

⑥ Others

EMOPESCA Beira and East Germany are jointly operating 4 trawlers for catching shrimps. For the catch of shrimps in the industrial fishery, EMOPESCA exports it in through PESCOM INTERNATIONAL while EFRIPPEL and PESCAMAR through their own sales networks.

Other kinds of fish and the catch of MOSOPESCA are sold for domestic consumption.

(2) Licensed Fishery

Mozambique declared the adoption of the Exclusive Economic Zone in 1975 and started controlling the natural resources in the water areas. Since 1977 the country has allowed foreign fishing vessels to operate beyond 12 nautical miles off the coast in return to payment of specified license fees for the surplus above its fisheries production including the catch of foreign joint enterprises.

The common of piscary is given by the Secretariat of State for Fisheries on the basis of a piscary agreement. Such kind of fishery is generally called licensed fishery. There are 33 trawlers (as shown in Table 9) operating at present with such licenses.

The shrimps caught and exported by the industrial fishery and the licensed fishery are the precious sources of foreign currency for the country so that both fisheries are important industries.

Table 9 Fishing Vessels of Industrial and Licensed Fisheries

(Unit:Vessel)

Name of Corporation	Number of Vessels	Shrimps Fishing Boat (*1)			Other Fishing Boat (*2)		Transport Vessel (*3)
		L	M	S	L	M	
Emopesca Beira	11		1	10			
Emopesca Quelimane	7			7			
Emopesca Angoche	9			8			1
Efripel	17		14			2	1
Pescamar	18		12		3	2	1
Mosopesca	7				7	4	
Local Private Companies	14			14			
Others (*4)	4						
Licensed Fishery							
Soviet Union	6	6					
Spain	15	7	8				
East Germany	4	4					
South Africa	8		5	3			
Total	120	17	40	42	10	8	3

Source : Estudo do Sector Pesqueiro em Mozambique

Notes: (*1) S for small-sized vessel of 20 to 25 meters long.

M for middle-sized vessel of 29 to 35 meters long.

L for large-sized vessel of 35 to 65 meters long.

(*2) M for middle sized vessel of 30 to 35 meters long.

L for large-sized vessel of 50 to 56 meters long.

(*3) The transport vessel of FRIPEL is RIGEL 2.

The other transport vessels are small vessels operated between base station and fishing grounds.

(*4) The vessels jointly operated by Emopesca and East Germany.

(3) Small Scale Fishery

① Characteristics and Brief History

Fisheries which are conducted by petty coastal fishermen are generally called the Small Scale Fishery. Bottom trawling and gillnetting along the coast by canoe or fishing boat of 20 meters long or under fall into this category.

Since December, 1988, these fisheries are under the administration and supervision of the Institute Direction of Small Scale Fisheries (IDPPE) attached to the Secretariat of State for Fisheries.

The small scale fishery is further classified into the Semi Industrial Fishery which using fishing boats of 10 to 20 meters long with onboard catch hold such as ice holds and the Artisanal Fishery which is a self-supporting fishery managed on a household basis with canoe or powerless boat of 10 meters long or below.

The small scale fishery started developing in the latter half of the colonial era by private fishing boats around coastal cities but the small scale fishery failed to grow up enough to support the country's economy.

It was after the independence of the country when the authorities found the importance of developing small scale fishery. The Small Scale Fishery Bureau was organized in the Secretariat of State for Fisheries in 1981 and it has been initiating positive policies including the establishment of fisheries combinats.

It is estimated that the annual catch of small scale fishery is

20,000 tons to 30,000 tons. According to the survey conducted in 1985 by the Canada International Development Agency, the number of fishermen and catches by district are as shown in Table 10.

Table 10 Small Scale Fishery by District

Name of Province	Number of Fishermen	Number of Fishing Vessels	Number of Canoes	Catch of 1981 (ton)	Catch per Fisherman (kg/person)
Cabo Delgado	6,800	550	3,200	3,000	441
Nampula	8,000	1,700	2,300	3,500	437
Zambezia	7,800	100	4,000	3,000	384
Manica (inland)	250	10	150	100	400
Sofala	5,200	150	4,000	4,500	865
Inhambane	10,500	700	1,000	6,000	570
Gaza	550	150	100	750	450
Maputo	3,200	300	1,000	1,500	470
Total	42,300	3,660	15,750	21,850	516

Source: Estudo do Sector Pesqueiro em Mozambique

Note : Tete and Niassa provinces (inland waters) excluded.

(According to the data of Secretariat of State for Fisheries in 1985, both provinces have 2,498 fishermen and 1,249 fishing vessels (as of 1979).)

② Semi Industrial Fishery

The semi industrial fishery generally uses motorized boat of 10 to 20 meters long with the capacity of a 1 to 10 days operation. Catches are normally kept in onboard ice holds during trips and sold at local markets to ordinary consumers so that the fishing is deeply rooted in local community.

The boats used in the semi industrial fishery are either built in

Mozambique or imported from Portugal and other countries. Many of them are equipped with trawling gear and their popular fishing methods are bottom trawling, gillnetting and long-lining. Some fishing boats conduct drift-lining to catch sharks.

The semi industrial fishery is carried out centering around Maputo and Beira. In the Bay of Maputo approximately 20% of the catches are shrimps, which are not for export but for domestic consumption.

Table 11 Privately Owned Vessels for Semi Industrial Fishery
(as of 1986)

Name of Province	Number of Vessels
Maputo	26
Sofara	34
Zambezia	3
Nampla	5
Total	68

Source : Estudo do Sector Pesqueiro em Mozambique

③ Artisanal Fishery

It is reported that 40,000 to 45,000 petty fishermen have been engaged in the artisanal fishery off the shore of Mozambique and estimated 20,000 tons of their catches are consumed as their food.

Their fishing method is mainly long-lining with seasonal combination of netting, hand-lining and long-lining. The fishery productivity of the artisanal fishery is quite limited and annual catch of a fisherman is more or less 500 kg.

As the catch is not enough to support the household and it is required to have a source of earnings other than fisheries, many of them are engaged in side line jobs such as agriculture and livestock

farming.

For the type and number of boats used in the artisanal fishery, according to the Canada International Development Agency's (CIDA) survey conducted in 1985, there are 15,750 canoes and 3,592 small sized fishing boats (68 boats out of 3,660 are used in the semi industrial fishery) as shown in Table 10. Although most of them are wind-sailing boats, they have been gradually replaced by outboard motorboats.

(4) Fisheries Combinat

Fisheries combinat (CPPE) is an organization which aims at developing and promoting fishermen's cooperatives and petty fishermen of local community. It is under the administration of the Small Scale Fishery Bureau (UDPPE) of the Secretariat of State for Fisheries. There are now (as of November, 1988) 11 combinats including SULPESCA based at Maputo organized as a model of such combinats which was established by reorganization and unification of existed fisheries production organizations involved in the following activities.

- ① Supply of fishing gears, equipment and materials for fishing, fuel, repairing tools and others.
- ② Booking, processing and distribution of catches.
- ③ Fisheries promotion activities including training and guidance of fishing skills.
- ④ Repair of fishing boats and gear.
- ⑤ Fisheries development by organizing fishermen.
- ⑥ Fisheries production activities by fishing boats directly controlled by combinat.

As of 1988, as shown in Table 13, 17,500 fishermen are affiliates of combinats. They marked a sales of 144,402 thousand Maticais from sales of equipment and materials and fishing production of 3,524 tons.

Table 12. Fisheries Combinats (as of 1988)

Fisheries Combinats	Provincial Location	Base Station	Year of Establishment
Sulpesca (Fisheries Cooperative)	Maputo	Maputo	1979
Sulpesca CPPE (Fisheries Combinat)	Maputo	Inhaca	1981
Metangula	Niassa	Metangula	1981
Ibo	Cabo Delgado	Ibo	1981
Moma	Nampula	Moma	1982
Beira	Sofala	Beira	1982
Nova	Tete	Nova	1983
Chicoa		Chicoa	
Ilha da Mozambique	Nampula	Ilha da Mozambique	1983
Sopinho	Zambezia	Sopinho	1984
Pemba	Cabo Delgado	Pemba	1984
Inhambane	Inhambane	Inhambane	1987

Source: Secretariat of State for Fisheries

Table 13 Transition of Fisheries Combinats (1980-1987)

Year	Number of CPPE	Number of Affiliated Fishermen	Sales of Fishing Equipment and Materials 1,000 Maticais	Plant Capacity				Number of Fishing boats	Catch (tons)
				Cold Store		Ice-Making Factory	Fishing boats		
				Qty.	m ³				
1980	1							21	757
81	4							40	1,345
82	6	1,000	66,500	20	550	1	5	93	1,964
83	6	1,500	52,000	24	885	2	8	103	2,738
84	9	3,500	29,500	26	950	2	8	92	2,646
85	10	5,500	64,800	24	1,024	2	8	94	2,575
86	10	7,000	103,561	13	612	2	5	91	3,403
87	11	17,500	144,402	14	621	3	5.5	54	3,524

Source: Secretariat of State for Fisheries 1988

Note: CPPE Small Scale Fisheries Combinat

2-2-3 Fishing Production

The fisheries of Mozambique is roughly divided into the industrial fishery, the licensed fishery and the small scale fishery which is further classified into the semi industrial fishery and the artisanal fishery.

The fishing production of the country in 1987 was 21,341 tons from the industrial fishery, 5,588 tons from the licensed fishery and 23,524 tons (including estimates) from the small scale fishery, totaling 50,453 tons.

Table 14 Fishing Production

(Unit : ton)

	1983	1984	1985	1986	1987
Industrial Fishery	15,957	14,909	15,082	21,842	21,341
Small scale Fishery					
Combinats	2,738	2,646	2,575	3,403	3,524
Others *1	20,000	20,000	20,000	20,000	20,000
Sub Total	22,738	22,646	22,575	23,403	23,524
Licensed Fishery	4,666	3,857	5,298	5,535	5,588
Grand Total	43,361	41,412	42,955	50,780	50,453

Source : Secretariat of State for Fisheries of Mozambique

Note : (*1) Estimated figure of non-organized fishermen's production (including estimated inland water production of 5,000 tons)

2-2-4 International Trade

Shrimps are exported annually approximately 5,000 tons. They are staple products for export which makes US\$38.3 million or 48.4% of foreign currency revenue (1986) of the country. (Table 15)

Shrimps for export are produced by the industrial fishery. This fishing production makes surplus of 848.9 million Meticaís (19.7 million US\$) in foreign currencies together with the charges for fishing paid by licensed fisheries in 1985. (Table 16)

Most marine products of the country except shrimps are supplied for domestic consumption but not enough meets the demand so the country has to import to meet the shortage of 10,000 tons per year. (Table 17)

As above described, the fisheries are considered to share an extremely important part in the international trade of the country.

Table 15 Exports by Major Products (as of 1986)

Products	Quantity (thousand tons)	Amount		Ratio (%)
		(million Meticais)	(million US\$)	
Shrimps	5.4	15,491	38.3	48.4
Cashew Nuts	3.1	6,757	16.7	21.1
Sugar	19.5	3,263	8.1	10.2
Petroleum Products	16.0	1,617	4.0	5.1
Tantalum Ore	0.02	891	2.2	2.8
Copra	11.7	845	2.1	2.7
Others	-	3,119	7.7	9.7
Total	-	31,983	79.1	100.0

Source : GPIE

Table 16 Industrial Fishery's Balance of Foreign Currency
(as of 1985)

(A) Import (million meticaais)		(B) Export (million Meticaais)	
Fishing	203.5	Shrimps	1,484.9
Equipment & Materials		License Fee	247.8
Technical Assistance	422.3		
Fuel	258.0		
Total	883.8	Total	1,732.7
(A) - (B) = 848.8 million Meticaais \approx US\$19.7 million			

Source: Estudo do sector pesqueiro em Mozambique

Table 17 Amount of Marine Product Trade
 (Unit: tons for quantity, thousand US dollars for amount)

		1982	1983	1984	1985
Export	Quantity	5,900	4,800	4,400	5,400
	Amount	38,495	31,187	28,264	33,387
Import	Quantity	15,221	16,698	11,900	9,032
	Amount	5,950	9,315	7,810	6,620

Source : Food and Agriculture Organization (FAO), Year Book 1985

2-2-5 Fisheries Related Service Corporation

(1) Marine Products Distribution Corporation (PESCOM)

The PESCOM under the Ministry of Commerce and Trade is in charge of marketing of marine products in Mozambique. It collects the catches of the industrial fisheries companies and the small scale fisheries combinats and sells them at the shops under its direct management or local public markets for domestic consumption.

In addition to purchase from local fishing boats, the PESCOM is dealing with imported fish.

Shrimps are dealt with by the PESCOM INTERNATIONAL and exported to Portugal, Spain, France and other West European countries. The EFRIPEL and the PESCAMAR have their own marketing routes bypassing the PESCOM INTERNATIONAL, through which they export shrimps.

(2) Equipment and Materials Supply Corporation (EQUIPESCA)

This corporation was incorporated in 1981 for the acquisition of equipment and materials for fisheries and their supply to fishing boats and fishermen to promote the fisheries. The fishing net manufacturing corporation (CIMA) and the information processing

corporation (ETIC) are also acting under this corporation.

The EQUIPESCA has a share of foreign currencies for importing equipment and materials for fisheries and is engaged in the business of equipment and materials import/export. It has its main office at Maputo and three branch offices at Maputo, Beira and Nacala. It supplies equipment and materials to fishing stations responding to the request of the Secretariat of State for Fisheries.

The Project vessel will be operated by this corporation. However, as the EQUIPESCA has no experience in the operation of the transport vessel, twenty-three experienced persons will be assigned for the implementation of the Project, three for ground services and twenty for sea service.

(3) Service Corporation (EMPRESAS DE SERVICOS)

This corporation was founded in 1988 for being engaged in maintenance and repair of the fisheries related equipment and facilities such as fishing vessel. There are shipbuilders (EMANA, ENAMA, ENABE, NAVIPESCA) and machine maintenance and repair corporations (TECNIPESCA, TECNABE) under this corporation.

2-2-6 Fisheries Education System

(1) Fisheries School

There is a fisheries school in the suburbs of Maputo City as an education institute of fisheries in Mozambique.

The school was opened in 1978 utilizing the facilities of a biological institute which used to be there before the independence. It has been training vessel crews and fishing gear manufacturers through its fishing department, engineering department and special department.

Table 18 shows the number of graduates of each course after the establishment of the school.

Table 18 Annual Graduates of Fisheries School

(Number of graduates)

Classification	Until 1982	'83	'84	'85	'86	'87	'88	Total
D Class								
Fishing Course	83	19	16	9	-	16	16	159
Engineering Course	85	25	17	8	-	18	16	169
C Class								
Fishing Vessel Navigator	-	-	-	7	4	-	-	11
Fishing Vessel Engineer	-	-	-	6	3	-	-	9
Special Department								
Craft Navigator	-	25	9	-	-	-	-	34
Net Maker	-	-	5	-	-	-	-	5
Total	168	69	47	30	7	34	32	387

Source : Fisheries School (1988)

People who finished the 6-year primary education are qualified to enter the above country. Those who finished the 2-year D Class course go to 1-year C Class course after practice on board of the country's fisheries companies. Many of graduates of the school are employed by domestic companies to be engaged in the fisheries.

2-2-7 Fisheries Administration and Organization

The fisheries administration of Mozambique is taken care of by the Secretariat of State for Fisheries, the level of which is

equivalent to other ministries. Figure 2 shows the organization of the Secretariat after 1989. The Secretariat has been undertaking administrative reforms on the basis of the National Economy Rehabilitation Plan.

The Secretariat of State for Fisheries is composed of the Secretariat, Department of General Affairs, Department of Administration and Finance, Bureau of Economy, Bureau of Human Resources, Bureau of External Relations, Bureau of Techniques, Bureau of Fisheries of Maputo, and Bureau of Fisheries of Sofala. Bureau of Fisheries of Quelimane and Bureau of Fisheries of Nacala will be opened in 1989.

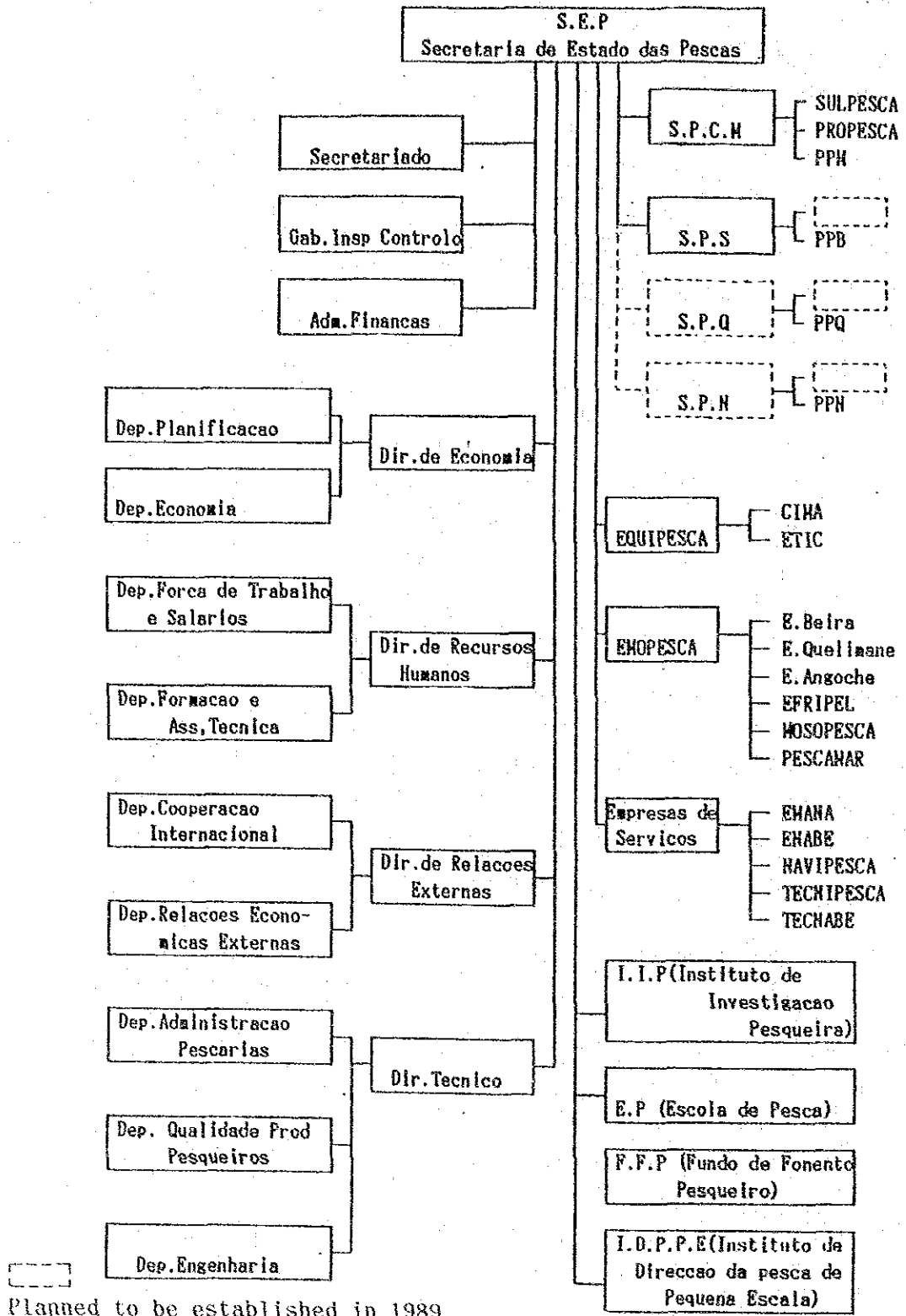
Moreover, the Secretariat of State for Fisheries directs an institute (IIP), a fisheries school (EP), a fisheries fund (FFP) and an association of small scale fishery (IDPPE) which controls small scale fisheries combinats.

The Secretariat also directly controls three corporations, EQUIPESCA, EMOPESCA and ES. These three corporations further controls the following corporations as shown in Fig. 2 the organization chart of the Secretariat of State for Fisheries.

- (1) The EQUIPESCA controls a net manufacturing corporation (CIMA) and an information processing corporation (ETIC).
- (2) The EMOPESCA puts its three corporations established at each station, the EFRIPPEL, the MOSOPESCA and the PESCAMAR under its control.
- (3) The ES is a controlling organization of the six enterprises: EMANA, ENAMA, ENABE, NAVIPESCA, TECNIPESCA and TECNABE.

For the distribution of marine products, the PESCOM and PESCOM INTERNATIONAL are organized under the Ministry of Commerce and Trade.

Figure 2 Organization Chart of the Secretariat of State for Fisheries
(December 1988)



2-3 Fisheries Development Plan

(1) Background of the Fisheries Development Plan

The sixth FRELIMO (Front for Liberation of Mozambique) central committee meeting held in 1980 specified the period from 1981 to 1990 as "10 years to overcome underdevelopment" and adopted "10-year plan for national economic development" and carried into effect with grand objectives placed at "self-sufficiency of food", "promotion of export industries" and "development of energy sources".

However, oil crises, droughts, floods and other inconveniences happened after 1981 resulted in extremely inactive economy and forced the program to be modified. With assistance of international organizations including World Bank and IMF, the National Economy Rehabilitation Plan has been established and put in effect in 1987 on the principles of open economy and administrative simplification.

The National Economy Rehabilitation Plan positions the Fisheries as an important industry which is a source for acquiring foreign currencies and for supplying food to the people. The plan describes its basic policies as follows:

Basic policies

- ① Give priority in investment to small scale fishery, shrimp fishing for exports and developing new fisheries resources.
- ② Establish fisheries centers on each major fishing station to promote small scale fishery.
- ③ Maintain the export amount of catches from the industrial fishery for stable increase of foreign currencies acquisition and reduction of imported foods by enlarging fisheries production.

(2) Contents of the Fisheries Development Plan

In the following introduced is the outline of the Fisheries Development Plan which has been determined and enacted on the basis of National Economy Rehabilitation Plan.

① Basic Policies

The basic policies of the plan is to increase supply of marine products to the people, improve life level of fishermen and raise productivity of fisheries corporate and expand exports through development and promotion of the fisheries.

② Strategy

The following concrete strategies are established for the implementation of the plan.

A. Industrial Fishery

- i. Increase in production of processed marine products (such as canned food and dried food) for the people especially living in interior areas.
- ii. Promotion of foreign joint venture fisheries.
- iii. Conversion of licensed fishery to local fishery (including foreign joint ventures).

B. Small Scale Fishery

- i. Improvement of living standards of fishermen and increase in productivity by expanding and consolidation of fisheries combinats.
- ii. Commercialization of catches of small scale fishery by processing then at factories of fisheries combinats.
- iii. Improvement of the fishing vessel shipyards at Maputo and Beira, and establishment of shipyards of small

scale fishery boats in the central area along the coastline.

C. Fisheries Related Infrastructure and Services

- i. Domestic production of fishing gear.
- ii. Improvement of dock facilities for repairing industrial fishing vessels.
- iii. Expansion and consolidation of technical service networks for the maintenance of fishing equipment and gear. (Establishment of specialized corporation).
- iv. Additional installation of marine products processing factories and improvement in quality control of their products.

(3) Implementation Plan

The following production and export plan is determined.

① Production Plan

Table 19 Production Plan

(Unit: ton)

Item	1988		1989	1990
	Plan	Result	Plan	Plan
Shrimps	6,000	4,714	6,700	7,000
Industrial Fishery		4,660	6,630	
Small Scale Fishery		54	70	
Fish	17,000	12,842	19,000	20,000
Industrial Fishery		11,287	15,750	
Small Scale Fishery		1,555	3,250	
Lobsters	190	109	200	200
Industrial Fishery		109	200	
Small Scale Fishery				
Total	23,190	17,665	25,900	27,200
Industrial Fishery		16,056	22,580	
Small Scale Fishery		1,609	3,320	

- Notes: 1. Besides the above-mentioned, production of sardines and others is planned after 1990.
2. Production of small scale fishery is the volume dealt with by combinats alone.
3. Target production of 1990 is equivalent to 154.0% of result of 1988.

② Export Plan

Table 20 Export Plan

Species	1988		1989		1990	
	Volume	Amount	Volume	Amount	Volume	Amount
	(ton)	(US\$ thousand)	(ton)	(US\$ thousand)	(ton)	(US\$ thousand)
Shrimps	4,900	44,568	5,640	49,871	5,950	53,564
Lobsters	180	5,525	200	744	170	2,210
Fish	10	9	-	-	-	-
Others	78	501	120	2,600	170	1,054
Total	5,168	47,603	5,960	53,215	6,290	56,828

- Notes: 1. Planned export amount of 1990 is equivalent to 119.4% of result of 1988.
2. Planned export volume of 1990 is equivalent to 121.7% of result of 1988.

(4) Budgetary Measure

The following budgetary measure will be taken for implementing the above-mentioned plan and the rehabilitation of fishing vessels.

Table 21 Budget

(Unit:US\$ million)

	1987	1988	1989	1990
Raw material	1.7	2.3	1.5	1.7
Spare parts	3.0	3.5	3.0	2.5
Investment	12.9	12.4	9.5	2.7
Total	17.6	18.2	15.0	7.9

In addition to the above-mentioned, US\$ 25 million is provided for acquiring materials for small scale fishermen.

2-4 History and Contents of the Request

(1) History of the Request

The fisheries of Mozambique has an extremely important role for supplying foods to the people and acquiring foreign currencies by exploiting its large exclusive economic zone extending up to approx. 900,000 km² including a continental shelf of approx. 70,000 km². Especially, the export of shrimps and prawns caught by the industrial fishery shares about 50% of the country's foreign currencies acquisition and is considered as one of basic industries which support its national economy.

The catch of the country is approx. 50,000 tons a year (1987). According to the survey conducted in 1986 by the Nordic Support gives estimation of 220,000 to 310,000 of MSY in the country's waters. However, due to its non-exploited resources, the domestic production does not satisfy the home demand, and the country needs to import about 10,000 tons of fishing product a year.

Mozambique is now implementing the National Economic Rehabilitation Plan (1988 to 1991) of which the basic policies of the fisheries development plan are aiming at "Increase of fishing product supply to people", "Grade up of fishermen's life level" and "Enlargement of export".

Since the country has historically been developing as the port for shipping of trade goods from southern African inland countries and landing of goods for such countries, the east-west land transport network to link the country's coastal area and inland countries such as roads and railways is well developed but the north-south one is behind in development. This condition is a large obstacle for the transport and distribution of fishing products which in the same time makes a barrier for the fisheries.

On the other hand, although the country has a refrigerated transport vessel for fishing products, RIGEL 2, operated by a joint

enterprise (EFRIPPEL), as it is a small vessel and cannot respond to the transport demand and has more than 20 years of use, it suffers from a severe deterioration and is not good for satisfactory use. It is the time to scrap it.

Under such circumstance, the Government of Mozambique considers that the resolving the above-mentioned problem is an important task in order to achieve the targets of the fisheries development plan and to activate the fisheries. On this consideration, the Government of Mozambique made a project for building of a coastal transport vessel for fishing products, and then requested to the Government of Japan for the Grant Aid.

(2) Contents of the Request

The contents of the Request from Mozambique in relation with the coastal transport vessel for fishing products and related equipment and materials are as follows:

① Coastal Transport Vessel for Fishing Products

Principal Dimensions

Length overall	55 m
Lpp	50 m
Breadth	9.8 m
Draft	3.9 m
Fish and cargo hold	600 m ³
Fuel oil tank	65 m ³
Fresh water tank	35 m ³
Main engine power	1,000 HP
Cruising speed	12.5 knots
Complement	10
DW (Dead Weight)	800 tons

Major installations

Main engine	1
Auxiliary engine	2
Generator	2
Compressor	2
Mooring equipment	1
Navigational instruments	1 set
Telecommunication equipment	1 set
Life saving equipment	1 set
Fire extinguishing equipment	1 set
Steering equipment	1 set
Loading/unloading equipment 20 tons x 15 m	1 set

② Onshore Supporting Equipment

A. Refrigerated truck	4 tons	2
B. Fork lift	2 tons	2
C. Truck crane	25 tons	1
D. Tank lorry		1
E. Uncovered truck	4 tons	2

③ Spare Parts

Major spare parts of main and auxiliary engines, refrigerators, pumps, machines on deck, navigational instruments necessary for ordinary navigation for 2 years. (Including docking materials such as paints and protective zincs)

2-5 Actual State of Existing Transport Vessel

The existing transport vessel in service is actually operated by a joint enterprise (EFRIPEL). However, as it passed 20 years of use, the vessel is deteriorated and requiring much time for maintenance of hull and engine which results in low operation rate. Because of lowered refrigerating capacity the refrigeratable volume of cold hold is diminished to almost a half, and then it is not operated as a transport vessel for fishing products.

(1) **Principal Particulars:**

Name of Vessel:	RIGEL 2
Kind of Vessel:	Bottom trawler
Type of Vessel:	Forecastle
Date of Construction:	May 13th, 1968
Shipbuilder:	Yamanishi Shipyard
Length overall:	48.00 m
Breadth:	8.40 m
Draft:	5.20 m
Refrigerated fish hold:	377 m ³
Dry cargo hold:	approx. 300 m ³ (Factory on deck)
Fuel oil tank:	250 m ³
Fresh water tank:	50 m ³
Main engine:	1,250 PS
Cruising speed	8.5 knots
Auxiliary engine:	200 PS x 2
Refrigerator:	Micon x 2

(2) Actual State and Problems

The actual state and problems of the existing transport vessel are as follows:

Main engine: It requires much overhaul cost, and parts acquisition is difficult.

Auxiliary engine: It is severely deteriorated by aging, and because of parts no more manufactured only temporary repair is possible.

Refrigerator: Because refrigerating coil is extremely corroded, repair work is almost impossible. There is danger of coolant leakage. Refrigeration volume is now down to one third of initial capacity.

Hull: It is also severely corroded so that outside plate under water level can not withstand water pressure.

Navigational instruments: Because of difficult acquisition of parts for repair and no engineer, many of instruments such as radar, fish-finder, etc. are left unrepaired.

Fuel oil tank: Although its capacity is 250 m³, its usable capacity is a half of it due to leakage or others.

Draft: As its draft is deep as 5.2 m, the vessel cannot entry in many of small fishing ports.

Cruising speed: Because of aging, its cruising speed is slow as 8.5 knots.

Transport results: In the past two years (1987-1988) satisfied only 28% of the demand for fishing products and 18.3% for equipment and material for finishing.

As mentioned above, the existing transport vessel has passed more than 20 years from its building and it suffers from a severe deterioration. It cannot be operated as a refrigerated transport vessel. Now it hinders the transport of the catch to consumers' areas and exporting ports and of the equipment and materials for fisheries to fishing ports. As it is operable only irregularly nor capable of responding to the transport demand. It causes an obstacle against the

fishing production activities of the country.

Therefore, it is the time to scrap the existing transport vessel for fishing products.

CHAPTER 3 CONTENTS OF THE PROJECT

CHAPTER 3 CONTENTS OF THE PROJECT

3-1 Necessity of Implementation of Project

Undeveloped inland transport route in Mozambique obliges the country to depend on the sea transport to supply fishing equipment and materials to the ports located at various areas along the coastline, and transport fishing products from those ports to consumers' areas. Although the existing transport vessel built in May 1968 in Japan (RIGEL 2) is operated by the EFRIPEL (Japan-Mozambique joint venture), it has been for more than 20 years in use resulting in low performance due to deterioration and requires much time for maintenance and repair. It cannot be operated in full scale as a transport vessel. Its capacity satisfies only about 20% of the transport demands.

The non-regular operation of the existing transport vessel forces the industrial fishery to use their own shrimp trawlers as transport vessels. Insufficient supply of fishing equipment and materials causes the small scale fishery to stop operation. Those loss of operation hinders the promotion the fisheries.

Therefore, in order to consolidate the sea transport capacity, transport smoothly the catch to consumers' areas and supply equipment and materials to fishery ports, it is considered necessary to provide a new coastal transport vessel for fishing products by implementing the Project. It is to develop and promote the fisheries.

3-2 Objectives of the Project

The Project is based on the basic policies of the fisheries section in the National Economy Rehabilitation Plan; "Increase of fishing product supply to people", "Grade up of fishermen's life level", and "Improvement of productivity of fisheries corporations and expansion of export". The objectives of the Project are to transport the fishing equipment and materials to the fisheries companies located at the 11 fishing ports (prescribed in 3-4-1 Conditions of Ports of Call) and fishermen along the coastline of Mozambique and to transport the fishing products to the consumers' areas and the exporting ports with the Project vessel. Then by such measures, it is to develop and promote the domestic fisheries, improve the life level of coastal fishermen, raise food self-subsistence rate by increasing the domestic supply of fishing products, and enlarge acquisition of foreign currencies by expanding export.

3-3 Study on the Contents of the Request

Necessity of Coastal Transport Vessel for Fishing Products and Onshore Supporting Equipment

① It is Necessary to Consolidate the Sea Transport Capacity.

Undeveloped inland transport route obliges the country to depend on the sea transport to supply fishing equipment and materials to all fishing ports located at various areas along the coastline, and transport fishing products from those ports to consumers' areas. Only non-regularly operated transport vessels for living goods or the deteriorated existing transport vessel are available as the actual means of sea transport for fishing products or fishing equipments and materials. Otherwise, in case of absolute necessary, shrimp trawlers in operation are used for transport. A specialized transport vessel is needed as early as possible.

② Necessity to Renew Deteriorated Existing Transport Vessel

Although the existing transport vessel is operated by the EFRIPPEL, it has been for more than 20 years in use resulting in low performance and operation rate due to deterioration and requires much time for maintenance and repair. Its operation rate lowers year by year and it satisfies only 28% of the cargo demand (fishing products). Therefore, it cannot be operated in full scale as a transport vessel. It is the time to scrap it and replace it with a new one.

③ Necessity to Promote and Develop the Fisheries

The non-regular operation of the existing transport vessel forces the industrial fishery to use their own shrimp trawlers as transport vessels. Insufficient supply of fishing equipment and materials causes the small scale fishery to stop operation. These facts result in loss of revenue in foreign currencies, insufficient supply of protein to the people. It means an enormous damage to the national economy. It is considered necessary to introduce earlier a

specialized transport vessel for fishing products to resolve such problems and promote the fisheries.

④ It is Necessary to Operate Smoothly the Transport Vessel.

In order to activate the fisheries activities in northern fishing ports where only insufficient onshore facilities are available, onshore supporting equipment for fishing products and equipment and materials for the fisheries have to be provided for raising transport efficiency.