

REPORT ON BASIC DESIGN
FOR THE FISHERIES DEVELOPMENT PROJECT
IN THE REPUBLIC OF GAMBIA

March 1981

JAPAN INTERNATIONAL COOPERATION AGENCY

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PREFACE

It is with great pleasure that I present this Report on BASIC DESIGN SURVEY FOR THE FISHERIES DEVELOPMENT PROJECT to the Government of the Republic of Gambia.

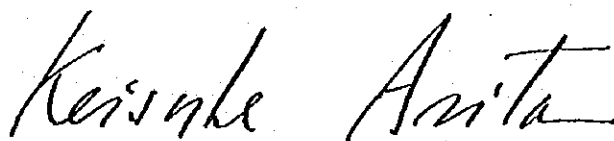
This report embodies the result of a basic design survey which was carried out in Gambia from January 6 to 12, 1981 by a Japanese survey team commissioned by the Japan International Cooperation Agency following the request of the Government of the Republic of Gambia to the Government of Japan.

The survey team, headed by Mr. Aritsune Furukawa, had a series of discussions with the officials concerned of the Government of Gambia and conducted a wide scope of field survey and data analysis.

I sincerely hope that this report will be useful as a basic reference for development of the project.

I wish to express my deep appreciation to the officials concerned of the Government of Gambia for their close cooperation extended to the Japanese team.

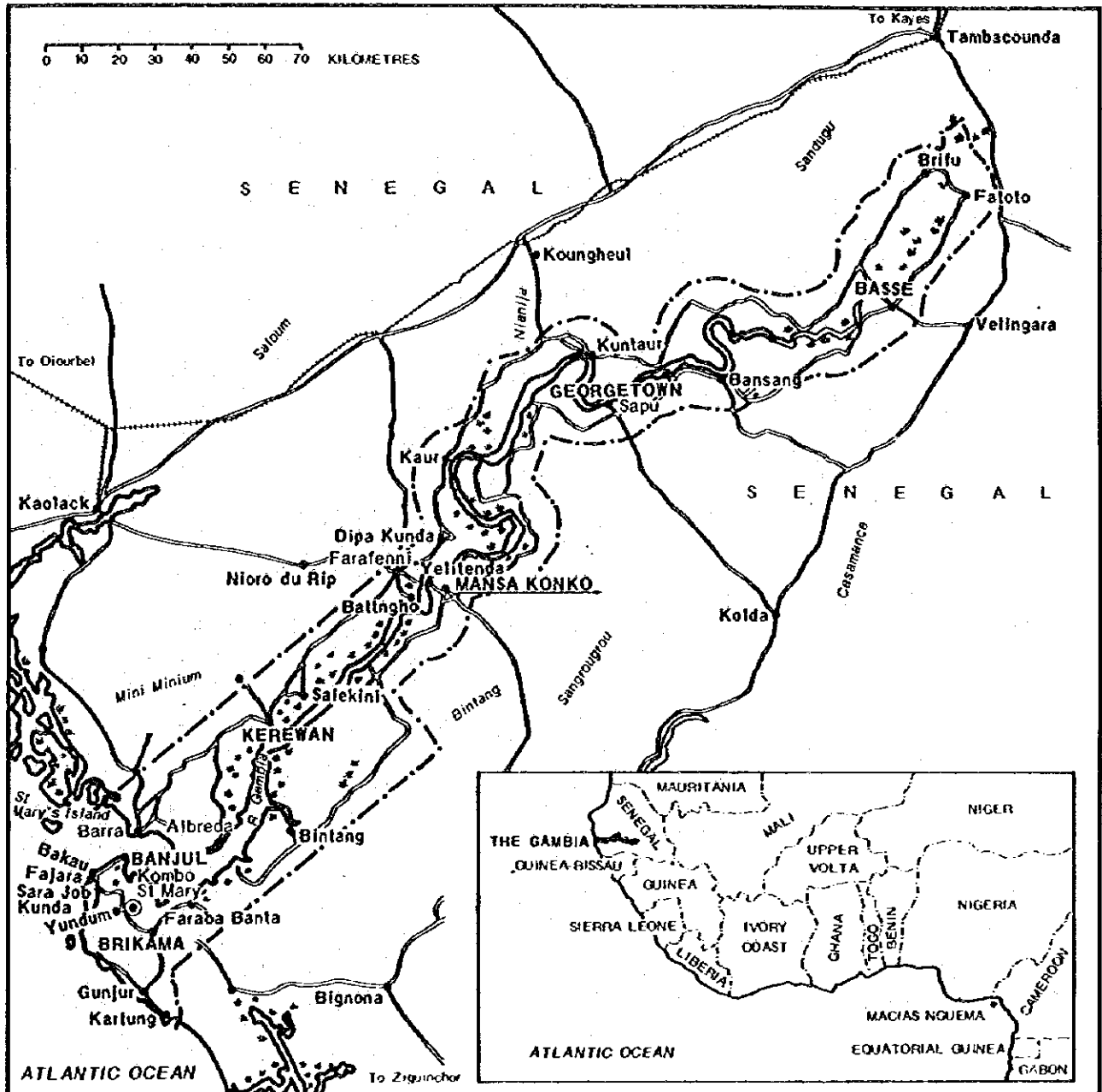
March, 1981



Keisuke Arita
President

Japan International Cooperation
Agency

THE REPUBLIC OF THE GAMBIA



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Summary

As part of its National Economic Plan, the Government of the Republic of Gambia wishes to promote the development of river and coastal fisheries. The intent of the plan is to increase employment and to improve the diet of the Gambian people by increasing the supply of fresh fish.

The Government of the Republic has requested the Government of Japan to extend aid in the form of a grant to be used for the construction of ice making facilities and the purchase of modern small powered fishing boats, fishing nets, fishing tools and outboard engines for existing canoes.

The Government of Japan decided to consider the request and sent a survey team to the Republic from the Japanese International Cooperation Agency.

A field survey was conducted in Banjul, Mansa Konko and other locations between January 1 and 12, 1981. After consulting with the Government of the Republic, the team evaluated the Gambian request and developed a basic design for the plan. This is an outline of the team's plan.

1. Construction of Ice Making Facilities

The Gambian Government's first priority is the construction of ice making facilities at three inland locations. The ability to provide cold storage for the catch would mean a greater supply of fish and improvement in the diet of the people. The survey team concluded the best location

for the ice making facilities would be Mansa Konko, a main traffic link near the center of the Gambia River.

2. Outboard Engines and Repairing Tools for Outboard Engines

The Government of the Republic has asked the Government of Japan to provide small outboard engines and repairing tools for outboard engines as part of its plan to mechanize the existing canoes. The survey team confirmed the necessity of the request in consideration of its possible increase of productivity. The Gambian Department of Fisheries plans to construct a state-run repair shop to maintain the outboard engines.

3. FRP Training Vessels for Coastal Fisheries

Most of the fishermen operating off the coast of Gambia are actually Senegalese or Ghanians. The Government of Gambia is eager to get more Gambian fishermen into its coastal waters by providing increased training in such areas as purse seine and bottom gill net fishing. To help achieve this aim the Government of Gambia asked the Japanese Government to provide multi-purpose training vessels. After careful study of the fishing conditions and types of vessels used, it has been decided that two and five ton powered fishing vessels would best serve the purpose.

4. Fishing Nets and Fishing Gear

The unavailability of various fishing materials in Gambia was identified by the field survey. The team felt that the request of the Gambian Government to develop

coastal fisheries was a valid and necessary request.

The specifications of the plan have been made out in such a manner as to properly fit the need to improve the level of local fishing technology.

Chapter 1. Survey Outline

1-1. Survey Objectives

The Government of Gambia, pursuant to the National Economic Development Plan, which comprises the promotion of coastal fisheries, has asked the Government of Japan to extend aid in the form of a grant for the construction of ice making facilities and provide small modern fishing vessels, fishing nets, outboard engines and repairing tools for outboard engines.

The Government of Japan responded to the request by deciding to examine the feasibility of such a project. As one item of cooperation a survey team was sent to Gambia, through the Japan International Cooperation Agency. The team evaluated the request made by the Government of Gambia and developed a basic plan.

1-2. Composition of the Survey Team

Team Leader: Mr. Aritsune FURUKAWA, International Affairs
Division, Fishery Agency of Japan

Fishing Gear and Fishing Methods: Mr. Shin EGAMI
Deep-sea Fisheries Department
Hoko Fishing Co., Ltd.

Fishing Boats and Engines: Mr. Tadahiko KOGA
Fisheries Development Department
Hoko Fishing Co., Ltd.

Coordinator: Mr. Hideo KIMURA
Kanagawa International Fisheries Training Center
Japan International Cooperation Agency

1-3. Itinerary

Monday, Jan. 5

21:30 Lv. Tokyo (BA 006)

Tuesday, Jan. 6

05:15 Av. London

09:45 Lv. London (BR 357)

15:45 Ar. Banjul

Observation Tour of Banjul Fish Market

Wednesday, Jan. 7

A.M.

Visited the Acting Director of the Dept.
of Fisheries for discussions on machin-
eries and equipment.

P.M.

Observation Tour of Banjul Fishing and
related facilities, and market survey.
Visited the Fish Marketing Cooperation

Thursday, Jan. 8

A.M.

Visited the Department of Fisheries

P.M.

Further detailed consultations on
machineries and equipment.

Friday, Jan. 9

A.M.

Visited the Ministry of Agriculture and
Natural Resources. Signed minutes of
meetings.

P.M.

Surveyed fishing villages in Brufut region.

Saturday, Jan. 10 A.M.

Surveyed the proposed site of ice making facilities at Mansa Konko.

Mission Chief Furukawa and member Kimura departed for Dakar at 18:15 (GH 546).

They arrived at Dakar at 18:45. Specialists Egami and Koga continued survey in their respective areas of concern.

Sunday, Jan. 11

1. Furukawa and Kimura compiled their information at Dakar.
2. Egami and Koga surveyed fishing villages in Gunjul region (AM) and compiled information.

Monday, Jan. 12

1. Furukawa and Kimura reported to the Japanese Embassy at Dakar on results of survey.

2. Egami and Koga visited Department of Fisheries for detailed consultations on machineries and equipment (AM).

Egami and Koga visited Fish Marketing Cooperation, discussed local fishing conditions and compiled information (PM).

Lv. Banjor 19:20 (GH 540)

Av. Dakar 19:50

Entire Survey Team:

Lv. Dakar 23:59 (AF 306)

Tuesday, Jan. 13

Av. Paris 06:35

Internal consultation and preparation
of report.

Wednesday, Jan. 14

Lv. Paris 12:00 (AF 274)

Thursday, Jan. 15

Av. Tokyo 14:10

1-4 List of Concerned Government Officials of the Republic
of Gambia

Ministry of Agriculture and Natural Resources

- | | |
|---|------------------|
| 1. Minister | Mr. J.L.B. Dafeh |
| 2. Permanent Secretary | Mr. M.B. Jagne |
| 3. Acting Director of
Fisheries Department | Miss H. King |
| 4. Acting Senior
Officer | Mr. C.D. Joof |
| 5. Mechanical Officer | Mr. S. Manjang |

Ministry of Economic Planning and Industrial Development

- | | |
|-------------------------|----------------|
| 1. Permanent Secretary | Mr. J. Langley |
| 2. Director of Planning | Mr. A.B. N'jie |

Fish Marketing Cooperation

- | | |
|------------|--------------|
| 1. Manager | Mr. S. Fatty |
|------------|--------------|

THE REPUBLIC OF THE GAMBIA



MINUTES OF DISCUSSIONS

In response to the request made by the Government of the Republic of The Gambia for assistance in the development of artisinal fisheries (hereinafter referred to as "The Project"), the Government of Japan has sent, through the Japan International Cooperation Agency (JICA), a team headed by Mr. Aritsune FURUKAWA, Acting Director, International Affairs Division, Fisheries Agency, to conduct a basic design survey for 6 days from January 7 to 12 1981.

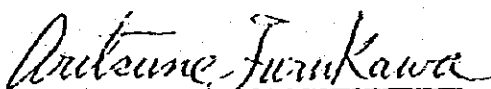
The team had a series of discussions and exchanged views with officials of the Fisheries Department, the Ministries of Agriculture and Natural Resources and Economic Planning and Industrial Development.

As a result of the study and discussions, both parties have reconfirmed the items of request for Japanese assistance with their order of priority made by the Government of the Republic of Gambia as listed in the Annex attached hereto.

Upon request for The Gambian side, the Japanese side agreed to convey the desire of the Government of the Republic of The Gambia that the Government of Japan will consider the possibility of extending its grant assistance for the implementation of the Project.

BANJUL , THE GAMBIA

January 9, 1981.



MR. Aritsune FURUKAWA



MR. Aliou M.B. JAGNE

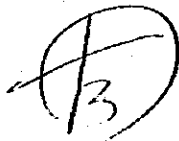
ANNEX:

Items of the Request in the order of priority

1. Ice Plants
2. Tools Kit
3. Fishing Vessels
4. Outboard Engines
5. Nets

We Agreed to take into consideration, the above mentioned Ice making plant under the following condition. The Government of the Republic of Gambia will take necessary measures to ensure:

- (i) preparation of an appropriate site for establishing the Ice Making Plant and provision of necessary, and adequate supplies of Electricity and clean Water, and
- (ii) Prompt internal transportation of the materials of the Ice Making Plant to the site when necessary, and
- (iii) Construction of foundation works required including the extension of electricity and water supplies so that prompt and smooth assembling of the Ice Making Plant is undertaken,
- (iv) Preparation of qualified personnel (Engineer) stationed at the plant who is responsible for operation and maintenance of the plant.



Chapter 2. Outline of the Request and Evaluation

2-1. Background of the Request

The economy of the Republic of Gambia almost solely depends on agricultural products, particularly the production and export of peanuts. Fisheries and tourism constitute the most important areas requiring urgent development for the economic growth of the country. According to the "Distribution of Efforts and Structural Aspects of the Artisanal Fishery in Gambia", Gambians are heavily involved in fishing only in lower parts of the river, while fishing in the Atlantic coasts and upper rivers of Gambia is operated largely by people from Senegal and Ghana.

Thus, economic development and expansion of employment require the training of Gambian fishermen and the promotion of coastal fisheries.

Gambia's geographical features have handicapped the development of inland traffic, preventing a smooth supply of fishery products to inland locations. The relatively high per capita fish intake of 92 kg in urban areas, such as Banjul, sharply contrasts with the rural figure of merely 22 kg. But Bongas, occupying as much as 75 percent of the total catch, are only partially consumed domestically as fresh fish, and most of them are smoked in shabby factories located within coastal camps of fishermen and exported to neighboring countries, such as Senegal and Sierra Leone as well as to distant lands such as Ghana. Fresh bongas command relatively high price of

20 Bututs per kg, while bongas for smoked products sell for only 5 Bututs per kg. A greater consumption of fresh bongas and other edible fish thus would not only raise the income of fishermen but also contribute greatly to improved diet of the agricultural population. Fresh fish, presently sold only through cycle vendors (Banabanas), would be distributed far more widely if the catch could be kept fresh longer.

The Government of Gambia wishes to accomplish a double task: the development of coastal fisheries and the improvement of diet of the people by obtaining the assistance from the Government of Japan in establishing ice making facilities at various communities and centers, promoting the use of purse seine nets, bottom gill nets and introducing small but efficient fishing vessels.

2-2. Outline of the Request and Evaluation

The last grant aid made by Japan to Gambia involved the provision of small canoes to develop bag net fishing of shrimp in river waters. The new request from Gambia asks for the following items for the development of coastal fisheries:

- 1) two small vessels for coastal fisheries (of the 5-ton type);
- 2) fishing nets; 3) purse seine; 4) outboard engines; 5) repairing tools for outboard engines; and 6) ice making facilities at two locations. Specifics of these items and the evaluation of the survey team are as follows.

1) Construction of Ice Making Facilities

(1) Outline of the Project

The project involves the establishment of ice making facilities at Mansa Konko (a community center about 120 km upstream of the Gambia River from Banjul) and at George Town (180 km upstream of the same river) to encourage smooth distribution of fresh fish in the upstream region and thus effect a dietary improvement in agricultural regions. At the time of the confirmation of the request, Miss H. King, Acting Director of Fisheries Department, strongly requested adding another plant at a location farther upstream.

(2) Evaluation

At the outset, the installation of ice making facilities was not considered as a priority item because of doubts that some of the local requirements could be met satisfactorily. However, the Department of Fisheries emphasized its importance and preferred that it be given first priority. The survey team found that there were fewer problems with the transportation system, budgets and management in Gambia, and concluded that Mansa Konko, the center of traffic and commodity flow, was the best place for constructing ice making facilities because it was fully provided with electricity and water and less vulnerable to inundation from the river. The survey team was convinced that the installation of ice making facilities would contribute to the improvement of diets in the neighboring rural community.

2) Outboard Engines and Repairing Tools for Outboard Engines

(1) Outline of the Project

Gambian fishing vessels consist mainly of small canoes with no engines. The Government of the Republic wishes to increase the catch by mechanizing small canoes, prompting itself to ask for the supply of various types of outboard engines and repairing tools for outboard engines from the Japanese Government, as well as constructing repair shops on its own.

(2) Evaluation

The survey team has justified the Government plan to motorize small coastal canoes and establish repair shops for outboard engines as appropriate and instrumental to the possible increase of catch by coastal fishermen.

3) FRP Training Vessels for Coastal Fisheries

(1) Outline of the Project

Purse Seine operation for bongas and sardines in Gambia has been carried out by Sea Goul Company, wholly owned by Ghana. Encircling gill net operation has been employed by Senegalese fishermen with the use of large powered canoes. Gambians thus are lagging behind foreigners in these fishing activities. The Fisheries Department of Gambia, to correct the situation, is now effecting training of its fishermen through the use of canoes with outboard engines, and strongly requests the Government of Japan to provide two powered vessels of 5-ton type.

(2) Evaluation

As sardines and bongas, both caught in abundance, form large schools, purse seine to encircle the school is more efficient than gill net. It has thus been judged that the planned introduction of purse seine for large-volume catch of sardines and bongas would prove to be quite rational. Purse seine, large in size and requiring manual handling of the purse line at the end of the net, calls for a large labor force and lots of time. The training vessels thus should be equipped with seining winches.

With respect to the vessels to be used for training, the 5-ton type as suggested by the Government of Gambia is deemed reasonable.

The Government of Gambia also requests multi-purpose fishing vessels for stern trawling and gill net. However, it is quite taxing to equip such small vessels with both purse seining and trawling. It therefore seems appropriate to assign specific tasks to each of the two 5-ton vessels, i.e., one mainly for purse seine operations and the other mainly for trawling.

With respect to the type of small powered vessels for the development of coastal fisheries, the survey team recommended 2-ton type vessels, while the Fisheries Department of the Gambian Republic requested for FRP canoes as exhibited at the Dakar Fair in Senegal. After some discussion it was mutually agreed to experiment with two 2-ton

coastal fishing vessels in view of their proven reliability in Japan's offshore waters.

4) Net

(1) Outline of the Project

As mentioned before, the Government of Gambia intends to ensure the increase of catch by mechanizing fishing vessels and improving fishing gears and nets. However, lack of a strong fishermen's organization in Gambia, and difficulties in achieving capital accumulation on the part of fishermen themselves, coupled with the lack of production facilities for such continually demanded items as fishing gears and nets, has prompted the Gambian Government to ask for these goods as part of a grant aid.

(2) Evaluation

Among the items requested by the Gambian Government are purse seine, bottom gill net, small trawl net and bottom long line, to be used for the purpose of both commercial fishing and training. Gambian fishermen have learned a little of the operation and repair of these gears from Senegalese and Ghanian counterparts. They have been used in actual operation and can be repaired locally. It is the judgement of the survey team that the Government's request is appropriate. Execution of this project should greatly enhance the production of Gambia's coastal fisheries.

2-3. Gambian Government Plan for the Use of the Machineries and Equipment Provided

1) Ice making facilities, outboard engines and repairing tools for outboard engines will be directly managed and operated by the Fisheries Department, and the Department's engineers will give instructions in the maintenance of these facilities. The ice will be supplied mainly to cycling vendors (banabanas) and used to improve the diet of the Gambian people.

The introduction of outboard engines will help mechanize a greater portion of Gambian canoes. Better repair shops will improve the repair operation of outboard engines at various locations. This will result in the improved fishing production of the country.

2) The training vessels, fishing gear and nets will be managed and operated by the Fish Marketing Corporation. The 5-ton type vessels will be moored at the fishermen's pier in Banjul Harbor, and the 2-ton type vessels will be landed on the beach at fishing villages.

In addition to the training to be carried out on individual vessels, the training on organized fleet operation, albeit on a small scale, is also planned.

Chapter 3. Basic Design

Our primary consideration in formulating the basic design was to procure the machineries, equipment and materials meeting the specific requirements of the National Economic Development Plan and the Coastal Fisheries Promotion Plan. To that end, we have reviewed the present status and future outlook of production, distribution, and consumption of marine products in Gambia.

After evaluating the request made by the Government of Gambia we have formulated the basic design as described below:

3-1. Ice Making Facilities

Note: Subject to Japanese Industrial Standard (JIS)

1. Design conditions

A) Capacity for ice making (flake)	5 tons/day
B) Capacity for ice storage	5 tons
C) Temperature of fresh water	+ 30° C
D) Condensing temperature	+ 45° C
E) Evaporating temperature	- 20° C
F) Refrigerant	R-22
G) Electric source	AC 200V 50Hz 3ø

2. Specifications for flake ice machine

A flake ice machine complete with ice machine, compressor with motor, condenser, receiver, fresh water pump, control board installed on the common bed and ice storage.

3. Itemized description

A) Flake ice machine

(1) Compressor with motor	42 kw	1 set
(2) Fresh water pump	0.06 kw	1 set
(3) Control board		1 set

B) Steel structure and roofing

1 set

C) Ice storage

1 set

(Pre-fabricated vinyl chloride coating type)

Size: 2700 2700 2400 mm.

D) Automatic supply water tank

(1) Water tank	FRP 1500 1	1 set
(2) Pump	0.4 kw	1 set

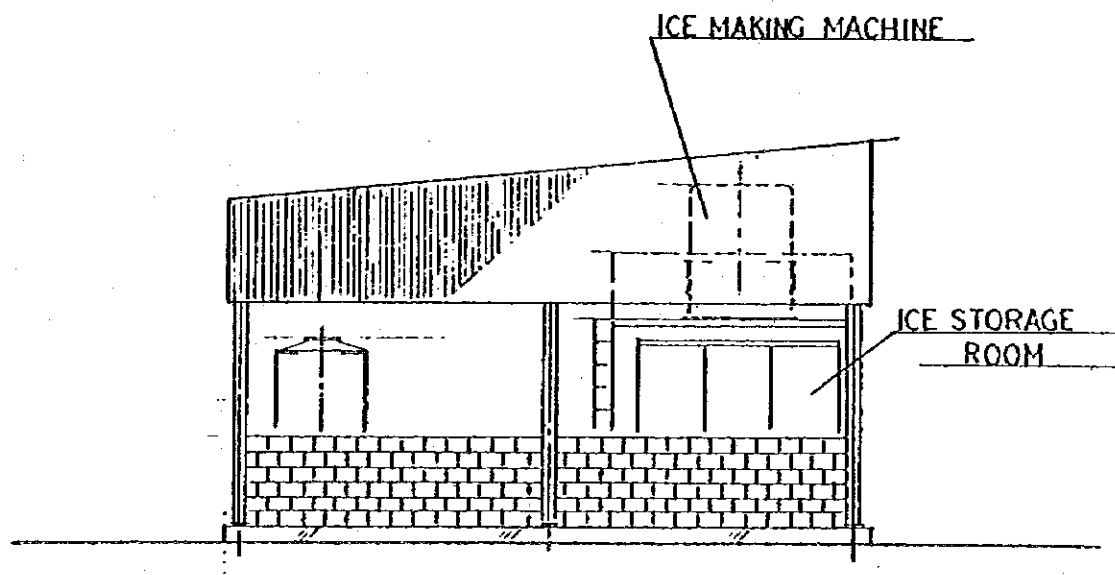
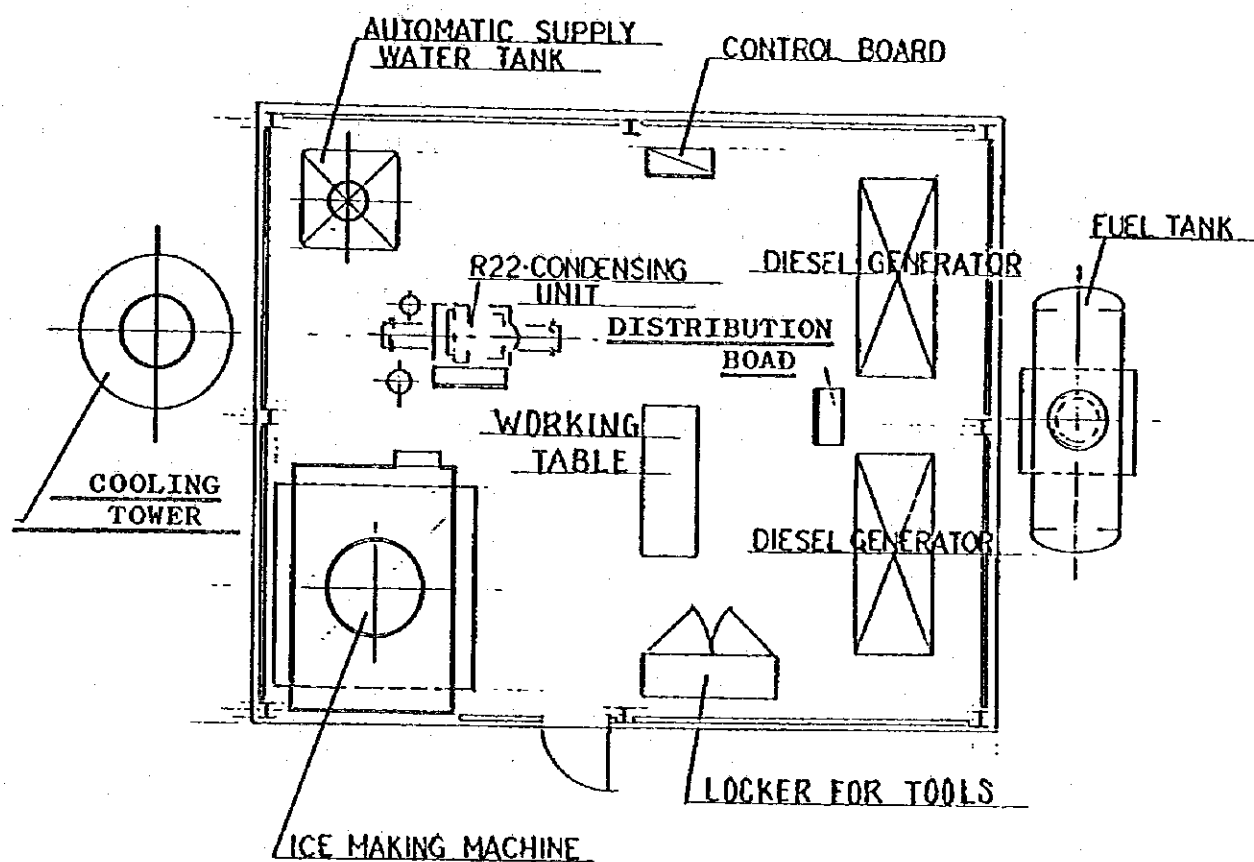
E) Cooling tower with fan (1.5 kw)

1 set

- | | | | |
|-----------------------|-----|--------|-------|
| F) Cooling water pump | | | |
| 600 l/min | 11m | 1.5 kw | 1 set |
- G) Electrical equipment
- | | | |
|-------------------------------|---------|--------|
| (1) Diesel generator | 100 KVA | 2 sets |
| (2) Distribution board | | 1 set |
| (3) Control board | | 1 set |
| (4) Electric wiring materials | | 1 set |
| (5) Lighting equipment | | 1 set |
- H) Accessories
- | | |
|--------------------------|-------|
| (1) Working table | 1 set |
| (2) Locker for tools | 1 set |
| (3) Tools for assembling | 1 set |
4. Spare parts and special spare parts
- | | |
|--|-------|
| A) Maker's standard spare parts | 1 set |
| B) Special spare parts for 2 years
(as indicated by the maker's list) | 1 set |
5. Area for setting up ice making equipment
- about Sq. m
6. To be provided by Gambia
- | |
|--|
| A) Foundation materials and construction |
| B) Wall |
| C) Primary water piping materials and pump |
| D) Heavy machineries for set-up working |
| E) Local transportation |
| F) Warehousing |
| G) Customs clearance |
| H) Labors |

- I) Temporary water, electricity and lodge for working
- J) Drainage water works
- K) Outer fence
- L) Access road

ARRANGEMENT FOR ICE MAKING FACILITIES



3-2. Repairing Tools for Outboard Engines

The members of our mission discussed the supply of repairing tools for outboard engines with the officials of Gambia. The proposed list of repairing tools for outboard engines is as follows:

Note: Subject to JIS

TOOLS FOR THE WORKSHOP

<u>Item</u>	<u>Article</u>	<u>Description</u>	<u>Quantity</u>
1.	Bench Drilling Machine	22 mm	1 Set
2.	Upright Drilling Machine	40 mm	1 Set
3.	Sets of drill bits		4 Sets
4.	Grinding Machine		1 Set
5.	Mechanic Kit	(a set of basic tools essential for servicing outboard motors, packed in a compact portable tool box)	2 Sets
6.	Pocket testers		5 Sets
7.	a) Pliers, electrical		7 Pcs
	b) Pliers, grip		7 Pcs
	c) Pliers, cutting		7 Pcs
	d) Pliers, long nose		7 Pcs
8.	Socket sets with handles		7 Sets
9.	"L" Type Wrenches	8 mm	21 Pcs
	" "	9 mm	21 Pcs
	" "	10 mm	21 Pcs
	" "	12 mm	21 Pcs
	" "	13 mm	21 Pcs
	" "	19 mm	21 Pcs
10.	Hammers, Copper		9 Pcs
	Hammers, Engineering		9 Pcs
11.	Ring Spanners	8 mm	21 Pcs
	" "	9 mm	21 Pcs
	" "	10 mm	21 Pcs
	" "	12 mm	21 Pcs
	" "	13 mm	21 Pcs
	" "	19 mm	21 Pcs

<u>Item</u>	<u>Article</u>	<u>Description</u>	<u>Quantity</u>
12.	Flat Spanners	8 mm	21 Pcs
	" "	9 mm	21 Pcs
	" "	10 mm	21 Pcs
	" "	11 mm	21 Pcs
	" "	12 mm	21 Pcs
	" "	13 mm	21 Pcs
13.	Files, flat		7 Pcs
	Files, three-cornered		7 Pcs
	Files, round		7 Pcs
14.	a) Screw Drivers (big)	200 mm	7 Pcs
	b) Screw Drivers, cross point	200 mm	7 Pcs
	c) Screw Drivers, medium	125 mm	7 Pcs
15.	a) Electrical Soldering Machine	Flat & "L" Type	2 Sets
	b) Soldering Sticks		
16.	Centre Punch Sets		6 Sets
17.	Chisel Sets		6 Sets
18.	Set of Dices and Taps	ISO	2 Sets
19.	Bench Vices		2 Sets
20.	Oil Guns and Jugs	1 Pint	10 Pcs
21.	Plastic Cans for fuel	20 L	10 Pcs
22.	Extractors for Fly Wheel of Outboard Engine		15 Sets
23.	Hack Saws and Blades		10 Sets
	Hack Saw Blades		10 Gross
24.	Pocket Screw Drivers		9 Sets
	" Blades		25 Sets

<u>Item</u>	<u>Article</u>	<u>Description</u>	<u>Quantity</u>
25.	Adjustable Pliers		9 Sets
26.	Ring and Flat Spanner Set		12 Sets
27.	Mechanical Briefcase		4 Sets
28.	Diesel Welding Machine (For 4 mm Electrode)		2 Sets
29.	Electrical Briefcase		2 Sets
30.	Air Compressor	150L, 240V x 50Hz	2 Sets
31.	Grease Guns		9 Pcs
32.	Medium Size Mechanical Cupboards	ab't 800x1200mm	2 Sets
33.	Mechanical Coats, Caps and Gloves		24 Sets
34.	Mechanic Kit	6 ps, 8 ps	7 Sets
35.	Mechanic Kit	20 ps, 25 ps	5 Sets
36.	Snap Ring Pliers (Closing type)	Used to remove and install round type snap ring	8 Sets
37.	Snap Ring Pliers (Opening type)	Used to remove and install snap rings in the drive shaft hauling gear case & others	8 Sets
38.	"T" type Box Wrench	10 mm	7 Sets
		12 mm	7 Sets
		14 mm	7 Sets
39.	Vernier Caliper	150 mm	9 Sets
40.	Micrometer		28 Sets
41.	Cylinder Gauge Set	Rod for 65 mm cylinder bore	4 Sets
		" " 75 mm "	" 4 Sets
		" " 82 mm "	" 4 Sets
42.	Dial Gauge		8 Sets

<u>Item</u>	<u>Article</u>	<u>Description</u>	<u>Quantity</u>
43.	Magnetic Stand		4 Sets
44.	Torque Wrench	0-450 kg. cm	9 Sets
		0-900 Kg. cm	9 Sets
45.	Steel "V" Block	Small 75 mm	2 Sets
	" " "	Large 100 mm	2 Sets
46.	Pocket Tester		12 Sets
47.	Timing Tester		9 Sets
48.	Honing hob		9 Sets
49.	Engine Hanger		12 Sets
50.	Flywheel Rotor Remover		9 Sets
51.	Timing Gauge		7 Sets
52.	Oil Leakage Tester		9 Sets
53.	Engine Tachometer		9 Sets
54. a)	Vernier Caliper, inside	200 mm	12 Sets
b)	" " , outside	"	12 Sets

3-3. Training Boats for Coastal Fisheries

1. 5 G/T Type Multi-purpose Fishery Training Boats

Note: Subject to inspection rule for small fishing boat in Japan (over 12 miles) and Japanese Industrial Standard.

A. Fishery Training Boats for Purse seine net, gill net and long line

1 Vessel

1) Principal Dimensions

Length (OA)	about	14.00 m
Breadth (Max)	"	3.60 m
Depth	"	1.50 m
Gross Tonnage (by Japanese rules)	"	5.5 tons
Length (REG)	"	10.80 m
Breadth(")	"	2.70 m
Depth (")	"	0.83 m
Capacity	Cubic meter	
Fish Hold	about	5.0
Fuel Oil Tank	"	1.0
Fresh Water Tank	"	0.3
Navigation Speed	"	10 knots
Main Engine	"	100 p.s
Crew		8 p

2) Hull and Deck Department

(1) Shell plating	FRP Single plate
(2) Other construction material	FRP Single Plate or FRP Sandwich type
(3) Rudder plate	Galvanized Steel Plate
(4) Rudder stock	Stainless Steel

- | | |
|--|--------------------|
| (5) Magnetic compass | 1 Set |
| (6) Bed (wheel house) | 1 Set |
| (7) Cooking Range | 1 Set |
| (8) Purse seine winch and accessories | 1 Set |
| (9) Changeable net and rope line hauler | 1 Set |
| (10) Insulation for fish hold | POLYURETHANE 50 mm |
| (11) In addition to the above,
plan for General Arrangement | |

3) Machinery Department

- | | | |
|--|--|-------|
| (1) Main engine | Electric Starting Type,
with Remote Controller
and Reduction-Reverse
Gear, 4 cycle Diesel
Engine (Gear Ratio/
about 3:1) 100 ps x
2200 RPM | 1 Set |
| (2) Propeller shaft | High tensile brass | |
| (3) Propeller | High tensile brass | |
| (4) Hydraulic pump
(driven by engine) | | 1 Set |
| (5) General service pump
(driven by engine) | | 1 Set |
| (6) Bilge pump
(driven by engine) | | 1 Set |
| (7) Mechanical Ventilator 30 cubic meter/
min | | 1 Set |
| (8) Accessories for engine room | | 1 Set |

4) Electric Department

- | | | |
|--|---------------|-------|
| (1) Main Generator
(with automatic voltage regulator) | DC 24 V 2KW | 1 Set |
| (2) Aux. Generator with regulator | DC 24 V 0.4KW | 1 Set |

(3) Batteries	DC 12 V 120 AH	4 Pcs
(4) Lights		13 Pcs
(5) Clear View Screen	200 mm	1 Set
(6) Radar	30 miles	1 Set
(7) Fish Finder for Purse Seine		1 Set
(8) Wireless telephone for Medium Distance		1 Set
(9) " " " Short "		1 Set
(10) Switch board and equipment		1 Set

5) Accessories

(1) Anchor	Steel 25 kg	2 Sets
(2) Anchor Rope	Nylon 22mm x 100m	2 Sets
(3) Life Buoy		2 Sets
(4) Life Jackets		8 Sets
(5) Emergency Signal equipments		1 Set
(6) Fire extinguisher		1 Set

6) Spare parts and special spare parts

(1) Maker's standard spare parts	1 Set
(2) Special spare parts for 2 years (As indicated by the maker's list)	1 Set

5 $\frac{G}{T}$ TYPE PURSE SEINER



B. Fishery training boat for trawl net, gill net and long line

1 vessel

1) Principal dimensions

Length (OA)	about	14.00 m
Breadth (Max')	about	3.00 m
Depth	about	1.70 m
Gross tonnage (by Japanese rules)	about	5.0 tons
Length (REG)	about	11.00 m
Breadth (REG)	about	2.70 m
Depth (REG)	about	0.77 m

Capacity

Fish hold	about 5.4 cubic meters
Fuel oil tank	about 1.0 cubic meters
Fresh water tank	about 0.3 cubic meters
Navigation speed	about 10 knots
Main engine	about 100 ps
Crew	8 p

2) Hull and deck department

(1) Shell plating	FRP single plate
(2) Other construction material	FRP single plate or FRP sandwich type
(3) Rudder plate	Galvanized steel plate
(4) Rudder stock	Stainless Steel
(5) Magnetic compass	1 Set
(6) Bed (wheel house)	1 Set

- | | |
|---|-------|
| (7) Cooking range | 1 Set |
| (8) Trawl winch and accessories | 1 Set |
| (9) Changeable net and rope line hauler | 1 Set |
| (10) Insulation for fish hold | |

Polyurethane 50 mm

- (11) In addition to the above, plan for
general arrangement

3) Machinery Department

- | | | |
|---|--|-------|
| (1) Main Engine | Electric Starting Type with Remote Controller and Reduction Reverse Gear, 4 cycle diesel engine, 100 ps X 2200 RPM | 1 Set |
| (2) Propeller Shaft | High Tensile Brass | 1 Set |
| (3) Propeller | High Tensile Brass | 1 Set |
| (4) Hydraulic pump (driven by engine) | | 1 Set |
| (5) General service pump (driven by engine) | | 1 Set |
| (6) Bilge pump (driven by engine) | | 1 Set |
| (7) Mechanical ventilator | 30 cubic meter/
min. | 1 Set |
| (8) Accessories for engine room | | 1 Set |

4) Electric Department

- | | | |
|---|------------------|--------|
| (1) Main Generator (with automatic voltage regulator) | D.C. 24 V 2 Kw | 1 Set |
| (2) Aux. Generator (with regulator) | D.C. 24 V 0.4 Kw | 1 Set |
| (3) Batteries, D.C. 12 V, 120 AH | | 4 Sets |
| (4) Lights | | 13 Pcs |

(5) Clear view screen	200 mm	1 Set
(6) Radar	30 miles	1 Set
(7) Fish finder for trawl		1 Set
(8) Wireless telephone for medium distance		1 Set
(9) " " " short "		1 Set
(10) Switchboard and equipment		1 Set

5) Accessories

(1) Anchor	Steel 25 kg	2 Sets
(2) Anchor rope	Nylon 22 mm x 100m	2 Sets
(3) Life buoy		2 Sets
(4) Life jackets		8 Sets
(5) Emergency signal equipments		1 Set
(6) Fire extinguisher		1 Set

6) Spare parts and special spare parts

(1) Maker's standard spare parts	1 Set
(2) Special spare parts for 2 years (as indicated by maker's list)	1 Set

C. Wireless telephone for coast station

For medium distance	1 Set
For short distance	1 Set

GENERAL ARRANGEMENT

5 1/2 T TYPE TRAWLER

STERN ROULING

GREENS

HYDRAULIC WINCH

NAVY

MID HULL OR LINE HAULER

STORE

STEEL BAY NO. 1 STORE

ENGINE ROOM

FISH HOLD

FISH HOLD

FISH HOLD

STORE

L (OVER) 10' 80'

L (OVER) 11' 80'

D. 2 G/T Type multi-purpose fishery training boats 2 boats

Note: Subject to Japanese Industrial Standard

1) Principal Dimensions

Length (OA)	about	7.40 m
Breadth (Max.)	"	2.30 m
Depth	"	1.10 m
Gross Tonnage (By Japanese Rules)	"	2.2 tons
Length (REG)	"	7.00 m
Breadth (REG)	"	1.90 m
Depth (REG)	"	0.75 m
Fuel oil tank	"	0.15 cub. m
Navigation speed	"	10. knots
Main engine	"	25 p.s.

2) Hull

- | | |
|---|--|
| (1) Shell plating | FRP single plate |
| (2) Other construction material | FRP single plate or
FRP sandwich type |
| (3) Rudder plate | Stainless Steel |
| (4) Rudder stock | Stainless Steel |
| (5) Shoe piece | Stainless Steel |
| (6) Other attachments shown in
the plan for G.A. | |

3) Machinery Department

- | | |
|-----------------|--|
| (1) Main engine | Electric Starting Type with
Remote Controller and
Clutch, 4 cycle Diesel
Engine, about 25 p.s. X
2700 rpm
1 Set |
|-----------------|--|

4) Electric Department

(1) Main Engine starting battery 1 Set

(2) Control panel 1 Set

5) Accessories

(1) Paddle 1 Set

(2) Life jacket 5 Sets

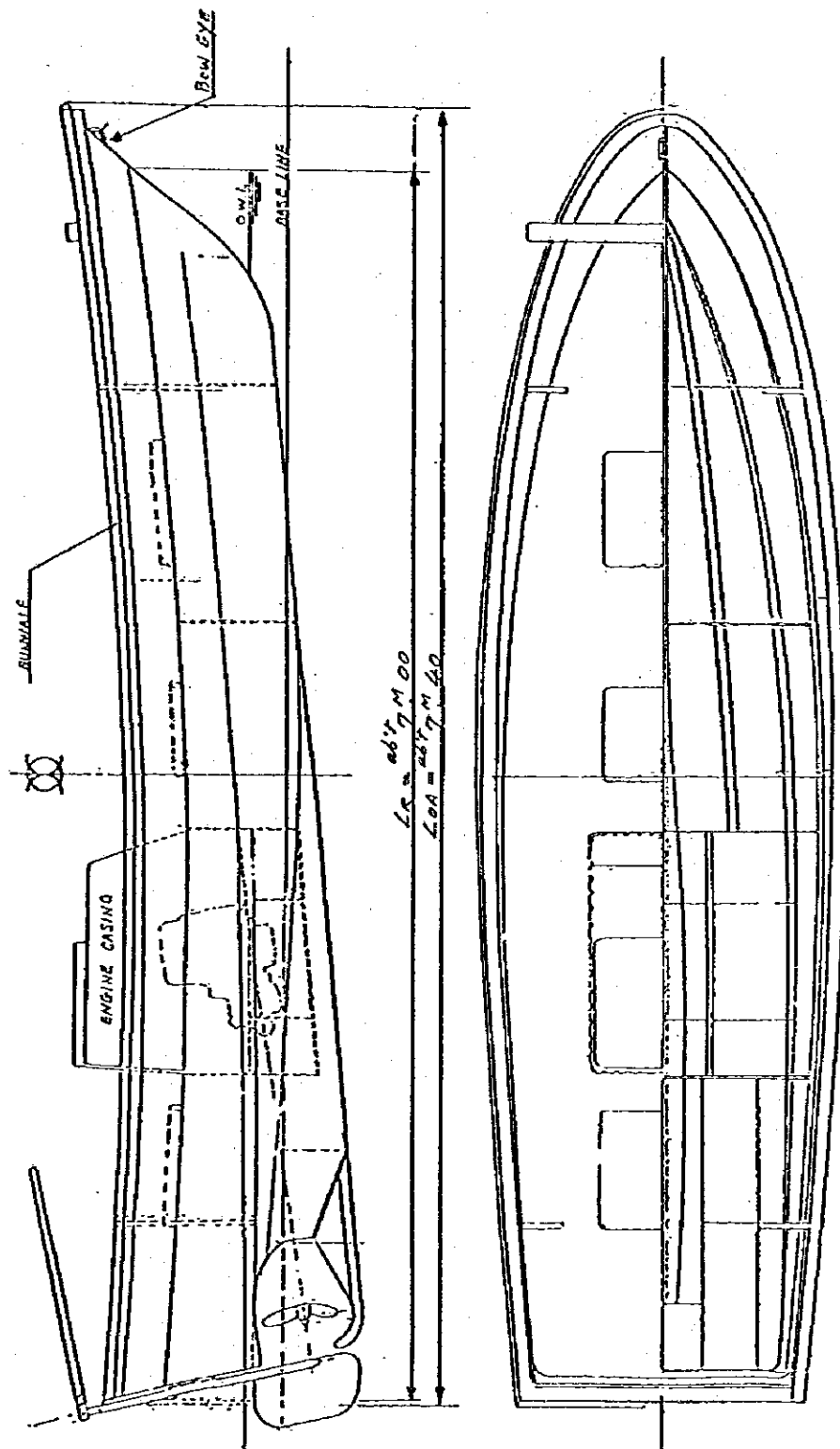
6) Spare parts and special spare parts

(1) Maker's Standard spare parts 1 Set

(2) Special spare parts for 2 years 1 Set

(as indicated by the maker's list)

GENERAL ARRANGEMENT
2 G/T Type Fishing Boat



3-4. Outboard Engines and Spare Parts

1) Outboard Engine

(1) 6 p.s.	L type	30 Sets
(2) 20 p.s.	L type	20 Sets

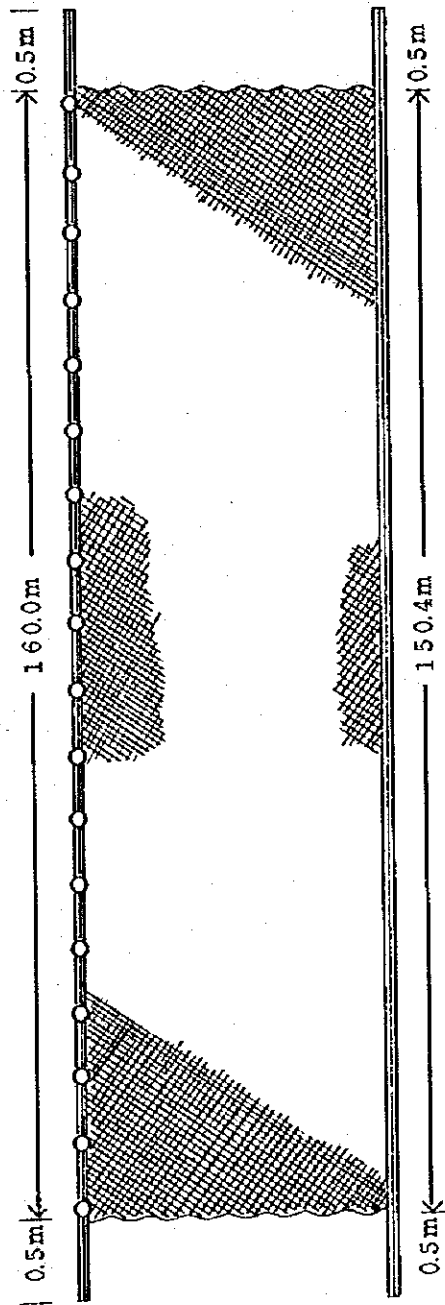
2) Spare parts

(1) Maker's Standard Spare parts	1 Set
(2) Special spare parts for 2 years	1 Set
(as indicated by the maker's list)	

3-5. Fishing Nets

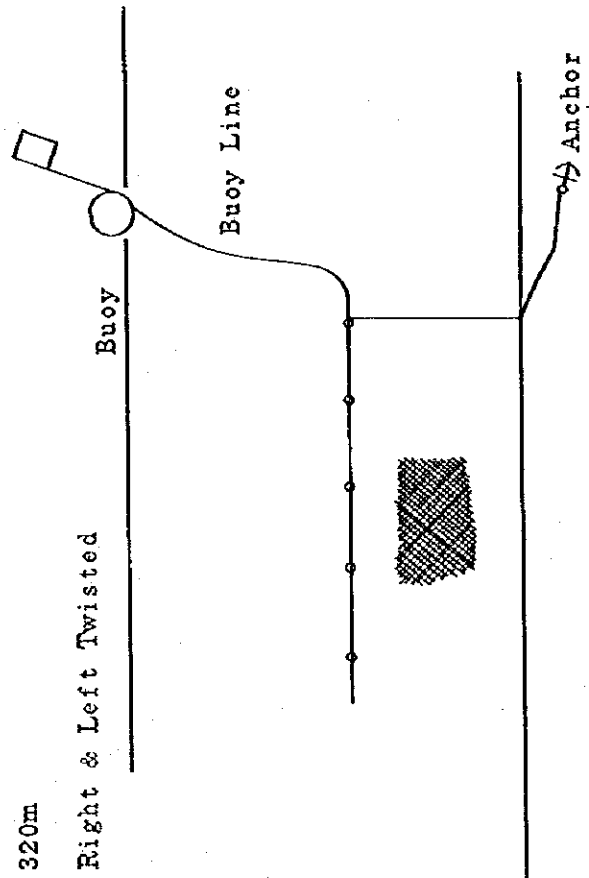
	Quantity for One Boat		
	CANOE	5 G/TBOAT	2 G/TBOAT
(A) BOTTOM GILL NET			
1. Net Complete Set with Float and Sinker	4 sets	30 sets	20 sets
2. Buoy 300 m/m	2 pcs	2 pcs	2 pcs
3. Anchor 8 kg	2 pcs	2 pcs	2 pcs
4. Buoy Line Poly-Vinylon Mixed Rope 8m/m x 200 m	1 coil	1 coil	1 coil
5. Anchor " "	1 coil	1 coil	1 coil
6. Spare			
a. Nylon nettings 210d /9 70m/m 40MDx320m	8 pcs	60 pcs	40 pcs
b. Mending	10 kgs	70 kgs	50 kgs
(B) BOTTOM LONG LINE			
1. Bottom Long Line Complete Set		30 sets	
2. Spare			
a. Hook		20,000 pcs	
b. Nylon Mono-Filament #12		20 kgs	
(C) PURSE SEINE NET (280m)	1 set		
1. Spare Set for Item (C)	1 set		
(D) PURSE SEINE NET (340m)	1 set		
1. Spare Set for Item (D)	1 set		
(E) TRAWL NET (FOR 5G/T100p.s) with Otter & warp	1 set		
1. Spare Set for Item (E)	1 set		

(A) BOTTM GILL NET

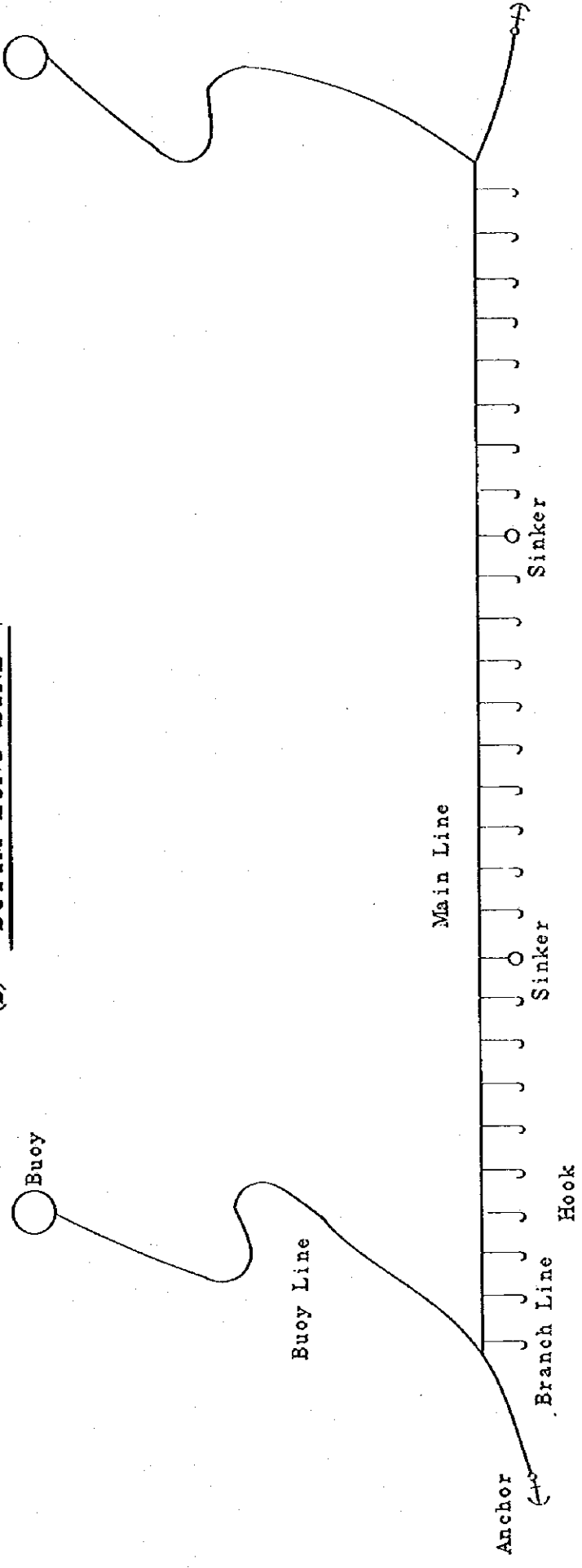


1. Nettings :
2. Float :
3. Float Line :
4. Sinker :
5. Sinker Line :
6. Buoy :
7. Buoy Line :
8. Anchor :

Nylon 210d/9 70mm str. 40MD. x 320m
 Synthetic Float C-9 140 PCS.
 Poly-Vinylon Mixed Rope 15g/m, Right & Left Twisted
 Lead 375g 200PCS.
 Poly-Vinylon Mixed Rope 25g/m
 Right & Left Twisted
 Synthetic 300^m/m
 Poly-Vinylon Mixed Rope 8^m/m
 Iron 8g 2Pcs



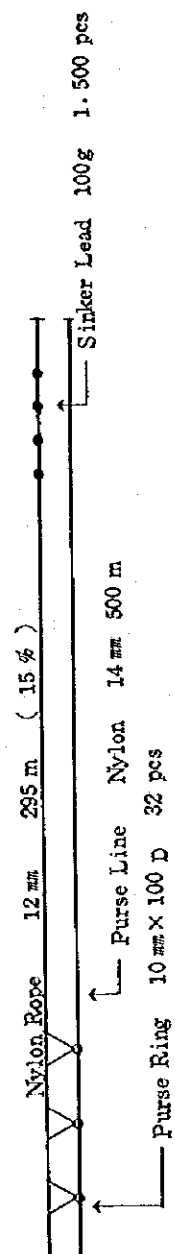
(B) BOTTM LONG LINE



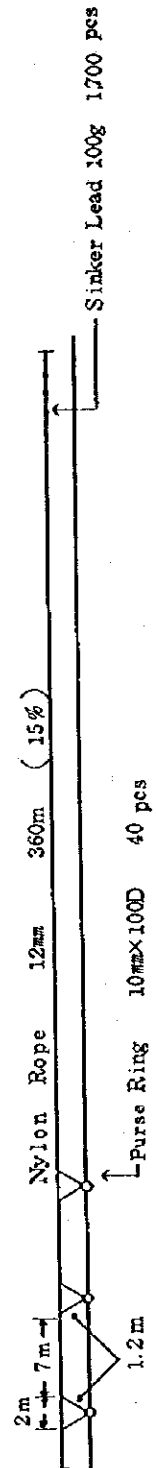
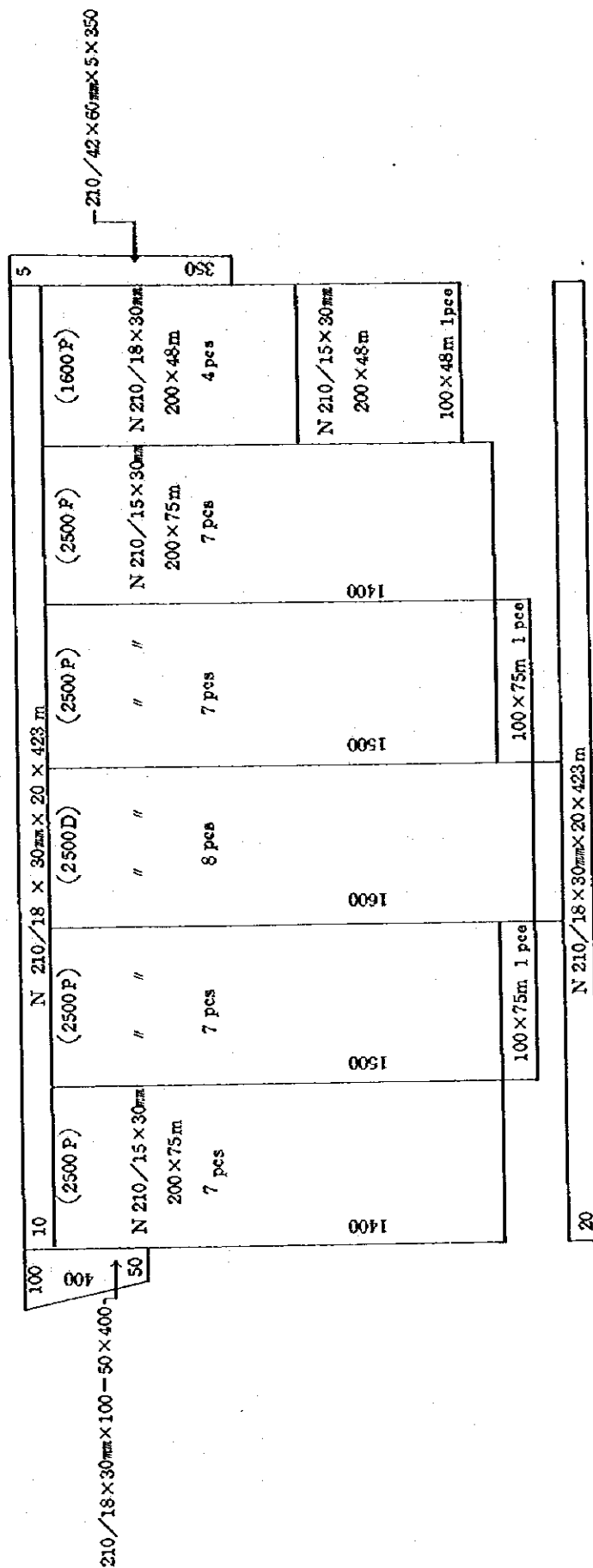
1. Main Line : Vinylon 20s/120. 300m
2. Branch Line : Nylon Mono-Filament #12 60cm, 100p'cs
3. Hook : #18, 100p'cs
4. Buoy Line : Polypropylene Rope 8^m/m, 200m
5. Buoy : 300^m/m dia., 2p'cs
6. Sinker : Iron, 860gr 2Pcs
7. Anchor : Iron, 5kgs 2Pcs

Diagram illustrating the experimental apparatus. A vertical line is shown, labeled "Nylon Rope 12 mm" and "280 m (20%)". At the top of the line is a "Float C-13" with a weight of "900 pes". The line is attached to a weight at the bottom.

85	N 210 / 18 × 30 mm × 20 × 348 m				5
400	(2500)	(2500)	(2500)	(2500)	(1600)
210 / 18 × 30 mm × 85 × 400	N 210 / 15 × 30 mm 200 × 75 m	"	"	N 210 / 15 × 30 mm 200 × 75 m	N 210 / 18 × 30 mm 200 × 48 m
	7 pcs	7 pcs	7 pcs	7 pcs	4 pcs
	1400			1400	800
					N 210 / 12 × 30 mm 200 × 48 m
					600
	N 210 / 18 × 30 mm × 20 × 348 m				

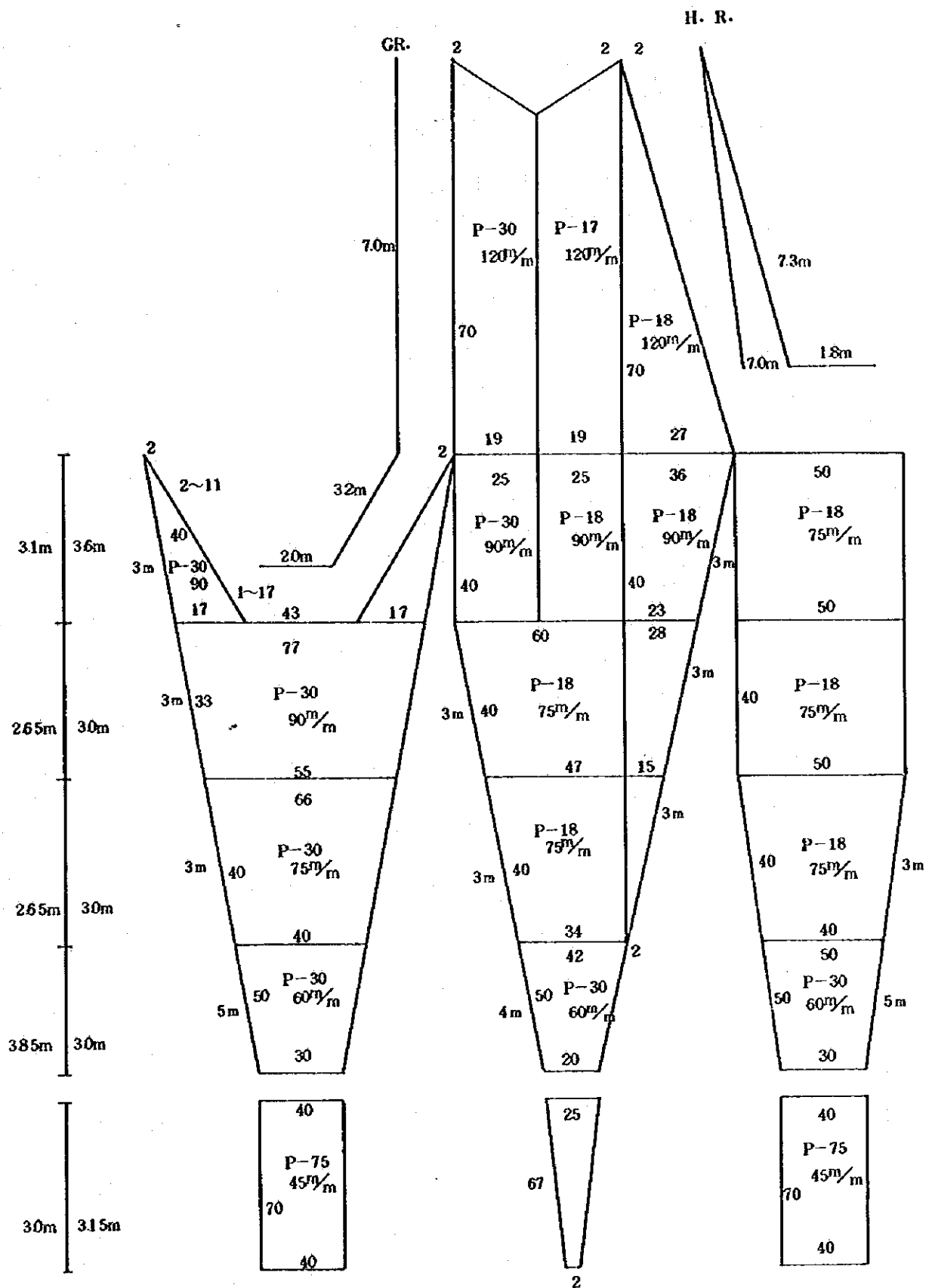


(D) PURSE SEINE NET (340m)



(E) TRAWL NET (FOR 5¢ 100 P. S.)

TRAWL NET(FOR 5^G/_T 100p. s.)



3-6. Schedule for Project Implementation

If given the green light, the project will be implemented in accordance with the following schedule:

Schedule for Project Implementation

MONTHS		-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12
BASIC DESIGN SURVEY																
EXCHANGE NOTES				-												
DESIGNING																
BIDDING																
ENFORCEMENT																

3-7. Considerations

The proposed site for installing the ice-making facilities is located in the tropic area around latitude 13° N. It is a harsh climate with high atmospheric temperatures. It is difficult to procure repair parts and consumable materials from local sources. The number of experienced Gambian engineers is limited.

These adverse conditions must be contended with in our efforts to promote the fisheries promotion plan, and the design of the machineries, equipment and materials provided under the grant aid should be predicated on the beneficial effects of the promotion of the plan. In other words, the following considerations should be given to the design of the facilities, equipment and materials:

- 1) They are capable of functioning properly;
- 2) The method of operation and repair may be mastered easily, and;
- 3) A sufficient amount of repair parts and materials should be provided.

Furthermore, after such plants, equipment and materials are provided, the local people should be trained in their operation.

APPENDIX: PHOTOGRAPH



Gambian Officials and Members of the Survey Team
January 9 , 1981 .

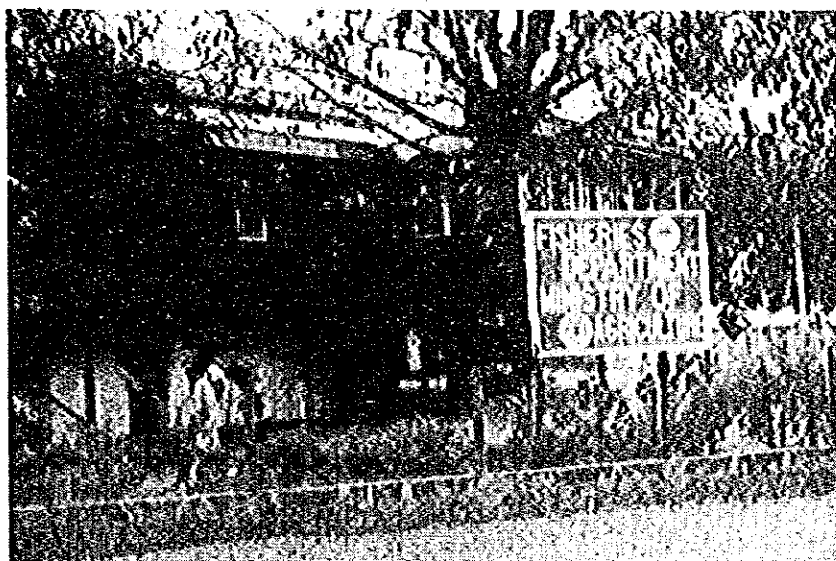
Back Row At the Right End
 Mr. M. B. Jagne (Permanent Secretary of Ministry of
 Agriculture and Natural Resources)

 Second From the Right
 Miss H. King (Acting Director of Fisheries
 Department)

 Third From the Right
 Mr. Aritsune Furukawa (Team Leader)

 At the Left End
 Mr. Shin Egami

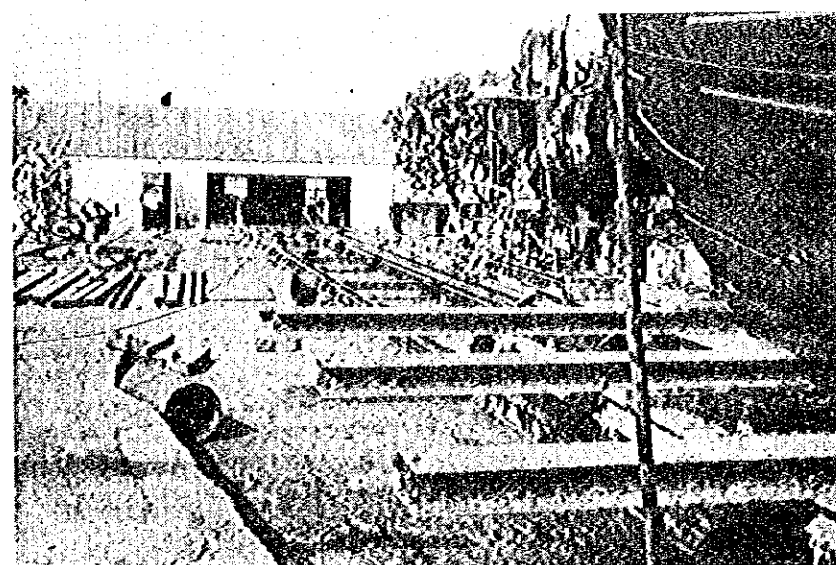
Front Row Left
 Mr. Tadahiko Koga
 Right
 Mr. Hideo Kimura



Fisheries Department in Gambia



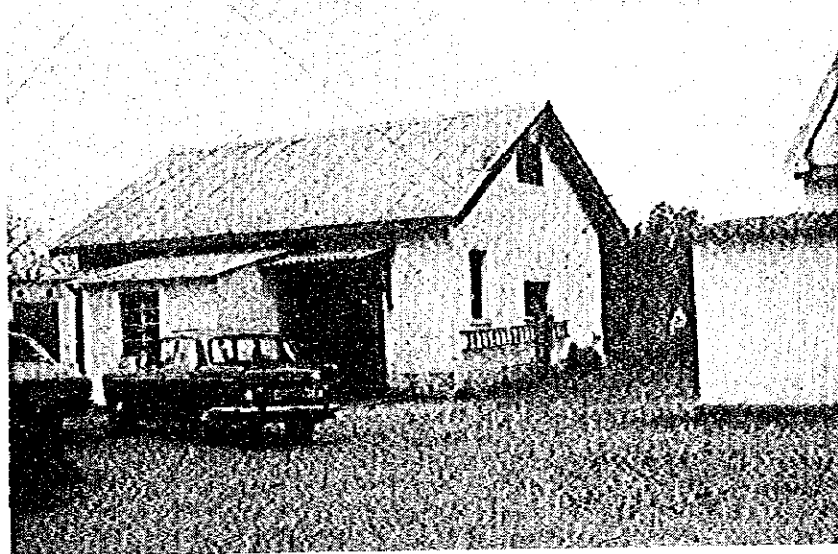
Fish Marketing Corporation



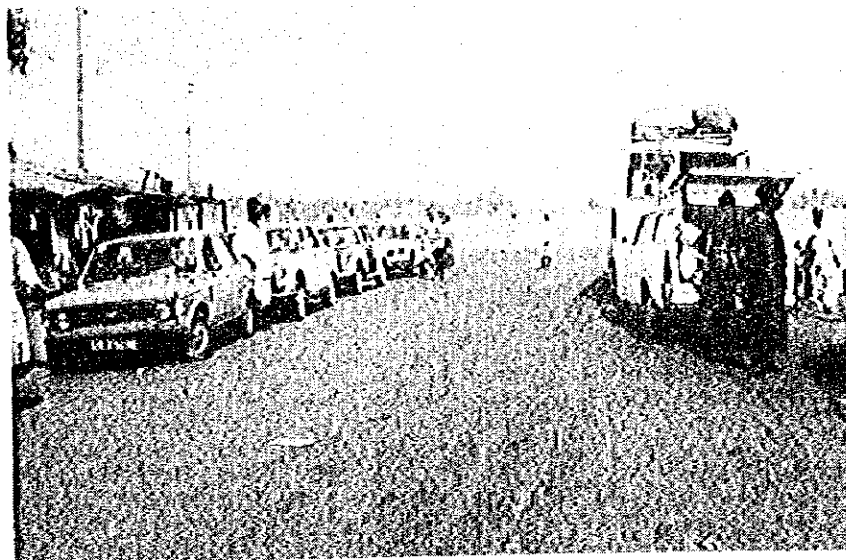
Slipway of Shipyard in Banjul



Selected Construction Site for Ice Making
Facility in Mansa Konko



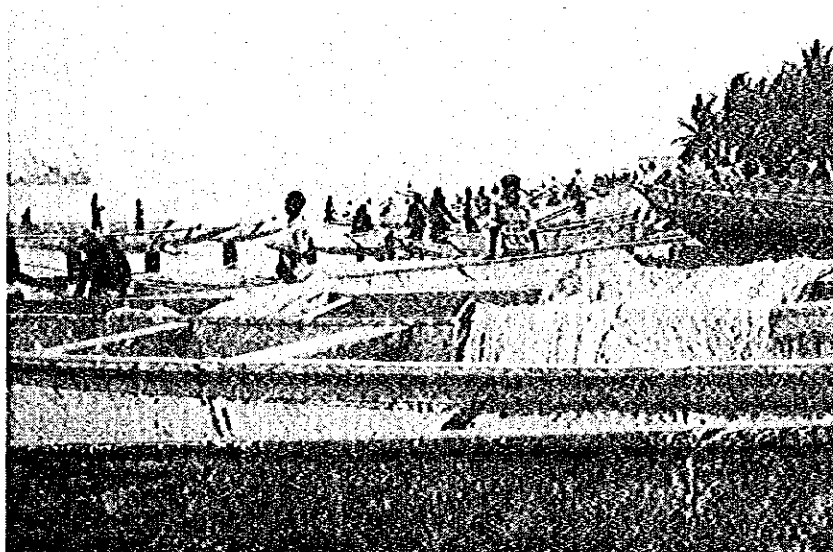
Diesel Power Plant in Mansa Konko



Landing Place for Ferryboats near Mansa Konko



Fishing Boats Mooring Pier in Banjul



Fishing village in Banjul



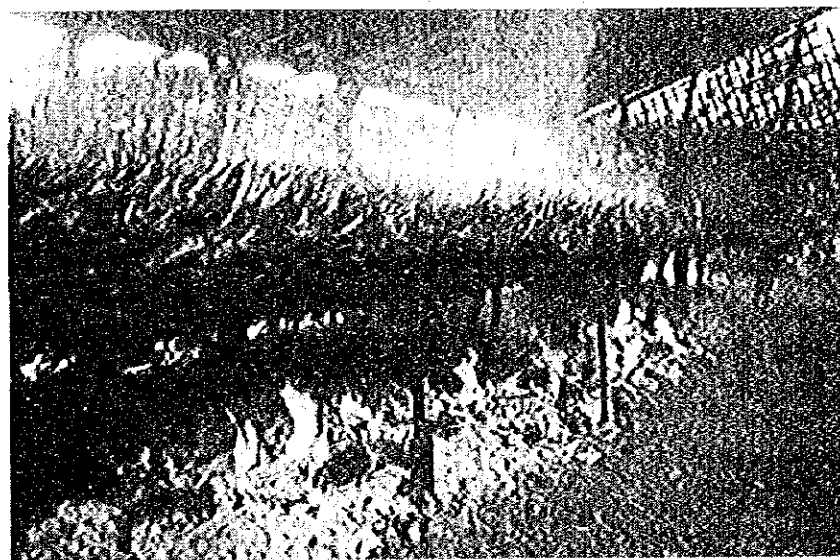
Repairing of Fishing Nets



Smoking Hut in Bruft Region



Preparation for Smoking Fish



Processing of Smoking Fish

JICA