

Japan International Cooperation Agency

The Republic of The Gambia
Ministry of Natural Resources
and the Environment

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR IMPROVEMENT OF
ARTISANAL COASTAL FISHERIES
IN
THE REPUBLIC OF THE GAMBIA

November 1993

Overseas Agro-Fisheries Consultants Co., Ltd.

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PREFACE

In response to a request from the Government of the Republic of The Gambia, the Government of Japan decided to conduct a basic design study on the Project for Improvement of Artisanal Coastal Fisheries and entrusted the study to the Japan International Cooperation Agency (JICA).

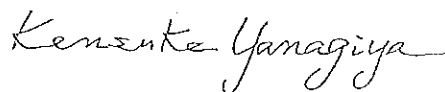
JICA sent to The Gambia a study team headed by Mr. Noboru Tazoe, Chief Fisheries Officer, Office of the Overseas Fisheries Cooperation, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries, and constituted by members of Overseas Agro-Fisheries Consultants Co., Ltd. from 10 July to 6 August, 1993.

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

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

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

November, 1993



Kensuke Yanagiya
President

Japan International Cooperation Agency

November, 1993

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

Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Improvement of Artisanal Coastal Fisheries in the Republic of The Gambia.

This study was conducted by Overseas Agro-Fisheries Consultants Co., Ltd. under a contract to JICA, from 7 July, 1993 to 30 November, 1993. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of The Gambia and formulated the most appropriate basic design for the project under the Japan's grant aid scheme.

We wish to take this opportunity to express our sincere gratitude to the officials concerned of JICA, the Ministry of Foreign Affairs, and the Ministry of Agriculture, Forestry and Fisheries. We would also like to express our gratitude to the officials concerned of the Fisheries Department of the Ministry of Natural Resources and the Environment, the JICA Senegal office, the Embassy of Japan in Senegal for their cooperation and assistance throughout our field survey.

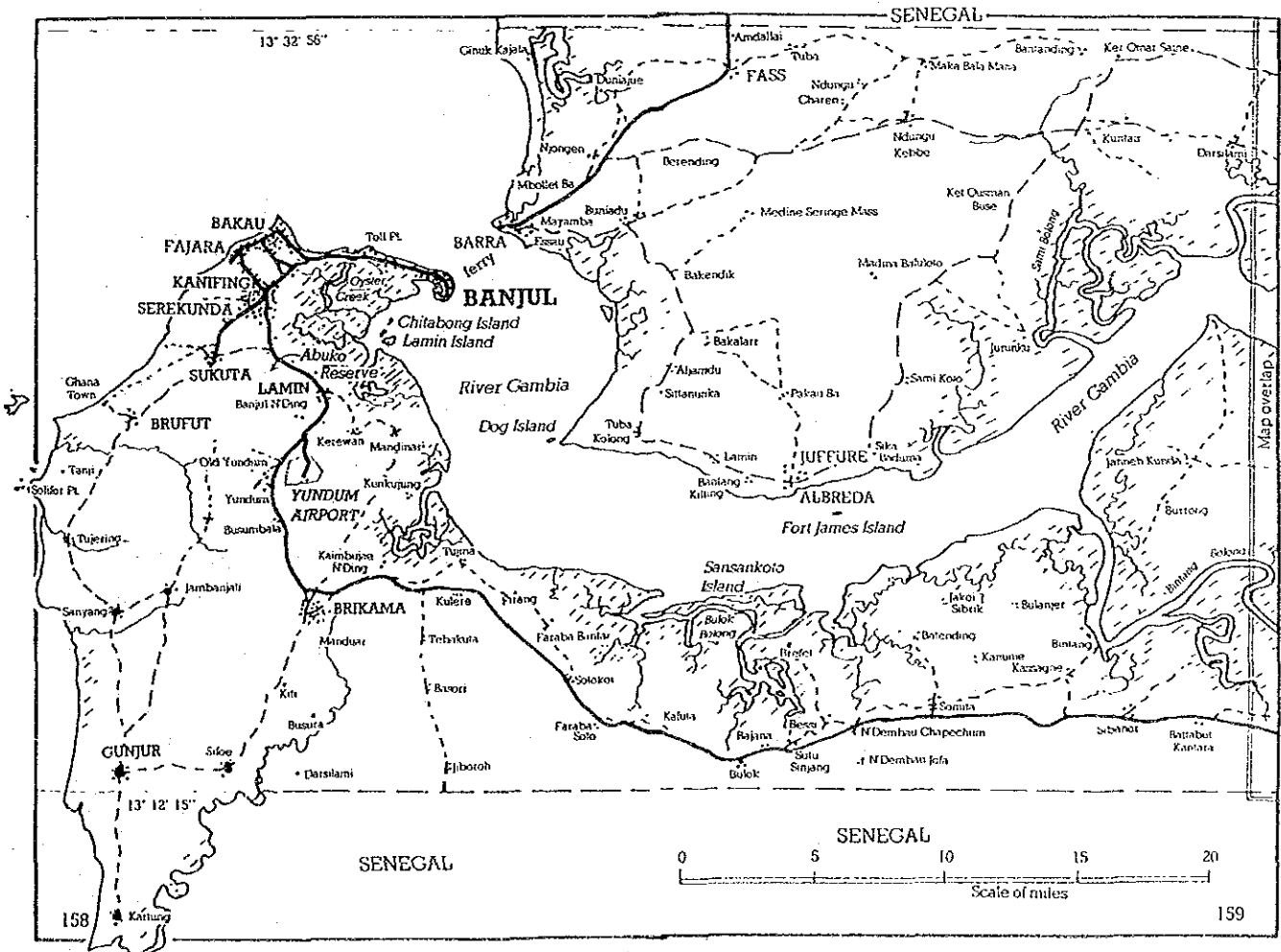
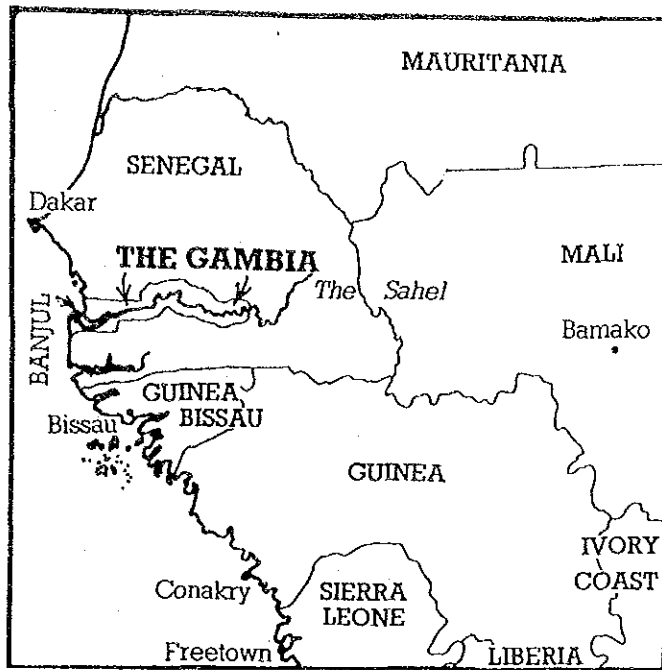
Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,



Munehiro Shimada
Project manager,
Basic design study team on the Project for
Improvement of Artisanal Coastal Fisheries
Overseas Agro-Fisheries Consultants Co., Ltd.

MAP OF GAMBIA



SUMMARY

The Republic of The Gambia has rich fisheries resources compared with its national size, and the fishes supplied by the artisanal fisheries are considered to provide major sources of animal protein for the people. To improve nutritional standards of Gambian nationals, further increase in the production of the artisanal fisheries is one of the key tasks for the fisheries sector of the country. Under these circumstances, the artisanal fisheries of the country are increasing the production capacity by advancing the motorization of the fishing canoes. By contrast, improvement of fisheries infrastructures such as fish landing facilities and fish marketing facilities is considerably retarded. To meet the growing demands for fresh fish especially in the metropolitan area, it has been a major task to establish the facilities to provide adequate support to these fisheries activities.

In response to the request from the Government of the Republic of The Gambia under these circumstances, Japan's grant aid was implemented for construction of the land facilities such as an ice plant & cold storage and artisanal fisheries support facilities at the Bakau fish landing spot in the metropolitan area in 1991 Japanese fiscal year. While establishment of such land facilities has encouraged artisanal fisheries activities in the Bakau region, inefficiency in fish landing activities due to lack of appropriate landing facilities and inconveniences in fisheries production activities due to shortage of fisheries equipment are coming to the surface.

In view of these situations, the Government of the Republic of The Gambia has requested the Government of Japan for the grant aid assistance to improve fish landing facilities and fisheries equipment in order to promote effective use of the existing land facilities, to extend the fisheries operation, to ensure improved safety in departure from shore and fish landing work and to extend fisheries operation time by reducing their time required for preparation; hence achieving the increased fish production by improving efficiency in fisheries activities.

In response to this request, the Government of Japan decided on implementation of the basic design study for this project, and Japan International Cooperation Agency (JICA) dispatched the basic design study team to the Republic of The Gambia during the period from 10 July, 1993 to 6 August, 1993. The basic design study team confirmed the details of the request, discussed the project, confirmed the project implementation system, and conducted a survey on natural conditions and related matters. After the team studied the project further in Japan, the Japan International Cooperation Agency dispatched the team to The Gambia for explanation of the draft report, final discussion and confirmation of the contents of the basic design in the period from 19 September to 30 September in 1993.

The objectives of the project are to construct the fish landing facilities suited to artisanal fisheries at the Bakau fish landing spot which is the project site, to improve the fisheries equipment for the support of artisanal fisheries activities, and to establish a system which ensures supply of animal protein to the nationals inhabiting the metropolitan area. Establishment of the following facilities and supply of the following equipment are considered to be the most effective to achieve these objectives.

(1) Fish landing facilities	
1) Fish landing jetty:	T-shaped, steel pipe pile structure, steel-made slit slab, 135 m in overall extension
① Berthing section:	34 m in jetty extension, 6.3 m in width, 30 m in T-shaped section, 6.3 m in width, 1.0 m to 2.5 m in water depth
② Jetty approach section:	95 m in jetty extension, 5.3 m in width
③ Auxiliary equipment:	Fender, steps for elevation, navigation light
2) Jetty connection section:	Steel sheet piling type revetment: 90 m in extension (of which 60 m is for wave absorbing treatment), asphalt pavement 900 m ² , drainage groove, slope protection
(2) Fisheries equipment	
1) FRP fishing canoes:	12 units, beaching type, about 13 m in overall length, about 2 m in overall width, about 1 m in overall depth
2) Outboard engines and spare parts	
① Diesel outboard engines	12 engines (27 hp)
② Gasoline outboard engines	20 engines (8 hp for 10 engines, 15 hp for 5 engines, 40 hp for 5 engines)
3) Fishing gears:	Surrounding gill nets 12 sets Bottom gill nets 12 sets Drift gill nets 4 sets Bottom long lines 4 sets Hand line fishing gears 4 sets
4) Maintenance tools and materials for FRP fishing canoes:	1 lot (lamination tools and maintenance materials)
5) Artisanal fisheries support vehicles:	2 units, pickup four-wheel drive, diesel 85 hp
6) Radio telephone sets	VHF/FM radio telephone sets (one 60W set, two 25W sets)
7) Materials for hygienic environment improvement at the fish landing beach:	Thirty 10-liter capacity beach bins, four 100-liter capacity beach bins, one roll of vinyl sheet for fish drying shelf, three hand carts

This project is implemented by the Fisheries Department of the Ministry of Natural Resources and the Environment, and is managed by the Bakau Subcommittee and Project Management Committee which are currently managing the land facilities under the guidance of the Fisheries Department. The Bakau Subcommittee has been managing the profit gained by operation of the existing land facilities as the artisanal fisheries promotion fund for artisanal fisheries support system.

Implementation of this project requires 3.5 months for detail design, and 11 months for construction period.

Implementation of this project provides the following effects:

1) Effect of the project on artisanal fisheries production increase

- ① Actual fishing operation time is expanded by reducing fish landing time which results from construction of the fish landing facilities. Since the current annual fish landing volume at the Bakau fish landing spot is 500 to 700 tons, an annual increase of about 75 to 100 tons in fish production can be expected.
- ② There will be an increase of about 460 tons in the fish production every year by four new FRP fishing canoes which will join the operation under the project.
- ③ The current fisheries production level can be maintained by supporting the artisanal fisheries activities at the project site by introducing the fisheries equipment such as the outboard engines and fishing gears.
- ④ As annual supply of fish amounting to 5,000 tons is considered to be necessary to fill the demands for the population of about 200,000 living in the metropolitan area of Banjul, annual supply of 1,000 to 2,000 tons for these demands will be supported from the Bakau region through project implementation.

2) Effect of the project on artisanal fisheries development and improvement of fisheries household management

- ① The indirect benefit brought about use of the fish landing facilities includes reduction of the load in preparation of departure from the shore and equipment loading and unloading. This not only improves operation efficiency, but also reduces the factors which prevent participation of the younger successors in the fishing industry.
- ② The FRP fishing canoes equipped with the diesel outboard engines promote spread of operation at a fuel cost lower than that of conventional gasoline outboard engines. This is considered to trigger establishment of a high value added operation system which aims at reduction of operation cost.

- ③ Though the present artisanal fisheries management tends to pursue comparatively short-term profitability, introduction of the FRP fishing canoes having much longer service life than that of the conventional wooden canoes will encourage conversion of such management into a planned fisheries management based on a long-term entrepreneur spirit.
- ④ Promotion of multi-operation of surrounding gill net fishing plus bottom gill net fishing and large hand line fishing using the FRP fishing canoes will realize multi-operation of bonga fishing and demersal fish fishing; bonga fishing features high quantitative productivity, while demersal fish fishing ensures high value-added qualitative productivity. This will lead to improvement in artisanal fisheries and stable fishing management at the project site.

For the above reasons, implementation of this project under the Japan's grant aid is extremely significant.

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CHAPTER 1 INTRODUCTION

CHAPTER 1 INTRODUCTION

The Republic of The Gambia has rich fisheries resources compared with its national size, and the fishes produced by the artisanal fisheries provide major sources of animal protein for the people. To improve nutritional standards of Gambian nationals, further increase in the production of the artisanal fisheries is a key task. Under these circumstances, the artisanal fisheries of the country are transforming to modern fisheries by operation of motorized fishing canoes. Compared with the production capacity, development of fisheries infrastructures such as fish landing facilities, fish preservation facilities and fish marketing facilities is considerably inadequate. To meet the growing demands for fresh fish especially in the metropolitan area where development of residence areas is under way, it has been a major task to establish facilities to provide adequate support for related fish supply activities.

In response to the request from the Government of the Republic of The Gambia under these circumstances, Japan's grant aid was implemented for construction of land facilities such as an ice plant & cold storage, fisheries processing support facilities, and artisanal fisheries activity support facilities at the Bakau fish landing spot in the metropolitan area in Japanese fiscal 1991. While establishment of such land facilities has encouraged artisanal fisheries activities in the Bakau region, inefficiency in fish landing activities due to lack of appropriate landing facilities and inconveniences in fisheries production activities due to shortage of fisheries equipment are coming to the surface.

In view of these situations, the Government of the Republic of The Gambia has requested the Government of Japan for the grant aid assistance to improve fish landing facilities and fisheries equipment in order to promote effective use of the existing land facilities, to extend the operation and to ensure improved safety in departure from shore and fish landing work for the coastal fishing people by reducing their time required for preparation; hence achieving the increased fish catches by improved efficiency in fisheries production.

In response to this request, the Government of Japan decided on implementation of the basic design study for the project, and the Japan International Cooperation Agency (JICA) dispatched to the Republic of The Gambia the basic design study team headed by Noburo Tazoe, Chief Fisheries Officer, Office of the Overseas Fisheries Cooperation, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries during the period from 10 July to 6 August, 1993. The basic design study team confirmed the details of the request, discussed the project, confirmed the project implementation system, and conducted a survey on natural conditions and related matters.

After the team returned to Japan, further studies were made. JICA dispatched the team to The Gambia for explanation of the draft report, final discussion and confirmation of the contents of the basic design from 19 September to 30 September, 1993.

This report presents most appropriate basic design, implementation scheme, evaluation, recommendations, etc. for the project. Related information such as member list of the team, field survey schedule, the minutes of discussions and the other data are attached to the end of the report.

CHAPTER 2 BACKGROUND OF THE PROJECT

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2-1 Overview of the Republic of The Gambia

The Republic of The Gambia is located at the west end of the African Continent and has a common boundary with the Republic of Senegal on all sides. It is a slender country stretching about 300 km from east to west along the River Gambia and 30 to 50 km from north to south. The land area measures about 10,689 km², of which 2,077 km² are occupied by marshland. The climate of the country is that of a tropical savannah, having an extremely dry season (November to May) and extremely rain season (June to October). Its population is 920,000 according to the mid-1991 estimate, comprising six major tribes, and the Mandingo tribe accounts for 80% of the entire population. English is the official language, with languages of major tribes being used extensively. Over 80% of the people are Islamites, who are particularly dedicated among the other African nations. The Gambia was a colony of U.K. since 1822, but became a republic in 1970 after declaring independence in February 1965. The Gambia is now a republic country, being a member of the British Commonwealth of Nations (See Table 2-1).

The Gambia exhibits an annual population increase of about 3.4% in recent years, and the population density is estimated at 83 persons per km². No statistics data is available to show recent population distribution, but the rate of urban population concentration in the Banjul metropolitan area composed of the administrative district of Banjul and the administrative district of K.U.D.C. (Kanifing Urban District Council) is estimated at 21.2% according to the 1983 statistics. About 200,000 of the estimated mid-1991 population of about 920,000 inhabit the metropolitan area, and the hinterland of the metropolitan area is occupied by the administrative district of Brikama boasting a population concentration of about 20% (See Table 2-2).

Table 2-1 illustrates the economic indicators of The Gambia. The GDP at market price for fiscal 1991 is about 2,950 million Dalasis, and the GDP per capita shows an increase of nearly 10% over the year-before level. However, the foreign currency exchange rate against the U.S. dollars is worsening. The rate of increase in GNP (market value) in terms of U.S. dollars is staggering at 6 to 7% in recent years, and especially the period from fiscal 1990 to 1991 witnessed a drop from about 365 U.S. dollars to about 343 U.S. dollars. The consumer price shows an average annual increase rate of about 10%, imposing a great burden on the standard of living of Gambian nationals.

Looking at the international balance of payment, the figures show a permanent deficit, and the balance is widening year by year. This is because of the staggering production growth of agricultural products such as peanuts which are major export products and sluggish international prices, despite increasing imports after 1988.

Table 2-3 shows the GDP market price according to the industrial composition. It reveals the sluggish primary industry, growth of manufacturing industry and growth of tertiary industry in the industrial composition during the period from 1986 to 1991.

Whereas contribution of the agriculture sector the primary industrial field is reduced considerably, the livestock industry supported by the tourist industry and fisheries industry assisting improvement of the nutritional standards of the people are making a stable contribution.

Growth of the manufacturing industry suggests that the industrial structure of The Gambia is taking a turn for the better, but growth of the tertiary industry results from growth of international trade attributable to the increasing imports; this is not necessarily a preferable phenomenon.

2-2 National development program

According to the first national development program (from 1975/1976 to 1979/1980), the major target was set to improvement of the social infrastructures and services for the people, resulting in increased employment of public servants and expanded expenditures for development; it brought about a burden for the state finance. Furthermore, the economy of the country was pressed by staggering agricultural production due to drought, drop of international peanut prices and spiraling crude oil price, resulting in reduced foreign currency earnings and sluggish economic growth.

To solve these problems, the second national development program (1981/82 to 1985/86) went back to the position that agriculture should be the basic industry of The Gambia, and set up a policy to give priority to agriculture. Furthermore, to overcome the economic depression, the Government formulated the Economic Recovery Program (ERP) in August 1985 to increase public investments in all industrial areas and to promote participation of large-scale private capital by encouragement of adequate investment, thereby achieving short-term economic stabilization and long-term economic growth.

After that, the second ERP (1988/89 to 1990/91) was worked out to take over the first ERP, and the emphasis of the program was placed especially on agriculture, fisheries, livestock and tourist industries.

The secondary ERP showed an satisfactory achievement of the target. This was taken over by the Program for Sustained Development (PSD) which was based on the same principle, plus with expanded targets. The PSD was initiated in 1992. It was aimed at strengthening of the economic structure, which was initiated in the ERP, and was designed to ensure expansion of long-term economic productivity, environmental protection, and reinforcement of activities in private sectors.

2-3 Overview of fisheries sector

2-3-1 Overview

The fisheries of The Gambia can be classified into two categories; large scale industrial fisheries and artisanal fisheries. According to the operation area, the artisanal fisheries are divided into coastal fisheries in the Atlantic Ocean and riparian fisheries along the River Gambia. Large scale industrial fisheries mainly comprise double rigger type shrimp trawl fisheries in the mouth of the river. They also include trawl fisheries for high quality demersal fish, and the majority of the fish catch is marketed to European countries. Artisanal fisheries mainly comprise net fishing, hand line fishing and long line fishing using the Senegal type wooden fishing canoes. Originally, artisanal fisheries used to be done mainly by the fishing people of Senegal, but in recent years, many Gambian nationals have learnt the technique from these people of Senegal. Friendly cooperation and coexistence have been established between these two nations.

The River Gambia is a tidal river affected by sea water up to 200 kilometers. Despite riparian fisheries, products include marine fishes such as barracuda, croaker and sea catfish, in addition to small shrimps. Though detailed survey of fisheries resources have not yet been conducted, the Maximum Sustainable Yield is considered to be 65,000 tons of pelagic fish and 15,000 tons of demersal fish, according to the Fisheries Department.

2-3-2 Fisheries production

The fisheries production by fishery category registered a total of 43,000 tons as of 1991, which was broken down as 20,000 tons for artisanal fisheries and 23,000 tons for industrial fisheries. The artisanal fisheries production used to remain about below 10,000 tons, but exceeded 10,000 tons in 1989 and 20,000 tons in 1991, posting a remarkable growth. In the industrial fisheries, on the other hand, the production was slow because of poor business performances due to failure in maintenance and control of fishing vessels and related facilities and shortage of infrastructures due to deterioration of the Banjul fishing port as a fisheries base, and remained about the level of 10,000 tons. However, the production has reached again the 20,000-ton level of pre-1988 level since 1990 (See Table 2-4).

2-3-3 Infrastructures for fisheries

The infrastructures for fisheries are little advanced in The Gambia, and fish landing facilities are especially insufficient. Though the Banjul fishing port (concrete pile type jetty) for large scale industrial fisheries is installed in Banjul, it is extremely dilapidated and requires repair. For the artisanal fisheries, there is only a wooden jetty constructed by the aid of EC countries at the Tanji fish landing spot on the coast of the Atlantic. At Tendaba 150 km up the River Gambia, there is a concrete jetty for riparian traffic built by the Government of The Gambia. This is also used by the fishing people.

Except for the ice plant owned by a fisheries company, there is an ice plant for artisanal fisheries at Mansa Konko 110 kilometers up the River Gambia; it has a daily production capacity of 5 tons and was built under the Japan's grant aid in 1980. There is another ice plant having a daily production capacity of 3 tons, which was also built in Bakau under the Japan's grant aid in 1991. In addition, there are two plants having a daily production capacity of 3 tons halfway down the River Gambia, which were built under the assistance of Italy, and a plant having a daily production capacity of 4 tons in inland Brikama, which were built under the assistance of the EC. Though those engaged in artisanal fisheries are calling for supply of more ice, supply capacity cannot meet their requirements.

2-3-4 Fish marketing

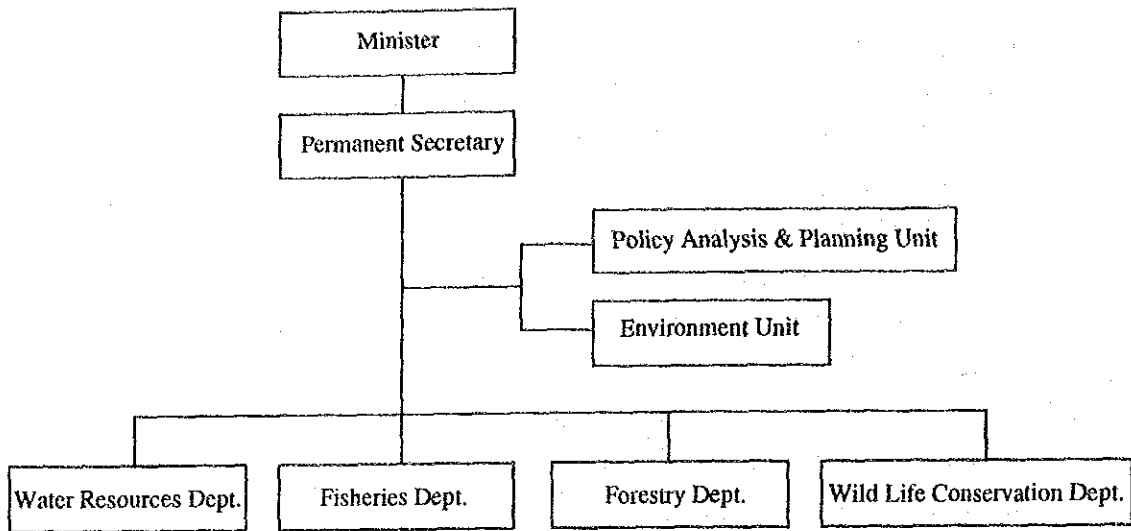
Fish marketing of The Gambia can be classified into two categories; domestic marketing for artisanal fisheries and export of fishery products. The domestic marketing can be further divided into two; marketing of fresh, smoked or dried fish of bonga to Gambian nationals, and marketing of fresh demersal fish to tourists and medium and high-income brackets. Table 2-5 illustrates the prices of major fishes, where the low price of bonga is conspicuous. Fresh fish is dealt in fish sections of comprehensive retail markets in densely populated areas; bonga and processed fish products are actively handled out of the market as well. In residential areas and local areas, many fisheries products are sold also by fish peddlers, who are supporting the domestic marketing activities. In recent years, high quality fish derived from artisanal fisheries are often shipped by air to European countries. Table 2-6 shows recent fishing products export for The Gambia. The export has hanged low.

2-3-5 Fishery administration

The Fisheries Department of the Ministry of Natural Resources and the Environment of the Republic of The Gambia is in charge of the fishery administration of the country. The number of the officers of this Department is 107 as of 1991. The budget of the Fisheries Department for 1992/93 accounted for 1,094,570 Dalasis, and is equivalent to about 12% of the total budget of the Ministry; this ratio remains unchanged in recent years (See Table 1).

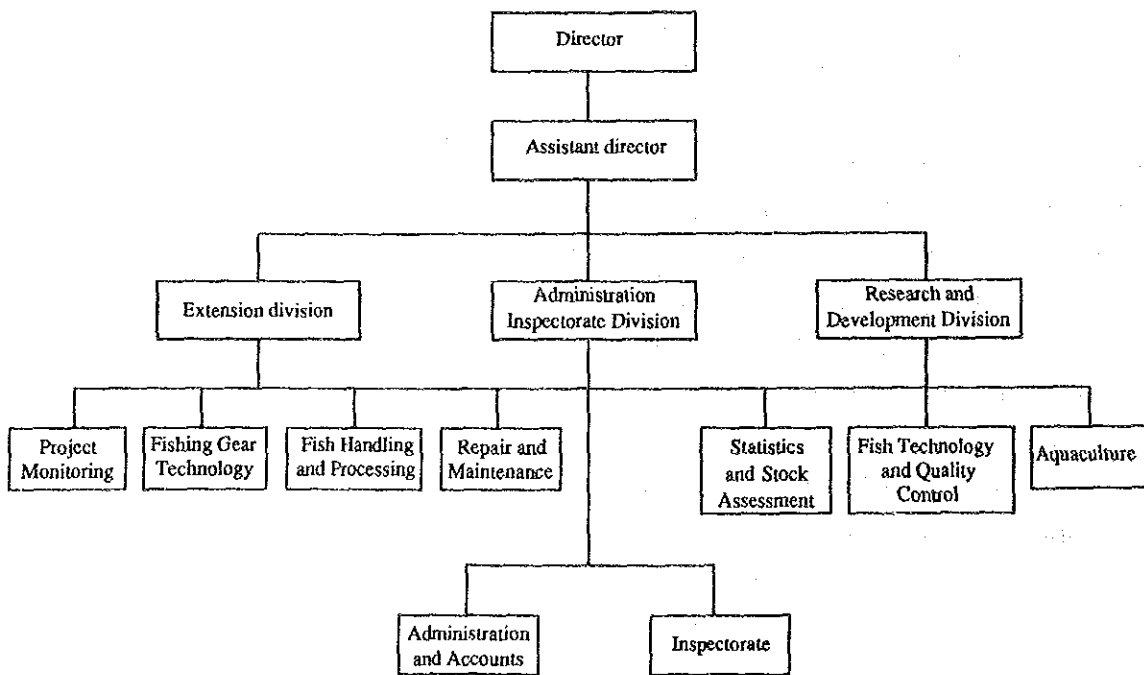
Figs. 1 and 2 illustrate the organization of Ministry of Natural Resources and the Environment and the Fisheries Department:

Fig. 1 Organization Chart of Ministry of Natural Resources and the Environment



(Source: Fisheries Department)

Fig. 2 Organization Chart of the Fisheries Department



(Source: Fisheries Department)

Table 1 Budget of Fisheries Department

(unit: Dalasis)

Fiscal year	1990/91	1991/92	1992/93
Budget of the Ministry	6,500,220	7,893,970	8,986,360
Budget of Fisheries Department (Component ratio in the budget of the Ministry)	788,951 12%	962,770 12%	1,094,570 12%
Breakdown			
Administration	--	170,810	136,770
Research and development	--	189,220	209,550
Extension	--	457,740	558,250
Expenses	--	145,000	190,000

(Source: Fisheries Department)

2-3-6 Fisheries development program

The following shows the objectives of the first fisheries development program (from 1975 to 1980):

- (1) 10% growth rate increase of total production
- (2) Improvement of nutritional standards
- (3) Rational long term utilization of coastal and inland fisheries resources
- (4) Increased employment and increase net foreign exchange earnings

The second fisheries development program (1981 to 1986) to take over the first fisheries development program takes greater interest in encouraging participation of private investment, in addition to the objectives of the first fisheries development program. The objectives of this program are given below.

- (1) Rational long term utilization of marine and inland fisheries resources
- (2) Using local fish as a means of improving nutritional standards of the population
- (3) Increased employment and net foreign exchange earnings
- (4) Expanded participation of Gambian private entrepreneurs in the fisheries industry

No individual fishery development program has yet been worked out for 1987 and thereafter, but action policies have been made public in PSD as taking over the objectives of the second fisheries development program.

2-4 Overview of artisanal coastal fisheries sector

2-4-1 Artisanal coastal fisheries

(1) Overview

Artisanal coastal fisheries of The Gambia have been under the influence of the traditional coastal fisheries of Senegal, and have been developed by applications of the techniques of Senegal fisheries. The operation using the Senegal type wooden canoe is the major form of the Gambian operation. Modes of fishing are surrounding gill net fishing for bonga, bottom gill net fishing for demersal fish, hand line fishing, and stow net fishing for small shrimps around the estuary of the River Gambia. Motorization of large sized fishing canoes with outboard engines for bonga fishing are gradually proceeding, but the rate of motorization is meager for small fishing canoes engaged in hand line fishing (See Table 2-7). The bonga fish as major products for artisanal fisheries are considerably lower in price than other fishes, and are used as important sources of animal protein for Gambian nationals.

(2) Fisheries production

The yield of artisanal coastal fisheries for 1991 registers about 20,000 tons. Looking at the transition of the yield for 1981 and thereafter, the production tends to increase, despite repeated annual fluctuations. Especially in 1987 and thereafter, steady growth is posted every year. The 5,000 ton level in 1987 has jumped to the 10,000 ton level in 1989, and to the 20,000 ton level in 1991, exhibiting a rapid growth in recent years (See Table 2-8). This is considered to be attributable to the increased productivity and number of people engaged in fishing, as a result of motorization and increased size of the fishing canoes, which have been promoted according to the artisanal coastal fisheries promotion policy implemented by Fisheries Department of The Gambia, assisted by overseas aid in 1981 and thereafter.

Looking at the species of fishes, the yield features a greater component ratio of bonga; approximately 80% is the average component ratio of the bonga production in total artisanal fisheries production during the period from 1988 to 1991. The major species except for bonga are croaker, barracuda, snapper, sea catfish, mackerel, shark and ray. Their prices are considerably higher than that of bonga.

Among them, the croaker and snapper are positioned in the daily life of the people as "fishes to be relished."

Observing the fisheries production by the fish landing spot, larger fish production is performed on the southern coasts including Gunjul, Tanji and Brufut. Going down the south, however, infrastructures such as roads and electricity supply worsen, and marketing conditions are handicapped. So in the south, fish landing spot is targeted to supply inland areas with smoked fish and dried fish products mainly consisting of bonga and sea catfish; and in the area close to Banjul such as Bakau, fish landing spot is targeted to supply urban inhabitants with fresh fish and foreign residents with demersal fish and shrimp. In Old Jeshwan fish landing spot close to the estuary of the River Gambia, fishing of only bonga close to 3,000 tons per year is carried out by 11 surrounding gill net fishing canoes, to support the domestic demands in the urban areas. However, since this landing spot is located at the upper part of the water channel branching off from the estuary of the River Gambia, navigation is interrupted at low tide, and the landing beach is too narrow to accommodate more fishing canoes than the existing ones, making it impossible to increase the production in future (See Table 2-9).

(3) Distribution of fishing canoes

Table 2-10 illustrates the distribution of fishing canoes for artisanal fisheries according to the major fish landing spots and fishing methods as of 1990. To see how fishing canoes are used according to fishing methods, the greatest percentage of canoes utilization is occupied by bottom gill net fishing, which is followed by hand line fishing, surrounding gill net fishing and stow net fishing, in that order. Observing the scale of the fishing canoes, the major canoes for bottom gill net fishing are the motorized canoes with outboard engines of 8 to 40 hp, having a length of 8 to 10 m, while those for hand line fishing are the sailing canoes having a length of 6 m or less, and motorized canoes with outboard engines of 15 to 25 hp, having a length is 8 to 25 m. Canoes having a bottom length of 10 to 15 m are used mainly for surrounding gill net fishing, and they are motorized by outboard engines of 15 hp to 40 hp. The local construction costs for the wooden canoes about 10 m long is about 30,000 Dalasis. Since they are launched from and landed on the beach, provided with wooden plates rough and carelessly laminated, they are often eaten by shipworms, and their service life is only three years or so.

Looking at the distribution of fishing canoes according to fish landing spots, the fishing spots with greater fisheries production tend to have stronger distribution of fishing canoes, but this is not always the case. This is because fish landing spots for more surrounding gill net fishing for bonga have greater production. Another reason is that the fishing people of The Gambia, similar to Senegal, are more likely to move in the fishing season, and they often land fish at the fishing spots other than those to which fishing canoes belong, resulting in differences between distribution of fishing canoes and actual landing spots.

(4) Fishing method

In artisanal coastal fisheries, the following major fishing methods are used according to the species of the fish: (1) Surrounding gill net fishing for mass school type pelagic fish such as bonga, (2) bottom gill net fishing for sea catfish, (3) drift gill net for migratory large fish such as barracuda, (4) bottom long line fishing for grouper and snapper and (5) hand line fishing for grouper and snapper.

(5) Fisheries infrastructures

1) Fish landing facilities

The Tanji fish landing spot has a wooden pile type jetty constructed under the aid of EC countries. This jetty is T-shaped, and measures a total length of 125 m, provided with T shape jetty of 10 m length, access way of 3.5 in width and the floor level of about 3.7 m. The jetty is also provided with the ladder to go up and down to the jetty, but since it is not a staircase, it often causes troubles in fish landing activities.

Banjul has an L-shaped concrete pile type jetty for a large scale commercial fishing port, which has a berthing section 30 m long, access way 45 m long, causeway 60 m long, and floor level of about 2.9 m. It is used by the trawl fishing vessels of fisheries company and wooden fishing canoes from the nearby fish landing spot on the opposite shore or from Senegal. The upper structures of the jetty are seriously damaged, and The Gambia Port Authority has issued an order to suspend its use.

2) Fish market

The metropolitan area of Banjul has three retailing markets to handle fisheries products as fish market sections of the general retail market. To engage in sales activities in the market place, it is necessary to pay an annual registration

charge of 150 Dalasis and 2 Dalasis for daily use of each sales table. Table 2-11 illustrates the scale and activities of the fish market. Generally only fresh fish are handled in the fish market, and such high-quality fish as barracuda and croaker are often handled. This trend is conspicuous especially in the fish market of Bakau which is covered by the project, since restaurants and hotels for foreign tourists are located nearby. From the viewpoint of the market scale, the Sere Kunda market boasting the densely populated area is the biggest in the country. This is followed by Bakau market. The scale of Banjul market is relatively small since it is not located in the residential area.

2-4-2 Artisanal coastal fisheries development activities

(1) Artisanal coastal fisheries improvement activities in Bakau area

1) History

The land facilities were constructed and fisheries equipment were supplied to promote the artisanal coastal fisheries at the Bakau traditional fish landing beach located about 11 kilometres away from Banjul, according to the Project for Improvement of Artisanal Coastal Fisheries implemented under the Japan's grant aid in fiscal 1991. The land facilities such as an ice plant and cold storage, artisanal processing support facilities, fishermen lockers and access roads; and the fisheries equipment are composed of FRP fishing canoes, outboard engines, fish boxes, fishing gears and insulated vans. The opening ceremony of these land facilities was held on 4 June, 1993 by the Government of The Gambia, and have been used by artisanal fishermen since 15 June, 1993. The following describes how these land facilities and fishing equipment are utilized.

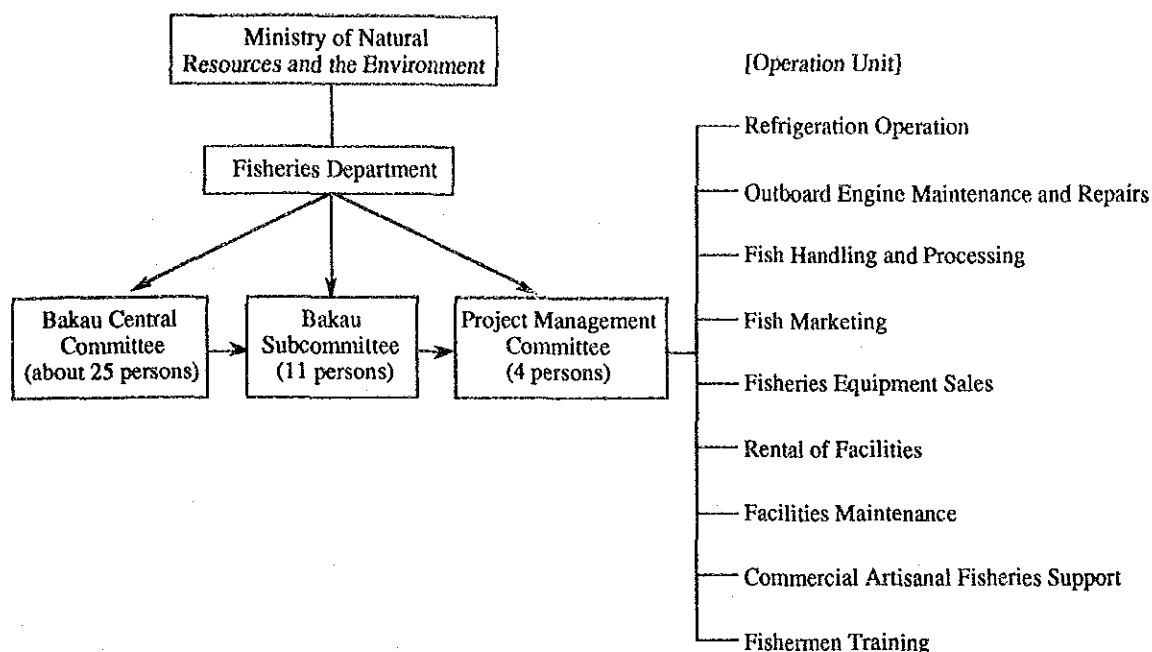
2) Management system

Fig. 3 illustrates the management system of the land facilities. The actual management bodies of the land facilities are the Bakau Subcommittee and the Project Management Committee subordinate to it. The Bakau Central Committee which is responsible to handle the regional problems of Bakau region and to control the regional issues are positioned above the Bakau Subcommittee, and makes final adjustment of regional problems. This management system is similar to those of the artisanal fisheries support facilities funded by EC countries and Italy. The Subcommittee is composed of one official of the Fisheries Department plus 10 people representing the inhabitants in the Bakau area, the fishermen and the processing sector, and it

takes charge of determining administration policies, personnel selection, accounting, auditing and regional issues adjustment. Table 2 show the members of the Subcommittee. The decision of the Subcommittee is finalized by the approval of the superordinate Bakau Central Committee composed of regional representatives including the responsible officer of the Fisheries Department. The Project Management Committee takes charge of operation of the land facilities by the members as shown with 4 management members and 18 staff members, as shown in Table 3.

In the management of the land facilities, facilities operation earnings, fisheries equipment sales and lease earnings are to be controlled at the special bank account as an artisanal fisheries promotion fund and allocated for future fisheries equipment replacement fund and related artisanal fisheries support expenses. The special bank account was opened by the name of the Bakau Fisheries Project account with the Bakau branch of the Meridien Bank on 24 June, 1993, and funds are kept under the management. In the operation during the period from 15 June to 28 July, a revenue of 101,550.25 dalasis and expenditures of 71,736.50 Dalasis are recorded, resulting in a operation profit of 29,813.75 Dalasis, which is managed under the special bank account (See Table 2-12).

Fig. 3 Organization Chart of Bakau Land Facilities Management



(Source: Fisheries Department)

Table 2 Bakau Subcommittee Member for Bakau Land Facilities

1. One alkali of Bakau
2. One alkali of Wassulung
3. One fish smoker
4. One fish drier
5. One fish trader
6. Two fishermen
7. One rep. of Bakau
8. One rep. of Wassulung
9. One rep. of Sanchaba
10. One rep. of Fisheries Dept.

Note 1) Wassulung and Sanchaba are districts closely related to the artisanal fisheries of Bakau

Note 2) "Alkali" means a caretaker to solve regional issues in each area

(Source: Fisheries Department)

Table 3 Project Management Committee Member for Bakau Land Facilities

1. Management Members

- 1) Project Manager (Rep. of fishermen)
- 2) Submanager (Rep. of fishermen)
- 3) Accounting Manager (Rep. of the region)
- 4) Technical adviser (dispatched from the Fisheries Department)

2. Staff members

- 1) Two refrigeration engineers (project members)
- 2) Three guards (project members)
- 3) Two trainers (dispatched from the Fisheries Department)
- 4) Two fisheries processing and statistics
(dispatched from the Fisheries Department)
- 5) Three for bill collection, fishing and marketing (project members)
- 6) One miscellaneous workers (project member)
- 7) Two cleaning persons (project members)
- 8) Two storage van drivers (project members)
- 9) One clerk (project member)

22 persons (of which 14 persons are project members)

(Source: Fisheries Department)

3) Utilization of the existing facilities and equipment

① Ice plant

The plant has been producing and selling ice from 15 June when the land facilities were opened. Daily ice sales records are illustrated in Table 2-13. Except for the four-day initial operation immediately after starting the operation, average daily sales is about 2,660 kg. Considering the daily production capacity is 3,000 kg, the utilization factor is about 89%, showing an effective use. The ice price is 1.0 Dalasis per kg, and the sales earnings amounted to 85,327 Dalasis as of 28 July. This is equivalent to 84% of the land facilities operation earnings, and this fact shows how the ice plant is supporting the management of land facilities. In the vicinity of Bakau, there is no ice plant where artisanal fishermen people can obtain ice. The ice making function of these land facilities is highly evaluated

from the viewpoint of assisting the artisanal fishing canoes visiting to and landing the fish at the Bakau fish landing spot. At present, the ice price is the same for both fishermen and general public. The price for the general public may be increased depending on the demand in future.

② Cold storage

The cold storage has been operating since the land facilities were opened. The use of the cold storage can be classified into two types; (1) storage of artisanal fisheries products such as bonga during the latter half of the landing time (4 p.m.) until the time of shipment on the following morning, and (2) storage of export samples until the time of shipment by air after the samples of fresh fish of the high-quality marine products are carried into the storage in the insulated boxes. The storage rent of one fish box containing about 35 kg of fish is 10 Dalasis for one day in the case of artisanal fishermen, and is 10 Dalasis for a 15-liter insulated box per day in the case of export traders. The cold storage earnings as of 28 July amounted to 14,492.25 Dalasis. Depending on the operation and the demands, the rent for export traders may be raised in future.

③ Fish smoking house

After opening of the land facilities, smoking ovens in the fish smoking house has been rented to fish smokers as predecessors at the Bakau fish landing spot on a priority basis. The monthly rent for one oven is 45 Dalasis. The bonga and sea catfish are the major materials for smoking at the Bakau area. Smoking time is 3 to 4 hours; this is shorter than that at remote fish landing spots. Short smoking has disadvantages in preservation, but advantages in taste. Smoking is mainly targeted at urban inhabitants who have keener taste. Smoking is started at about four o'clock when the fish landing is completed. Users of the smoking ovens are more numerous than the total number of the ovens. One oven is often used for smoking by two or three persons alternately late into the night. Prior to smoking, gills and guts are removed from fish, and are discharged on the beach. Since there are a group of resort hotels and tourists often visit the artisanal fisheries at the Bakau fish landing spot, the Fisheries Department is trying to find out some effective means to dispose of them. Efficiency of remove exhaust smoke from the smoking house is very poor, and the work is accompanied with difficulties, according to the Fisheries Department and smokers.

④ Fish drying shelves

After opening of the land facilities, the fish drying shelves have been rented to fish dryers as predecessors at the Bakau fish landing spot on a priority basis. Use of drying shelves was not active possibly because it fell on the rainy season during survey period. The monthly rent for one shelf is 45 Dalasis.

⑤ Fishermen lockers

The fishermen lockers have been rented to artisanal fishermen of this district on a priority basis. At the time of the survey, all lockers were used. Almost all the artisanal fishermen in the Bakau district come to the working place on foot. So convenience of the lockers which provide storage for fishing gears and outboard engines is considered to be very high. The monthly rent for one room is 40 Dalasis.

⑥ Fuel oil facilities

Gasoline sales have already been started. The fuel pump is rented to fuel traders at the monthly rent of 250 Dalasis. It is determined that a gasoline trader could purchase fuel oil for 3.9 Dalasis per liter free of consumption tax, and should sell it for 4.3 Dalasis per liter. The diesel fuel sales is not yet started due to small demand.

⑦ FRP fishing canoes

Four FRP fishing canoes have been supplied. One of them is used as the canoe NO.8 for fishermen training in Bakau implemented by the Fisheries Department, and is already been used for training. The other three canoes are rented to the artisanal fishermen in the Bakau district on a priority basis. For the time being, they are rented in the same way as in fishermen training project. Namely, the fishing canoe is lent free of charge, and 50% of the fish production is distributed as salaries for fishermen. The fuel cost is deducted from the remaining 50%, and the balance is incorporated into the artisanal fisheries promotion fund. The operating conditions are reviewed at intervals of three months. If profits in fisheries management are confirmed, the annual rent of fishing canoes with the outboard engines will be set up to start renting. The annual rent of 30,000 Dalasis is planned. Compared with the current wooden canoes, FRP fishing canoes with diesel outboard engine are strong and economical, so many

fishermen are hoping to use them. The Fisheries Department and the Bakau Subcommittee took the lead in selecting the candidates from the viewpoint of fishing experience, financial capacities and diligence.

⑧ Gasoline outboard engines

Ten engines having a capacity of 25 hp were supplied. Since gasoline outboard engines are the major method of motorization for the artisanal fisheries of The Gambia, there were a great number of applicants. The Fisheries Department and Bakau Subcommittee took the initiative to collect the protocol (evidence of their qualifications and employment records) from applicants to have an interview, and selected the appropriate users from the viewpoint of fishing experience, diligence and popularity in the region. As for the rent, 4,200 Dalasis will be paid as advance payment, and the monthly rate will be 545 Dalasis for the subsequent 18 months. The profits will be incorporated into the artisanal fisheries promotion fund, as in the case of the four FRP fishing canoes.

⑨ Insulated vans

The insulated vans will be used to transport fresh fish mainly to inland areas. As insurance coverage for insulated vans was finalized, their operation will start soon. The vans will be rented to fish traders in Bakau at the charge of 750 Dalasis per day for long transport and 350 Dalasis per day for short transport. There are many applicants for use because of the profitability of fresh fish transport services to remote areas such as the Basse region.

⑩ Fish boxes

Fish boxes have been rented since the opening of the facilities. They are put to comparatively active use for bonga landing. The daily rent of a fish box is 2.0 Dalasis. Rental management is carried out so that the user name, the number of the boxes to be rented and the signature of the user are given on the special register before the rent; when they are returned, the number of the boxes is checked, and the management personnel put down the signature.

(2) Artisanal fishermen training activities

1) History

In 1987, Fisheries Department worked out an artisanal fishermen training program to train the artisanal fishermen according to the practical training system for fishing and to extend assistance to trained fishermen to procure fishing canoes. This program has been gradually expanded. The background for this program is that the artisanal fisheries have come to draw attention as a source of animal protein for Gambian nationals, and that the construction cost of the fishing canoes has been increased due to shortage of timber for fishing canoe building materials, imposing a great burden on the development of the artisanal fisheries. Against this background, the artisanal fishermen training activities have come to be highly evaluated as providing major functions to promote artisanal fisheries.

Regarding the relationship between these training activities and Japan, the Fisheries Training Center was built adjacent to office of the Banjul Fisheries Department, funded by the Japan's grand aid for fiscal 1989, and is working as a basis for the training activities. As related equipment, three 13-meter FRP fishing canoes and 22 diesel outboard engines were supplied to this Center at the time of construction. Fisheries training activities are conducted as follows: The suitable sites are selected from the main fish landing spots and fishermen are trained according to so-called OJT (On-the-Job Training), using the training canoe owned by the Fisheries Department. Representatives of the Fisheries Department are dispatched to the selected landing spots for training, to handle the matters involved in supply of equipment and materials for training, management of the expenses and adjustment of regional problems. For selection of the trainees, applicants are collected from the specified site and trainees are selected strictly by checking protocols and interview. The number of applicants is reported to be great. Four to eight persons are selected for one training canoe according to fishing experience, enthusiasm, personality and reputation, with priority placed on young inexperienced people having greater enthusiasm. In order to make training substantial, however, one or two persons who have rich fishing experience and popularity but are unable to own the canoe are selected as trainee leaders.

With respect to the training expenses and earnings, training canoes (motorized type) owned by the Fisheries Department are used, and 50% of the earnings gained by fish landing are distributed to the trainees. Normally the trainee

leader gets 30% of this amount, and the balance is shared equally among other trainees. The fuel and maintenance costs are deducted from the remaining 50% of the landing earnings and the balance is incorporated into the artisanal fisheries promotion fund of the Fisheries Department. In addition, fishing gears and rain coats are borrowed free of charge from the Fisheries Department. After having finished the course, the FRP canoe lease right is awarded to the excellent trainees on a priority basis. They are also awarded with a letter of recommendation which is essential to get loans from private banks.

Though Tanji was only fish landing spot for training activities in the initial stage, five landing spots are currently used. More than one training canoe were used depending on one landing spot. In the near future, another landing spot will be added. The training period was several months in the beginning, but was later changed to the one-year period, which has been practiced on a steady basis. However, for fiscal 1993, the training period will be extended to 1.5 to 2 years.

Regarding the relationship with Japan, one fisheries expert was dispatched from JICA for the period of four years starting from 1988, and took charge of entire training activities in Tanji. From 1991 up to the present, another fisheries expert has been dispatched to the office of Banjul Training Center, to provide instruction and assistance for the entire fisheries training activities.

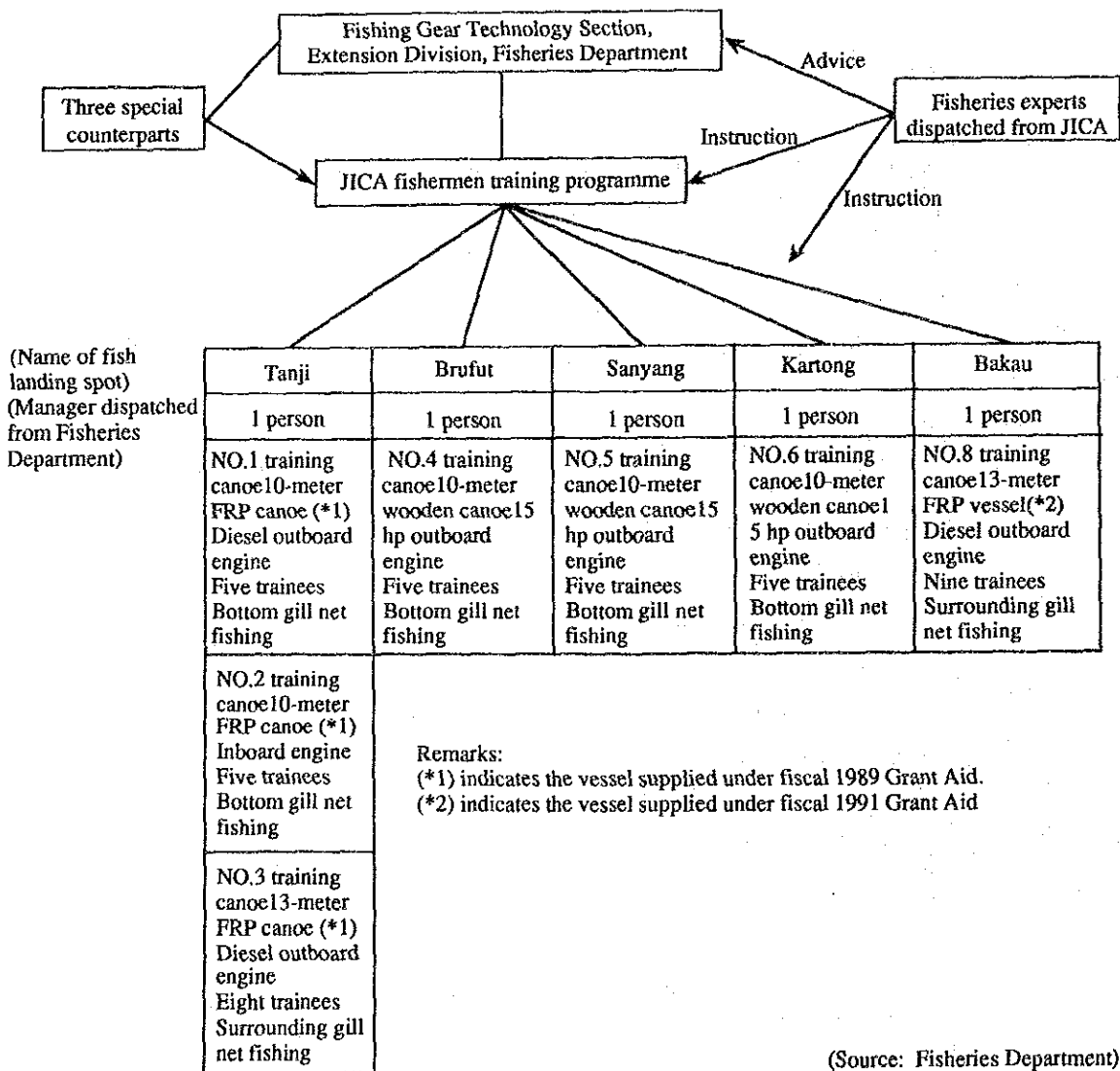
These experts dispatched from JICA, together with the fishing equipment and gears supplied under the Japan's grant aid, are making a significant contribution to the promotion of the artisanal fishermen training activities in The Gambia. In the fiscal 1992 training activities, training for 24 trainees was carried out for one year starting in April 1992 at four fish landing spots, using five training canoes. This training course was completed in March 1993. One of the problems which emerged with the completion of the training is the shortage of fishing canoes to be lent to the trainees. Three of the five training canoes were the FRP fishing canoes supplied from Japan. Once the trainees have used the FRP fishing canoes, they are very eager to use the FRP fishing canoes.

2) Current artisanal fishermen training activities

Fig. 4 illustrates the training system which has been practiced since April 1993. The current training system takes over the training system so far, but the

positioning of the management people is clearly defined. One of the greatest characteristics of the current training is to change the training period from 1 year to 1.5-2 years. This is because fishing equipment including the FRP fishing canoes and fishing gears to be rented out to the trainees having completed the course have not yet been procured. As for the FRP fishing canoe to be rented out to the trainees having completed the course, one canoe is planned to be rented out to each operation team, which is organized by two or three trainees. In the fiscal 1993 training, five fish landing spots were selected, and seven training canoes were used for a total of 42 trainees.

Fig. 4 Artisanal Fishermen Training System for Fiscal 1993



(Source: Fisheries Department)

(3) Artisanal fisheries development activities related to other foreign aids

1) EC aid

A facilities construction and technical cooperation program funded by EDF (European Development Bank) were implemented during the 12-year period from 1979 to 1991 in the major fish landing spots in Gunjul, Batokunku, Brufut, Tanji, Sanyang and Karton, where the basic policy of fishing village development was to achieve increase in fish catches by the growing distribution of fishing canoes and improved fishing technique, increase in incomes of fishermen, improvement in processing and storage technologies, increased fish consumption by improved marketing system, and absorption of the excessive labor force in village by employment creation. The above mentioned fish landing spots selected in the Program are provided with the extensive coast line extending shallow to a great distance from the shore. They have been prosperous as traditional fish landing facilities for fishing canoes. Since they are a little distant from the fishing villages, however, an ice plant was built in Brikama, a convenient place from any of these spots, as part of the improvement of the road networks connecting two points and marketing networks.

Except for part of the fish sorting places, all fish landing facilities are generally utilized effectively. Engineers of the Fisheries Department are stationed at the workshops to provide instruction and advice to the fishermen. Ice plants are transferred from the jurisdiction of the Fisheries Department to that of the private sector.

2) Italian aid

While aids by the EC countries are extended to the fishing villages on the Atlantic Ocean, aids by Italy are extended to a total of eight villages down the River Gambia; four fishing villages, Barra, Albreda, Jurunku and Salikene on northern shores, and the four fishing villages, Bintang, Kemoto, Tankular and Tendaba on southern shores. The facilities construction started in February 1987, and are completed now. Instruction and advice are given by Italian consultants regarding management of the facilities.

The contents of the facilities are almost the same. Facilities are composed of offices, workshops, fishermen lockers, fish sorting places, fish smoking houses and fish drying shelves. Barra on the north and Bintang on the south are provided with the ice plants, in addition to the above mentioned facilities.

This aid is intended to increase fish catches in riparian fisheries and to improve marketing; development of the villages including cleaning and leveling of the access road to fishing villages detached from the trunk road is carried out under this program.

The facilities are generally used effectively. Fresh fish distribution is still stagnant probably because of the geographical inconvenience of being detached from the trunk road and major consumption site or because of shortage of ice supply.

2-5 Outline of the request

2-5-1 Background of the request

The Republic of The Gambia has rich fisheries resources compared with the national size. Fisheries production of the country in 1991 registered about 43,000 tons, of which about 20,000 tons were occupied by production of the artisanal fisheries. The major fish species is bonga, which accounts for 80% of the total fish catch of artisanal fisheries.

Contribution of the marine products to Gambian nationals is very important. The fish is said to account for 90% of the animal protein supply, but the supply of the domestic marine products is not considered to meet the latent demands. For this reason, increase in artisanal fisheries production is expected in order to improve nutritional standards of the people. At the same time, artisanal fisheries development is regarded as a priority category for national development, in the sense that it promotes increased employment and raises the level of food self-sufficiency.

The artisanal fisheries of The Gambia are developing from non-motorized canoes fisheries to motorized canoes fisheries with outboard engines through promotion of a great variety of development program. While the productivity of these artisanal fisheries are making a gradual improvement, there is a great delay in the establishment on of the fish landing facilities, fish preservation facilities and marketing facilities which are infrastructures to support artisanal fisheries activities, and this delay is retarding further development promotion. Furthermore, efforts are being made to switch from the motorized canoe operation with gasoline outboard engines featuring relatively high operation expenses to the use of diesel engines.

Under these circumstances, the Government of the Republic of The Gambia has requested Japan to extend the grant aid assistance to procure fisheries equipment which are the means of fisheries production, to construct the basic facilities for smooth fish landing and treatment after landing, and to procure equipment for quick transportation and marketing; this is intended to increase the marine production and to make an effective use of the fish catches by creating of infrastructures for artisanal fisheries in the Bakau area inside the metropolitan area. In response to this request, Japan's grant aid was implemented in fiscal 1991 for construction of the land facilities such as cold storage which are more urgently required. With the construction of such land facilities, artisanal fisheries activities in Bakau have become more active whereas inefficient fish landing due to shortage of proper landing facilities is coming to the surface. Against this background, the Government of The Gambia requested Japan to extend the grand aid to construct the landing jetty and procure the equipment in order to promote effective use of the facilities supplied by the fiscal 1991 grant aid assistance, to reduce the preparation time for fishing and fish landing time for artisanal fishing people, and to improve safety in fishing and landing operations, thereby ensuring increased fish catches through improved marine production efficiency.

2-5-2 Contents of the request

Facilities and equipment requested for the project are as follows:

① Facilities

Construction of landing jetty including access way 1 Unit
(approach way)

- | | |
|------------------------|----------------------------------|
| (A) Jetty | Structured with steel pipe piles |
| Length | 63m |
| Width | 6m |
| (B) Approach way | Structured with steel pipe piles |
| Length | 72m |
| Width | 5m |

② Equipment

1.	Purse seiner FRP 4 ton	2 Units
	FRP boat 13m long	10 Units
2.	Outboard engine (gasoline) 25HP	20 Units
	Outboard engine (diesel) 27HP	20 Units
	Spare parts for above outboard engines	1 lot
3.	Fishing gears	1 lot
4.	VHF radio telephone (150MHZ)	6 Units
5.	4WD car	2 Units
6.	Tools for carpenter shop	1 lot
	(Canoe repairing)	

CHAPTER 3 OUTLINE OF PROJECT AREA

CHAPTER 3 OUTLINE OF PROJECT AREA

3-1 Location and socioeconomic situations at project site

The project site is the Bakau fish landing spot where land facilities were constructed under fiscal 1991 Japan's grand aid. Fig. 5 illustrates the map around the project site.

The project site is located on the beach adjacent to the Bakau commercial district along the Atlantic road about 11 kilometres west of Banjul. Bakau city stretches from the commercial area about 3 km from east to west, and 3 km from north to south, bordering Cape Point area in the east, Fajara in the west and Latri Kunda and Sere Kunda, Latri Sakiji in the south. These regions stretching in all directions from Bakau city form the residential area of about 20 km².

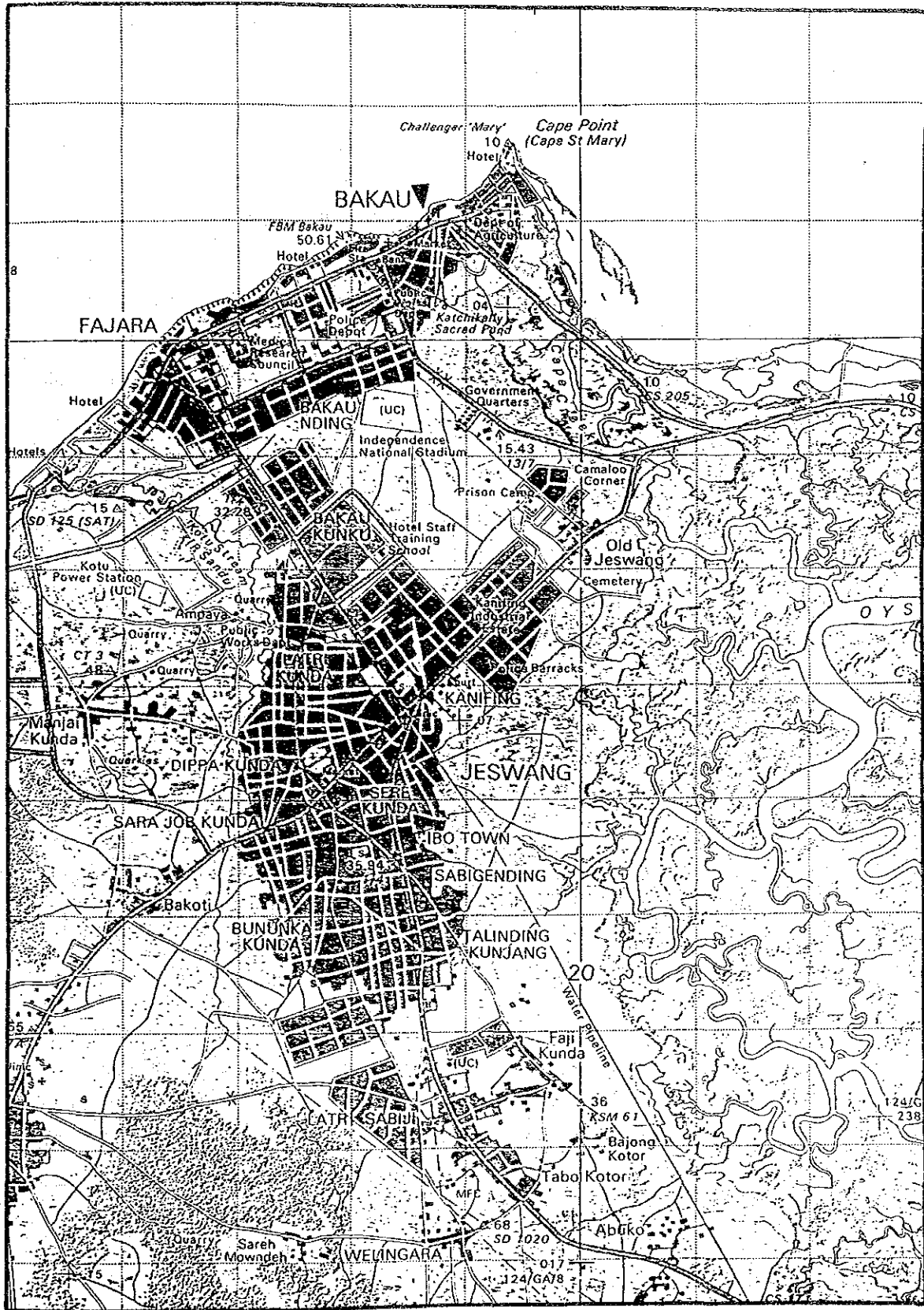
Further, they are connected to Banjul by means of paved highways, and the population of the metropolitan area of Bakau and Banjul is estimated at about 200,000.

The Bakau commercial area in the hinterland of the project site is lined with banks, general retail markets, shops, modern supermarkets, fire fighting stations and churches. The project site is located at the beach underside of the hospital and churches built along the coast, having the Atlantic road in-between from the general retail market. As an access to the site, an access road having a width of 4 m and branching off from the Atlantic road is constructed funded by the fiscal 1991 Japan's grant aid.

The project site is featured by installation of a great number of resort type hotels. Table 3-1 shows the number of hotels around the project site. A total of seven resort type hotels (accommodating 1,533 beds) are situated along the coast in the Bakau and Fajara areas less than 2 km in the east to west direction from the project site. Nine resort type hotels (accommodating 2,104 beds) are located in Kotu and Kololi areas positioned 5 to 6 km away on the west side, and resort type hotels (accommodating 1,486 beds) are found in Banjul. Tourists visiting this country are accommodated by these hotels. The tourism of The Gambia continued to grow in the 1980s, and the number of foreign visitors tripled in the same decade. The major percentage of the tourists come from Britain; many people also visit this country from northern Europe. The busiest tourist season is from December to March; however, several thousands of tourists visit this country every month throughout the year. (See Tables 3-2, 3-3 and 3-4).

The group of the resort type hotels located around Bakau own private beaches. On the east side of the Kololi area, there are few beaches which can be used as a fish landing spot for artisanal fisheries. The Bakau fish landing spot has been regarded as an important fish landing spot for artisanal fisheries in this area.

FIG.5 MAP OF PROJECT AREA



1 km

3-2 Natural conditions at the project site

3-2-1 Natural conditions in general

(1) Climate

The climate of The Gambia belongs to that of a tropical savannah. There is a conspicuous difference of precipitations between the dry seasons from November to May and the rainy season from June to October throughout the nation, but the climatic change, especially the change of the maximum temperatures, is comparatively moderate (See Table 3-5).

1) Temperature

There is no meteorological record for the Bakau fish landing spot of the project site, but there are meteorological records for Banjul on the coast area about 11 km to the west of the project site and for Yundum at the inland area about 16 km to the south of the project site. They are shown in Table 3-5. Since the project site is positioned on the coast, the meteorological conditions at the project site is considered to be similar to those at Banjul. Annual changes of the maximum temperatures for each month at the observatory point at Banjul are within the range from 31°C to 35°C, and changes of the minimum temperatures for each month at the observatory point at Banjul are within the range from 18°C to 26°C, showing comparative small changes of the maximum temperatures.

2) Humidity

According to the relative humidity record at Banjul and Yundum, there are marked changes of humidities between the dry and rainy seasons at Banjul on the coastal area where the topological conditions are similar to those of the project site. Relative humidity is almost zero percent in the dry season, but it reaches close to 160% in August at the height of the rainy season.

3) Precipitation

Annual precipitation in 1990 recorded about 715 mm in Banjul and about 557 mm in Yundam. Considering the average annual precipitation of about 1,400 mm in Tokyo, annual rainfall in this country is comparatively small. However, rainfall is concentrated in the period from June to October, especially in the three-month period of July, August and September, the monthly rainfall in Banjul posts close to 400 mm in August at the height of the rainy season.

4) Wind

According to the record for the past three years by the Water Resources Department, gusts of 20 m/sec or more tends to occur in the rainy season. The gusts of about 23 m/sec recorded in the past. The prevailing wind direction is west-northwestern direction throughout the year, registering the average maximum wind velocity of 5 to 6 m/sec. However, the western wind becomes prevailing from December to February, with the average maximum wind velocity marking 10 m/min. Windy days are often to be experienced in this period.

(2) Geographical features

The geographical features of the coastal area of The Gambia comprise the surface soil of laterite in red brown, and sedimentary rocks are partly exposed. Since the rain fall is concentrated in the rainy season, laterite or consolidated laterite is likely to be destroyed by rain.

Sands heated on the coastal area are white or black in color, and are assumed to have been brought from up the River Gambia. In recent years, part of the beach is used to collect fine aggregates for concrete, and the foreshore line has receded in some cases.

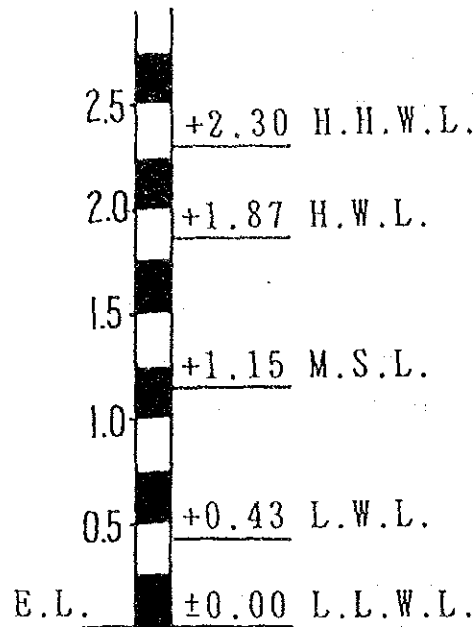
The project site is located to the south of estuary of the River Gambia. Since the estuary faces north, and the prevailing coastal current is northwestern, sedimentation is estimated to be small. According to the survey by hearing, it is necessary to work out the facilities plan so that the facilities to be constructed are protected against fluxing action. The sea bottom at the project site deepens at the sea bottom inclination of about 1/30 from the high water level on the sea side. In echo-sounding survey at the time of field survey, rocks were found to be partly exposed.

(3) Hydrology

1) Tide level

The tide level around the project site is recorded by a Banjul tide level observatory located about 11 km east of the project site. The CDL which is the elevation level for the marine chart is used as a standard level for tide level observation. This CDL is on the same level as public elevation level (EL) in The Gambia. Fig. 6 illustrates the relationship between these levels and the tide level.

Fig. 6



Tide level records at the time of survey at the project site are adjusted by comparing them with the record taken at the Banjul tide level observatory.

2) Current velocity

On the water surface at the project site, waves are normally caused by western winds. The current on the surface flows from west to east. According to the result measuring the current velocity at the time of site survey, water below the surface flows from east to west when the tide changes from low water to high water, and from west to east when the tide changes from high water to low water. The maximum current velocity is 0.4 knots according to the result measuring the current velocity at the time of site survey. The data on the current flow in winter when northern waves are prevailing could not be collected in the field survey. The flow velocity is expected to increase over that at normal times. Incidentally, current survey for the 1991 Japan's grant aid was conducted in December, and the maximum current velocity was 0.6 knots.

3) Wave

When the normal western wind prevails at the project site, short-cycle waves caused by winds prevail. In winter, however, the swelling waves coming from the Atlantic Ocean reaches the project site. According to the survey conducted by hearing, the wave height is said to mark 2 m close to the offshore line.

3-2-2 Field survey for natural conditions

(1) Topographic survey

Plain table survey and level measurement were conducted at the time of site survey. Elevation level was used as the standard level for height. The bench mark used for topographic survey is located at the top end of side wall of the sewage channel, and the level is EL plus 3.4 m.

(2) Sea Bed survey

At the project site, depth sounding was conducted by sounding lead 300 m offshore from the average high water line at the time of site survey. An echo-sounding device was also used for depth sounding, and results of two measurements were compared for study.

(3) Soil quality survey

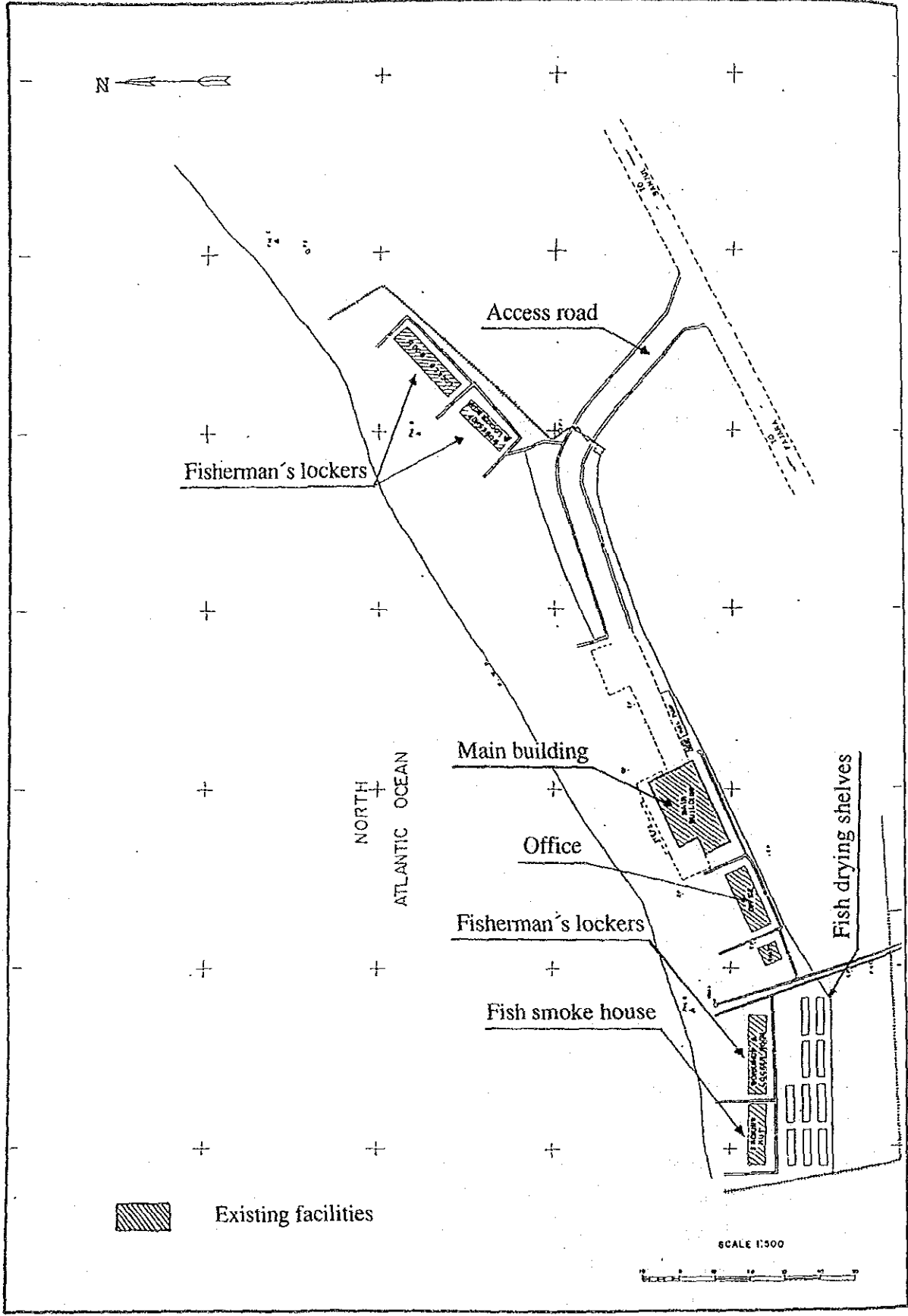
Boring survey was not conducted in the present site survey. In the basic design study on the Project for Improvement of Artisanal Coastal Fisheries in fiscal 1991, boring survey was conducted in December 1992 at the fish landing facilities construction site for this project. The result of this boring survey will be used to get the geological structure as well as information and soil quality constant required for design (See Appendix VII).

Fig. 7 illustrates the current conditions of the project site.

3-3 Artisanal fisheries at the project site

Around the project site, artisanal fisheries are operated based on the Bakau fish landing spot. Looking at the ranking of the Bakau fish landing spot in all the artisanal coastal fisheries of The Gambia in 1992, the fish landing in this spot accounts for 3.7% of the total fish landing (See Table 2-9) and the number of the fishing canoes of this spot occupies about 10% of the total fishing canoes (See Table 2-10).

Fig.7 Current Conditions of the project Site



The fish landing at the Bakau fish landing spot started to grow in the mid-1980 because of the increase in the population inhabiting the surrounding area and the development of tourism, and the annual fish landing in 1991 registered 735 tons. Fish landing activities are performed throughout the year. According to the recent data on the monthly fish landing, good results are registered in January, February, March and September, while results are poor in August, November and December (See Table 3-6). Vessels landing fish at the Bakau spot are local fishing canoes (their number was identified as 42 in 1993) and fishing canoes visiting from the adjacent spots such as Brufut. Many of the visiting fishing canoes are bottom gill net fishing canoes which land the valuable demersal fish. These visiting fishing canoes land the fish at Bakau because there is a general retail market on the hinterland of the Bakau spot, and delivery to nearby restaurants and hotels is easy, so many fish brokers gather there. According to the survey by hearing conducted at the time of site survey, 10 to 20% percent of the bottom gill net fishing canoes belonging to the Brufut fish landing spot are said to visit the Bakau fish landing spot. As a result, the composition of the fish landed at the Bakau fish landing spot is characteristic in that the percentage of bonga is relatively small. The percentage of bonga in the entire artisanal fisheries is about 79%, whereas that in the Bakau fish landing spot remains 63% (See Tables 2-8 and 3-8). By contrast, such valuable fishes as croaker, barracuda, grouper and snapper account for a greater percentage, and the percentage is growing in recent years. The Bakau area is inhabited by more high-income people than Sere Kunda and Banjul areas, and there are many resort type hotels and restaurants for tourists. These factors have led to such characteristic composition.

These characteristics in the composition of the fish species be landed are also represented in the composition of fishing methods adopted by fishing canoes based on the Bakau fish landing spot. Table 4 shows the number of the current local canoes at the Bakau fish landing spot. The hand line fishing canoes account for about 78% of the current 42 canoes. It shows greater percentage of the hand line fishing targeting at the grouper and snapper. At present, many of these hand line fishing canoes depend on hand rowing and sailing. The greatest desire of the fishermen is to expand the fishing area and to improve the productivity by motorization of the canoes with outboard engines. The percentage of the bottom gill net fishing canoes (See Table 2-10) is smaller than that of the national average level. This is considered to be the reason why the bottom gill net fishing canoes visiting from Brufut land fish at the Bakau fish landing spot. By contrast, at the Bakau fish landing spot, the surrounding gill net fishing canoes which have been mainly targeting at bonga are starting multi-operation by engaging in the bottom gill net fishing according to different fishing seasons.

Table 4 Local fishing canoes at the Bakau fish landing spot (as of July 1933)

Fishing method	Surrounding gill net fishing	Gill net fishing	Small sized hand line fishing	Large sized hand line fishing	Total
Number	4	5	30	3	42
Average length	10.5m	9.3m	5.0m	10.0m	
Average draft	0.8m	0.7m	0.4m	0.8m	
Average fish landing (kg/day)	626	62.5	13.3	66	

Remarks: Three FRP fishing canoes funded by the 1991 Japan's grant aid are not included.

(Source: Fisheries Department)

Many of the fishermen of the local fishing canoes in the Bakau area live in the area several kilometers away from the hinterland of the project site. Most of them commute to the landing spot on foot early in the morning. They launch into the sea their canoes which have been pulled on the shore and dried after completing the landing on the previous day. Since the water close to the Bakau fish landing spot is shallow to a great distance from the shore, water recedes as long as an average of 50 m from the high water line at the time of low water. So departure from the shore must be delayed or considerable labor force and time must be used to launch the canoes.

Except for the large sized hand line fishing canoes, all canoes are operated on the one-day operation basis. Fish are landed a little past 12 o'clock at noon in early cases, but normally at 1 to 4 o'clock in the afternoon. This is because fish smokers must start smoking before nightfall after removing gills from the landed fish, and fish must be made ready to be in time for the evening market and for the trade with fish peddlers. In The Gambia, the Government offices close at 4 o'clock, and private offices at 5 o'clock. Evening purchase starts around this time.

Except for the large sized hand line fishing canoes which are engaged in continuous operation for several days, the fishing area is near, and most of small sized hand line fishing canoes perform operations at positions within one hour from the spot; this is applicable to the case of fishing on the sea near the landing spot, surrounding gill net fishing and bottom gill net fishing. This is because preparation for departure for fishing depends on the tide, and time is limited to complete fish landing before nightfall. To ensure actual operation time, it is necessary to reduce the time of moving to the fishing grounds. This situation has been a bottle neck for the promotion of

artisanal fisheries. Since the small sized hand line fishing canoes are non-motorized canoes, they can operate only on the sea close to the landing spot. This results in concentration of fishing in the limited fishing grounds.

The basic design study team made a survey of the actual situation of artisanal fish landing by fishing canoes belonging to the Bakau fish landing spot under the cooperation of the Fisheries Department at the time of site survey. Tables 5 and 3-8 summarize the result of the survey. When the actual situation was surveyed, 17 to 19 fishing canoes landed fish at the Bakau fish landing spot. This number corresponds to about 43% of the current prevailing 42 canoes. The number of average fishing days for the canoes belonging to the Bakau fish landing spot is 275. So when consideration is given to that fact that the fishing rate is 75% (275 days/365 days) or fish landing season index for July at the Bakau fish landing spot is 74 (See Table 3-5), then the average fishing rate for July can be calculated to be 56% (0.75×0.74). The fishing rate at the time of actual situation survey, was slightly smaller than the average rate, but it is considered to reflect the actual situation.

Table 5 Fishing preparation and fish landing time for artisanal fishing canoes at the Bakau fish landing spot

Date	Fishing method	Number of canoes	Number of crew	Preparation for fishing			Time of fish landing		
				Loading the equipment (min.)	Launching the canoe (min./subtotal)	Number of helpers (number of person)	Fish landing (min.)	Landing the canoe (min./subtotal)	Number of helpers (min./subtotal)
3 July	Surrounding gill net	4	7	16	10/26	14	57	11/68	11
	Hand line fishing	12	1	10	5/15	2	12	4/16	4
	Bottom gill net fishing	1	2	13	8/21	2	10	13/23	4
	(Total)	(17)							
4 July	Surrounding gill net	4	7	21	6/27	12	47	10/57	10
	Hand line fishing	12	1	8	3/11	2	8	5/13	4
	Bottom gill net fishing	1	2	17	12/29	9	12	2/14	8
	(Total)	(17)							
5 July	Surrounding gill net	4	7	19	6/25	7	59	13/72	13
	Hand line fishing	14	1	9	3/12	2	9	3/12	5
	Bottom gill net fishing	1	2	13	8/21	8	10	12/22	5
	(Total)	(19)							

Note 1: Time and number of persons in the Table denote median values.

Note 2: The following shows the tide during observation.

3 July	high water	9:38, 21:52	low water	3:19, 15:57
4 July	high water	10:20, 22:36	low water	4:06, 16:42
5 July	high water	11:01, 23:15	low water	4:49, 17:24

(Source: Field Survey)

Fish landing is concentrated from 1 to 4 o'clock in the afternoon. It reveals that a great amount of catches are landed by the surrounding gill net fishing canoes and large sized hand line fishing canoes, using the fish box and plastic bucket (See Table 3-8).

Looking at the result of the time for departure and fish landing given in Table 5, it can be seen that launching of the canoes into water at the time of departure and landing of the canoes from water at the time of return require the time and number of persons conforming to the canoe size and volume of fish catch. The observed value denotes the time required after the canoes have started to move. In the case of lightweight canoes such as small sized hand line fishing canoes, departure for fishing is

delayed or suspended when the sea is windy, or the fishermen out on fishing wait until the sea becomes calm.

At the time of actual situation survey, preparation for departure such as loading of the equipment and launching of the canoes took 25 to 30 minutes for surrounding gill net fishing canoes, 12 to 15 minutes for the small size hand line fishing canoes, and about 20 minutes for the bottom gill net fishing canoes. The fish landing time depends on the volume of the catch. The fish catch at the time of observation was smaller than the average fish catch (fish landing season index: 74). Fish landing was operated at 50 to 60 minutes for surrounding gill net fishing canoes, and about 10 minutes for the small size hand line fishing canoes and bottom gill net fishing canoes.

Artisanal fisheries at the Bakau fish landing spot became active only in recent years. The background was as follows: The fresh fish market was formed because of the progress in developing the housing lot in Bakau and Sere Kunda districts, and the fish landing area near the Bakau district was reduced by exclusive use of the beach resulting from hotel construction. This has caused fish landing to be concentrated at the Bakau fish landing spot. Furthermore, development of the tourism industry encouraged the consumption of high-priced fish at hotels and restaurants. The spot has come to have characteristics that the percentage of bonga which is for the general public at the Bakau fish landing spot is relatively low, while such high-priced fishes as croaker, grouper and snapper account for relatively high percentage. Such activated fish landing operation has been further encouraged by the construction of such land facilities as ice plants and artisanal processing support facilities. This is leading to a formation of a local community which also contains loading service and food sales accompanying the artisanal fisheries operation.

Taking advantage of such location conditions, the Fisheries Department is planning to promote the Bakau fish landing spot as an urban & tourist resort type fish landing place for artisanal fisheries. The major points of promotion measures are as follows: (1) improvement of fish freshness by establishment of ice supply system and improvement of fish landing efficiency, (2) improvement of hygienic environment for fish landing, and (3) instruction to give "value added" in the management of the fisherman's household by promoting multi-operation of the surrounding gill net fishing, bottom gill net fishing and large size hand line fishing operations. Regarding the trend of the fishing canoes which permits increase in fish production, the Fisheries Department estimates a natural increase in the number of the fishing canoes at the Bakau fish landing spot, shown in Table 6. It assumes that the increase in the number of the fishing canoes will occur to the small size hand line fishing canoes. This is

because the fishermen can afford to make investment only in the construction of a low-priced small size hand line fishing canoe. In this connection, the Fisheries Department plans to cultivate the surrounding gill net fishing, large size hand line fishing and bottom gill net fishing operators by promoting the fishermen training program and fishing canoe building support project related to it, thereby achieving increase of fisheries production and increase of added value in the operation. Furthermore, the Department plans to motorize small size hand line fishing canoes by mounting the outboard engines, thereby ensuring improvement of operation capability.

Table 6 Estimated natural increase of the number of fishing canoes
at the Bakau fish landing spot

(unit: number of canoes)

Fishing method	Fiscal year				
	1993 (current situation)	1994	1995	1996	1997
Small size hand line fishing	30	31	34	37	40
Gill net fishing	5	5	5	6	8
Large size hand line fishing	3	3	4	6	9
Surrounding gill net fishing	4	4	5	7	8
Total	42	43	48	56	65

(Source: Fisheries Department)

CHAPTER 4 OUTLINE OF THE PROJECT

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4-1 Objectives

In the Bakau fish landing spot which is becoming a fish supply base for the metropolitan area of The Gambia, artisanal fisheries operations are becoming more active as artisanal fisheries support land facilities are improved. However, further development of the artisanal fisheries is bottlenecked because of insufficient fish landing facilities and shortage of fishing equipment. To solve these bottlenecks, this project is intended to prolong actual fishing operation time and to improve fishing operation efficiency and fishing equipment by building adequate fish landing facilities in the Bakau fish landing spot and by improving artisanal fisheries fish landing efficiency. At the same time, it is also intended to increase the fish production of artisanal fisheries and to improve added values in the management of the artisanal fisheries household by supporting the artisanal fisheries operations; furthermore, it aims to maintain a system to supply animal protein to Gambian nationals inhabiting metropolitan area. The followings show detail objectives.

- ① The project year shall be 1995, when construction of the facilities under the project is assumed to complete.
- ② To provide appropriate fish landing facilities at the Bakau fish landing spot and to establish fish landing support functions as an urban & tourist resort type fish landing place for artisanal fisheries. This is intended to improve efficiency of the fish landing operations of artisanal fisheries, to promote artisanal fisheries operations at the Bakau fish landing spot and to improve added values of the operations, thereby making contribution to the development of the local communities.
- ③ To promote improvement in the artisanal fisheries operations such as adoption of multi-operations of surrounding gill net fishing at the Bakau fish landing spot, to support replacement of existing large wooden canoes and the canoe distribution system for new comers, and to improve the production capacity of artisanal fisheries by introducing the FRP fishing canoes.
- ④ To reinforce the system of supplying the fisheries equipment such as outboard engines and fishing gears, to maintain the artisanal fisheries operations at the