No. 1

BASIC DESIGN STUDY REPORT ON THE PROJECT FOR IMPROVEMENT OF THE FEDERAL FISHERIES SCHOOL, NIGERIAN INSTITUTE FOR OCEANOGRAPHY AND MARINE RESEARCH IN THE FEDERAL REPUBLIC OF NIGERIA

FEBRUARY, 1990

JAPAN INTERNATIONAL COOPERATION AGENCY

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ON
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PREFACE

In Response to the request of the Government of the Federal Republic of Nigeria, the Government of Japan has decided to conduct a Basic Design Study on the Project for Improvement of the Federal Fisheries School, Nigerian Institute for Oceanography and Marine Research and entrusted the study to Japan International Cooperation Agency (JICA).
JICA sent to Nigeria a survey team headed by Masahiro Fujimura, Deputy Director, International Affairs Division, Oceanic Fisheries Department, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries from September 26 to October 23, 1989.

The team exchanged views with the officials concerned of the Government of Nigeria and conducted a field survey in Lagos. After the team returned to Japan, further studies were made. Then, a mission was sent to Nigeria in order to discuss the draft report and the present report has been prepared.

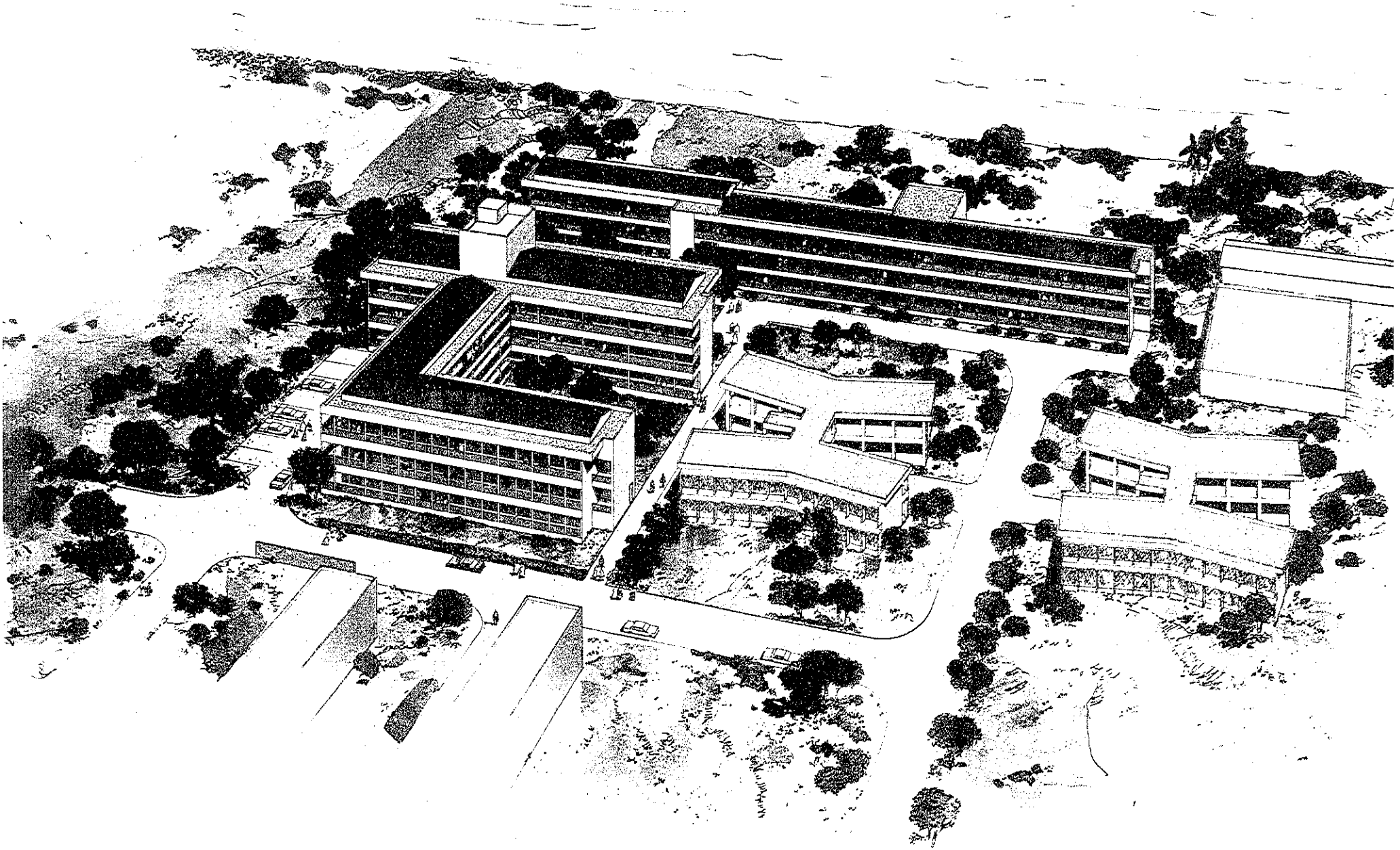
I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Federal Republic of Nigeria for their close cooperation extended to the team.

February, 1990

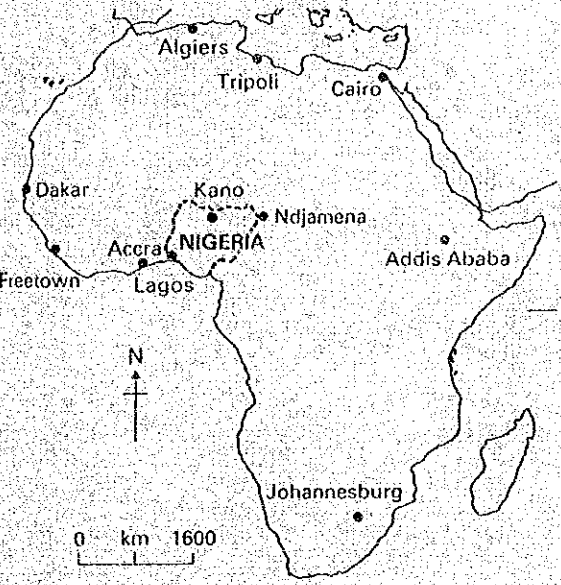
Kensuke Yanagiya

Kensuke Yanagiya
President
Japan International Cooperation Agency

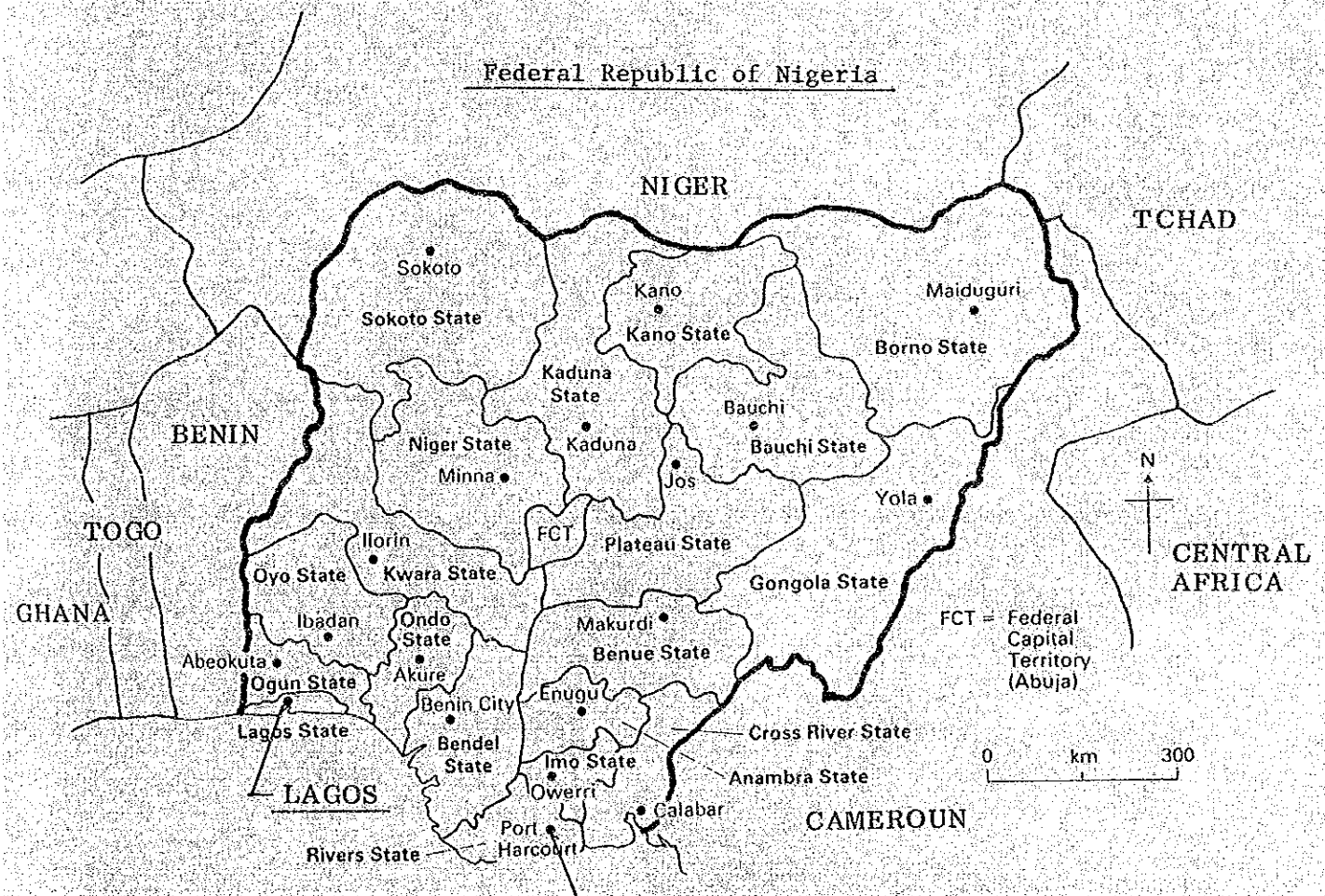


PROJECT FOR IMPROVEMENT OF THE FEDERAL FISHERIES SCHOOL, NIOMR

The Continent of Africa



Federal Republic of Nigeria



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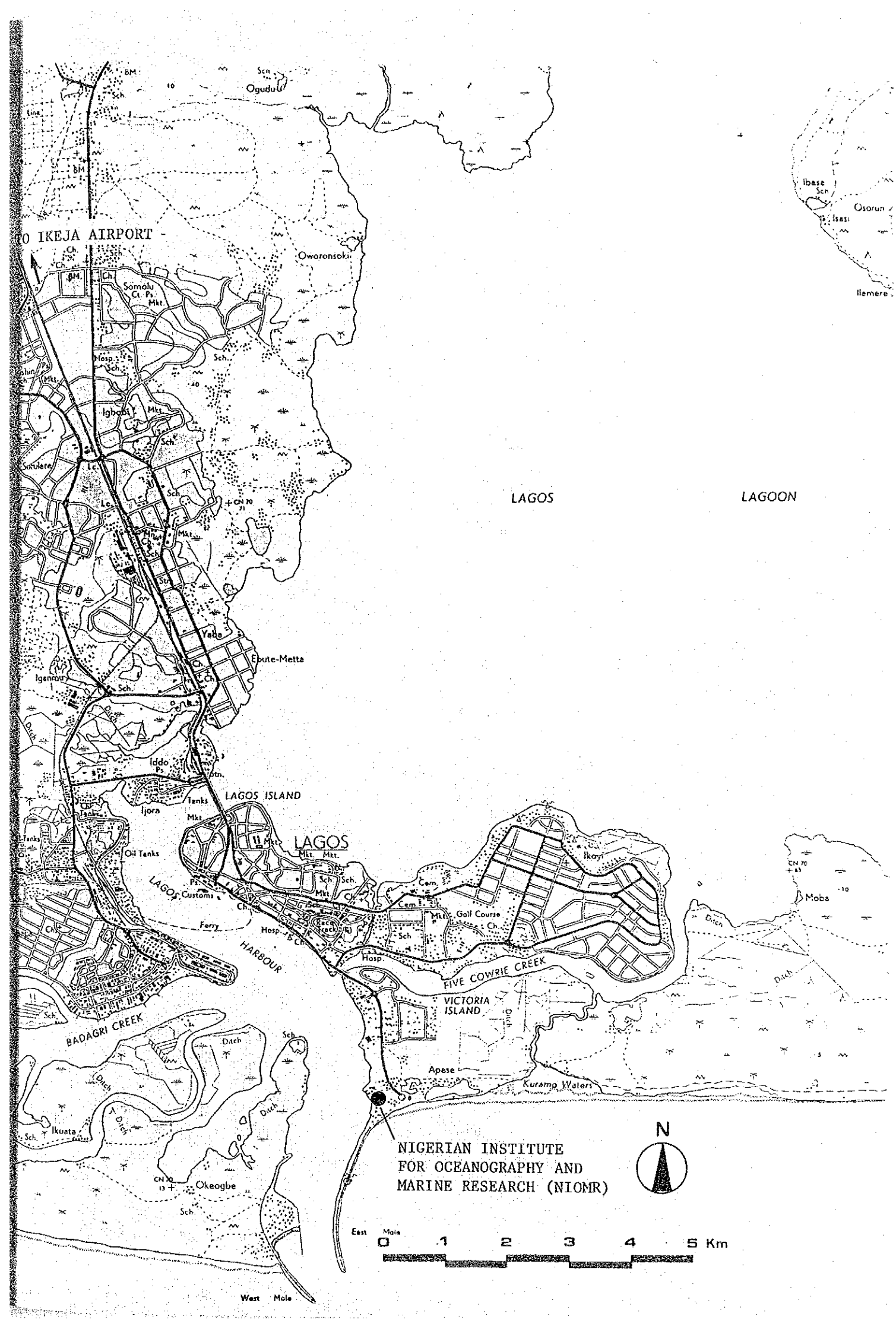
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SUMMARY

The Federal Republic of Nigeria (hereinafter referred to as Nigeria) showed rapid economic development in the 1970's through the exploitation of its rich oil resources. However, the over dependence of the Nigerian economy on oil revenues also began at the same time. As a result, the decline and stagnation of oil prices since 1981 has had a serious adverse effect on the Nigerian economy. In addition, the establishment of a self-sufficient food supply system has been delayed due to the slow development of such primary industries as agriculture and fisheries, and consequently the food supply for Nigeria's population of 110 million has much room for improvement.

In order to rectify the country's excessive dependence on oil revenues and establish a self-sufficient food supply system, the Government of Nigeria emphasized development of primary industries and the promotion of education in its Fourth National Economic Development Plan (1981-1985). In particular, the development of the fisheries industry is urgently required in view of the need for a sufficient protein supply.

In response to this emphasis on fisheries development, the Federal Department of Fisheries and similar departments of the state governments have been promoting pelagic fisheries and inland water fisheries by the development of new fishing grounds and resources, by providing advice to local fishermen and by the introduction of aquaculture. Sufficient skilled manpower is essential for the promotion of these activities. Threrfore, the fostering of senior fishing boat crew members and fisheries technicians to be involved in the development of pelagic and inland water fisheries is required.

Despite the increasing importance of manpower development for the promotion of the fisheries industry, the Federal Fisheries School (hereinafter referred to as the FFS) which is the only school in this field in Nigeria, is facing the problem of deficient and deteriorated facilities which casts doubt on the effectiveness of its future educational activities.

The Government of Nigeria therefore planned the Project for Improvement of the FFS (hereinafter referred to as the Project) with the purpose of improving the educational standard, facilities and equipment of the FFS and made a request to the Government of Japan to extend grant aid cooperation for implementation of this Project.

In response to this request, the Government of Japan decided to conduct a basic design study for the Project and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to Nigeria the Basic Design Study Team headed by Masahiro Fujimura, Deputy Director, International Affairs Division, Oceanic Fisheries Department, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries for the period between September 26 and October 23, 1989. The team discussed the Project's contents with the Nigerian officials concerned and conducted a field survey, collecting the necessary data and information for the preparation of the basic design.

After returning to Japan, the Study Team conferred with related organizations regarding the data and information collected in Nigeria and throughly examined the appropriateness of the Project, the appropriate scope and grade of facilities for the Project as well as the administration system for and benefits expected from the Project. Then the most appropriate basic design was drafted specifying the necessary facilities and their planning and equipment.

The new FFS facilities consist of the Administration Building, Classroom Building, Dormitory Building, Workshop Building and Power Building. The natural conditions of the proposed sites have been well considered in the basic design of these facilities and the line of flow between the buildings is clearly suggested.

The scope of the Project is outlined as follows:

o Facilities

Classroom Building	2,699.3m^2	Reinforced concrete structure, three-storied

classrooms (40 students x 9 rooms, 60 students x 1 room)
laboratories and preparation rooms (Chemistry, Physics, Biology and Applied Science)
audio-visual room (40 seats)
equipment storage room
drawing room (40 seats)
library (52 seats)

Administration Building	1,197.3m^2	Reinformced concrete structure, three-storied

principal's office
offices (Instruction, Accounting and Administration Sections)
lecturers' rooms
meeting room (30 seats)
medical treatment room

Dormitory Building	3,497.4m^2	Reinforced concrete structure, three-storied

bedrooms (4 students x 75 rooms)
guest rooms (2 rooms)
dormitory office

Workshop Building	554.9m^2	Steel-frame structure, Two-storied
Power Building	100.0m^2	Reinforced concrete structure, one-storied
Total floor area	8,048.9m^2	

o Renovation of Existing Facility

Canteen Building 441.0 m^2

o Other Facilities

Site Roads

Carpark

Gate

o Equipment

Equipment for Workshops

machines, tools, gas and electric welders, work tables and equipment models, etc.

Equipment for Nautical Science and Fishing Department

gyrocompass, satellite navigation set, various lifesaving apparatus, barometer and wind meter, etc.

Audio-Visual Equipment

slide projector and VTR, etc.

Equipment for Applied Science Laboratory

water tanks, pH meters, salinometers, water quality analyzers, pyrostat, oven, muffle furnace, protein analyzer, fat extractor, spectrophotometer, gas chromatograph, precision balance, portable mincer, portable meat mixing machine, refrigerators, work tables and laboratory tables, etc.

Equipment for Biology Laboratory

fish dissection sets, scales, microscopes, refrigerator and laboratory tables, etc.

Equipment for Chemistry Laboratory

draft chamber, glass apparatus and laboratory tables, etc.

Equipment for Physics Laboratory

various measuring instruments relating to dynamics, kinetic energy, heat, light and sound and laboratory tables, etc.

Data Processing Equipment

personal computers

Equipment for Drawing Room

drawing tables and desks and drawing tool sets

Others

microbuses and small boats with outboard engines, etc.

The implementation agency of the Project is the FFS. The FFS has already commenced the improvement and consolidation of the school's personnel and organizational aspects by means of increasing the number of staff and conducting the necessary rearrangement of the management system with the cooperation of its superior organizations, i.e. the Nigerian Institute for Oceanography and Marine Research (NIOMR) and the Ministry of Science and Technology. Therefore, no problems are anticipated in regard to the implementation system of the Project.

The Project will be implemented in two phases and each phase will take 18 months to complete after the respective Exchange of Notes. The first phase will consist of the construction of the Classroom Building, while the second phase will consist of the construction of the Administration Building, Dormitory Building, Workshop Building and Power Building, the improvement of the existing Canteen Building and the equipment installation work.

The direct benefits expected from this Project are as follows.

(1) Upgrading of the management and education organization of the school through construction of administrative facilities to enable the school to accommodate the necessary number of teaching and administrative staff so that they may be fully involved in school activities

(2) consolidation of the school's educational activities, including laboratory work and practical training, through the improvement of its facilities and equipment

(3) newly established Skipper Course and Marine Engineer II Course will open the way for Nigerians to become eligible to sit for the national examinations for Skipper and Chief Engineer for the first time in Nigeria

(4) improved morale of the students through improved accommodations which will guarantee a healthy boarding life

Indirectly, the Project is expected to contribute to the promotion of Nigerian fisheries and thereby to the establishment of a self-sufficient food supply system in Nigeria by means of providing better qualified graduates in the fisheries field.

In view of the above benefits, therefore, the Study Team considers that Japan's grant aid for the Project is highly significant.

The FFS should continue to maintain a close relationship with the NIOMR to which the FFS currently belongs even after its independence in order to make the best use of the new facilities and to continue to have access to the results of the research and development of the NIOMR in view of their application to the educational activities of the FFS. While becoming organizationally independent from the NIOMR, the FFS must secure the necessary budget for the sound management of the school. Furthermore, the FFS should secure the assistance and cooperation of the NIOMR and higher agencies, including the Federal Ministry of Science and Technology, so that the research and training vessels of the NIOMR can continue to be used for the navigational and fishing training of the FFS students.

PREFACE

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CHAPTER 1

INTRODUCTION

CHAPTER 1 INTRODUCTION

Nigeria achieved conspicuous economic development in the 1970's through the exploitation of its rich oil resources. However, the subsequent decline and stagnation of oil prices had a serious adverse effect on the country's economy. To rectify the situation, the Government of Nigeria emphasized the establishment of a self-sufficient food supply system together with the reform of the national economy which was too dependent on oil revenues, in its Fourth National Economic Development Plan commencing in 1981. With a view to providing a sufficient protein source for Nigeria's population of 110 million, the development of the fisheries industry has been given high priority and the development of new pelagic and inland water fishing grounds and marine resources as well as the training of qualified fishermen and engineers for fisheries-related research and development and for the management of fisheries businesses is now urgently required.

The Federal Fisheries School (hereinafter referred to as the FFS), which is the only technical school serving the fisheries industry in Nigeria, is facing problems of overcrowding and deteriorated facilities despite the increasing importance of manpower development in the fisheries industry and the present condition of the school's facilities cast doubt on the effectiveness of its educational activities in the future.

Against this background, the Government of Nigeria planned the Project for Improvement of the FFS (hereinafter referred to as the Project) with the purpose of improving the educational standard and educational facilities of the FFS and requested the Government of Japan to extend grant aid cooperation for the Project.

In response to this request, the Government of Japan decided to conduct a basic design study for the Project and entrusted the Japan International Cooperation Agency (JICA) to conduct the study. JICA sent to Nigeria the Basic Design Study Team headed by Masahiro Fujimura, Deputy Director, International Affairs Division, Oceanic Fisheries Department, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries, for the period from September 26 to October 23, 1989 to confirm and discuss the Project's

contents and implementation system with the Nigerian side, to study the existing facilities and proposed construction sites, etc., and to collect necessary data and information.

The data and information collected and the contents of the discussions with the Nigerian side during the study period were then analyzed and the prospect of the Project for improving manpower development for Nigerian fisheries were examined. The Basic Design indicating the appropriate scope of the Project and the facilities to be constructed under the Project was compiled as the Basic Design Study Report (Draft Final). The Draft Report Explanation Team headed by Tadashi Tsuchiya, Deputy Director, Office of Overseas Fisheries Cooperation, International Affairs Division, Oceanic Fisheries Department, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries was then sent to Nigeria for the period from January 14 to January 25, 1990 to discuss the contents of the Report with the Nigerian officials concerned. The present Report has been compiled to present the Basic Design for the most appropriate facilities and equipment, approximation of the project cost and overall evaluation at the Project, etc., based on a series of analyses, examinations and discussions.

The list of the survey team members, itinerary of the field survey, Minutes of Discussions and other relevant data are contained at the end of this Report.

CHAPTER 2

PROJECT BACKGROUND

CHAPTER 2 PROJECT BACKGROUND

2.1 Brief Description of Federal Republic of Nigeria

2.1.1 Natural Conditions

(1) Geographical Features

The Republic of Nigeria is located between the southern periphery of the Sahara Desert and the eastern end of the West African coast (Gulf of Guinea) and is bordered by Cameroon to the east, Benin to the west, Niger to the north and the Gulf of Guinea to the south facing the Atlantic Ocean. It stretches some 700 km in the north-south direction and some 900 km in the east-west direction and has a total land area of approximately 920,000 km^2 (some 2.48 times larger than that of Japan).

The topography and climate are generally divided into the following four belt-like zones which run east to west in terms of the relative rainfall which declines towards the north.

1) coastal marshland zone of some 20 km in width from the coast extending inland with many lagoons and mangrove forests
2) tropical rain forest zone of some 60 - 80 km in width and an elevation of up to 300 m to the north of zone 1
3) 500 km wide zone to north of zone 2 with sparse forests and savanna
4) northernmost, large and gently undulating highland zone adjoining the Sahara Desert

The coastline of some 700 km is relatively straight and the coastal area is generally flat. Monotonous sandy beaches stretch for some 300 km eastward from the border with Benin and many brackish water lagoons are scattered in this area. The approximately 400 km section further east is the huge Niger Delta which is formed by the Niger, Africa's third longest river which traverses Nigeria from the northwest

to the southeast. Mangrove forests and marshland containing innumerable creeks and lagoons are widely observed in this delta.

Nigeria has two large lakes, i.e., Lake Kainji which is an artificial lake created in the midstream of the Niger River following the construction of the Niger Dam for power generation and part of Lake Chad on the border with Chad.

The distance between the coast and the 20 m sea depth level is narrow in the west around Lagos (5 nautical miles) but widens in the eastern delta area (10 nautical miles). The width of the continental shelf (up to 200 m in depth) outside the above coastal ocean belt is 10 - 40 nautical miles and the sea depth rapidly increases outside the shelf. The seabed of the shallow sea area is relatively flat with sandy mud and provides good fishing grounds for trawling.

The Guinea current flows eastward from offshore of Ghana along the Nigerian coast and turns south around the border with Cameroon, becoming an equatorial current flowing westward. This equatorial current changes its direction toward the north around 0° longitude and becomes the Guinea current, forming a large circular current offshore of Nigeria. The current in the shallow water area near the coast takes a complicated form because of the influence of tidal currents.

(2) Climate

The climatic conditions such as temperature, relative humidity, rainfall (dry and rainy seasons), wind velocity and direction (cyclones) and earthquakes are as follows.

Temperature

The temperature is as high as 26°C - 28°C throughout the year due to Nigeria's location in the tropical zone and the high ratio of lowland area. Table 1 shows the monthly temperature fluctuations in 1986 at Lagos, the capital of Nigeria, observed by the Nigerian Institute for Oceanography and Marine Research (NIOMR).

Table 1 Monthly Temperatures at Lagos in 1986

(Unit: °C)

Temp.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Highest	31	31	31	31	32	29	27	27	27	28	30	31
Lowest	25	27	26	27	25	25	23	24	24	24	24	24
Mean	28	29	28	29	28	27	25	25	25	26	27	27

Relative Humidity

The relative humidity at Lagos is high (80% - 90%) in the rainy season between April and October and comparatively low (60% - 85%) in the dry season between November and March. Low relative humidity of 20% - 40% is sometimes recorded in February at the end of the harmattan season.

Rainfall

The annual rainfall gradually diminishes from south to north. The rainy season in the south begins in April with mean monthly rainfall of some 300 mm. Table 2 gives rainfall data at Lagos for 1986 - 1988.

Table 2 Monthly Rainfall at Lagos for 1986 - 1988

(Unit: mm)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1986	4.6	60.1	48.9	86.0	156.4	465.1	47.7	2.8	123.4	335.9	7.7	0.0
1987	0.6	66.1	154.6	39.8	224.4	746.6	159.1	478.1	369.1	141.0	30.1	0.0
1988	90.2	25.4	15.1	138.9	260.3	698.8	703.0	118.7	385.3	195.4	35.5	26.9

There is a tendency in the Lagos area for strong rain to occur in the evening or night except in March.

Wind Direction

The prevailing wind directions are south and southwest except in the harmattan season (November - February) when north or northeastern winds prevail. The south and southwestern winds come from the Atlantic Ocean

while the northern winds come from the Sahara. Tropical cyclones are sometimes generated along the coast but are generally weak and harmless.

Earthquakes

West Africa is not located on any earthquake belt. No earthquakes have been recorded in Lagos and only a few minor earthquakes have been recorded for the southwestern part of Nigeria.

Dry and Rainy Seasons

The dry and rainy seasons are different in the north and south of Nigeria. The rainy season in the south is between April and October with sudden strong winds sometimes occurring during this season while the dry season is between November and Mid-March. During the harmattan season, the air is full of fine dust brought from the Sahara Desert by the north wind, resulting in hazy weather. This dust eventually falls to the ground and causes various problems.

2.1.2 Economic Conditions

Nigeria is traditionally an agricultural country and is well-known for its production of coffee, cocoa, palm oil and natural rubber. Two-thirds of the population today live by agriculture. Nigeria saw rapid growth in the 1970's of its oil industry which subsequently became the country's leading industry and Nigeria is still the largest oil producing country in Africa with daily production of some 1.3 million barrels.

Income from oil exports has accounted for more than 90% of Nigeria's total export earnings since the 1970's and more than 65% of its government revenue. The fall and stagnation of oil prices in the international market since 1981, however, has drastically reduced Nigeria's export earnings, resulting in a sluggish national economy which in turn has caused such problems as inflation and an increasing unemployment rate, revealing the structural distortion of the national economy. The sluggish economy has since tended to show minus growth, leading to debt accumulation of 21.9 billion dollars at the end of 1986 which was the highest of all African

countries. The annual per capita income which was once as high as nearly 900 dollars is said to have dropped to approximately 400 dollars in 1987 due to the decline of oil income as well as that of the national currency, the naira.

The Government of Nigeria commenced the Two-year Structural Adjustment Programme (SAP) on June 27, 1986 to overcome a number of economic difficulties. Although the SAP officially ended at the end of June 1988 as planned, its objectives have been inherited as the main pillars of the economic plan for 1989. The main policies of the SAP were as follows.

1. Liberalization of the foreign exchange market which essentially means the devaluation of the naira.
2. Liberalization of trade and business deals, diversification of export products other than oil-related products and the promotion of exports in general.
3. Reduction of the budgetary deficit and improvement of public finance.
4. Improvement of the food supply self-sufficiency rate based on the rebuilding of agriculture and the increase of agricultural production.
5. Reduction of the debt burden.

Concrete measures included the introduction of the Second-Tier Foreign Exchange Market (SFEM) in September 1986 and its replacement by the Foreign Exchange Market (FEM) in July 1987, withdrawal of the export licence system (liberalization of trade in principle), partial privatization of public corporations and the substantial review of tariff rates.

With the implementation of the SAP, the annual GDP growth rate in 1987 increased by 1.2% on the previous year. Despite the poor performance of the agricultural sector in general due to bad weather, the production of such cash crops as cocoa, raw cotton and peanuts slightly increased because of their trade liberalization. The introduction of the SFEM and then the FEM resulted in a large devaluation of the naira, stimulating exports. With a stable oil price despite the low level, the international balance of payments for 1987 showed a surplus of 160 million nairas.

2.2 General Conditions of Fisheries

2.2.1 Outline of Fisheries

(1) Status of Fisheries

Nigeria's population of approximately 110 million is the largest of the 51 countries on the African continent. However, the present conditions of agriculture, stock raising and fisheries, which are the food supply sources for this large population, are unsatisfactory.

In agriculture, although the production volumes of the main staple crops such as sorghum, millet, cassava, yams and rice have shown an increasing trend in recent years, the annual increase rate of about 1% is below the annual population growth rate of 2.5%. In general, agricultural production has been rather stagnant despite various kinds of development efforts.

Stock raising, an important industry in the northern states for the supply of animal protein, has maintained its traditional nomadic style and, therefore, the productivity is low. The Government of Nigeria has been trying to encourage the nomads to settle and to promote the stock raising industry by the construction of local markets and other means. However, damage by the tsetse fly is hindering the success of these promotion efforts. In the case of chicken farming, efforts to increase production have not materialized due to the unstable supply of feed.

Fishery products are another source of animal protein and are more readily available and cheaper than meat. Freshwater fish are mostly sold inland and sea fish are sold along the coast. In addition to agriculture, fisheries are in fact one of Nigeria's important industries supporting the national diet.

The annual catch of around 300,000 tons according to the latest government statistics meets only one-third of the estimated annual demand of at least 1 million tons. This supply shortage is supplemented by imported fish. A reduction of fish imports by

increasing the domestic catch is one of the government's important targets. In reality, however, the catch is declining under the severe conditions of the Nigerian economy.

The previous Economic Development Plans (First-Third) gave first priority to the consolidation of infrastructure in the transport sector and only secondary priority to education and agriculture despite the critical conditions of food production in general. In the Fourth Plan (1981 - 1985), however, the importance of the agricultural sector (including fisheries and stock raising) was recognized and first priority was given to the development of this sector. The First National Rolling Plan was launched in January 1990. The plan essentially is to consolidate the gains of the structural adjustment programme and to give top priority to the promotion of agriculture, followed by the consolidation of the infrastructure and the improvement of welfare.

In accordance with the new direction. The Federal Ministry of Agriculture announced its agricultural policy in 1988 to clarify the agricultural promotion policies and strategies in the agricultural sector (including forestry, fisheries and stock raising). A concrete implementation plan was then prepared and plan implementation is currently in progress.

(2) Current Conditions of Fisheries

Nigerian fisheries are divided into three different types which reflect the geographical features of Nigeria described earlier. The first type is inland water fisheries conducted in the two largest lakes (Lake Chad and Lake Kainji), the two largest rivers (Niger and Benue) and the numerous tributaries of these two rivers. The second type is brackish water and coastal fisheries conducted in the scattered brackish water lagoons along the coast and sea area adjacent to lagoons while the third type is trawling conducted in the shallow water section of the continental shelf. The first two types are conducted by artisanal fishermen and trawling is conducted by fishing companies.

The fisheries production volume by sectors in recent years is shown below in Table 3 below based on the Nigerian Fisheries Statistics of 1988 published by the Federal Department of Fisheries of the Federal Ministry of Agriculture, Water Resources and Rural Development.

Table 3 Fish Production by Sectors for 1980 - 1987

(Unit: metric tons)

Sector \ Year	1980	1981	1982	1983	1984	1985	1986	1987
Artisanal Coastal & Brackish Water Fisheries	274,158	323,916	377,683	376,984	246,784	140,873	160,169	145,755
Trawling (Fish)	11,667	7,070	17,648	13,951	22,992	23,766	22,419	21,383
(Shrimp)	1,965	2,382	1,914	5,294	2,658	2,376	2,622	3,517
Sea Fish Sub-Total	287,790	333,368	397,245	396,229	272,434	167,015	185,210	170,655
Lakes & Rivers	188,409	157,867	119,527	146,267	112,219	60,510	106,967	103,232
Aquaculture				20,476	22,012	15,000	14,881	15,221
Freshwater Fish Sub-Total	188,409	157,867	119,527	166,743	134,231	75,510	121,848	118,453
Total	476,199	491,235	516,772	562,972	406,665	242,525	307,058	289,108

Source: Federal Department of Fisheries

As the above table clearly shows, large declines in the catches of coastal and brackish water fisheries and inland water fisheries, both of which are mainly conducted by artisanal fishermen and account for some 90% of the total catch, have been recorded.

The decline originates from strict and deliberate import controls imposed by the Government of Nigeria due to the scarcity of foreign exchange. These controls were in reaction to the substantial drop in export earnings due to the low oil prices since 1981. The inadequateness of imported fishing gear and spare parts for engines has, together with the fall in the value of the naira, badly affected artisanal fishermen. Secondary reasons may be overfishing and environmental degradation.

The annual demand for fish in Nigeria, which has the largest population among African countries at 110 million, is estimated to be approximately one million tons. The domestic supply is far below this requirement and imports to meet the difference are insufficient. As a result, there is a chronic fish supply shortage.

Table 4 shows the annual fish import volume, most of which consists of such cheap fish as mackerel and horse mackerel.

Table 4 Annual Fish Imports

(Unit: metric tons)

Year	1980	1981	1982	1983	1984	1985	1986	1987
Import Volume	121,144	168,769	404,413	131,308	147,261	61,704	65,242	209,402

Source: Federal Department of Fisheries

Table 5 shows the total fish supply based on the domestic catch and imports.

Table 5 Annual Fish Supply

(Unit: metric tons)

Year	1980	1981	1982	1983	1984	1985	1986	1987
	597,343	660,004	921,185	694,280	553,926	304,229	372,300	498,150

Source: Federal Department of Fisheries

(3) Artisanal Fisheries

Artisanal fishing in inland waters is conducted in such freshwater areas as Lake Kainji, Lake Chad and numerous rivers in addition to small-scale aquaculture based on catfish and tilapia. Borno State which adjoins Lake Chad has the largest catch of freshwater fish, followed by Kwara State where Lake Kainji is located. The catch of these two states accounts for some 65% of the inland freshwater fish production because of the large volume of fish taken from these two lakes. The largest catch is of catfish, followed by tilapia, moonfish, Nile perch and tigerfish. The fishing gear used are casting nets, gill nets and fishweirs, etc. While further development of freshwater fish aquaculture is called for, its production volume has been stagnant due to the low technical level.

The catch of artisanal fisheries from brackish water lagoons, inshore and rivermouth areas mainly consists of sea fish and is almost double that of freshwater fisheries. The largest catch is bonga (herring), followed by croaker.

The boats used for small-scale fishing are canoes ranging from hollowed out canoes to relatively large boarded canoes. Fairly large Ghanian canoe-type boats of 10 - 15 m in length and 0.9 - 1.5 m in width with a capacity of 5 - 10 people are also used. There is also a small number of small FRP boats. No canoes or small fishing boats are equipped with inboard engines and only outboard engines are used. The fishing gear used are casting nets, gill nets, round gill nets, dragnets, fishweirs, fishing poles and longlines. Table 6 shows the number of fishing boats for artisanal fisheries.

Table 6 Number of Fishing Boats for Artisanal Fisheries by Year

	1980	1981	1982	1983	1984	1985	1986
Powered Canoe (Outboard Engine)	13,205	18,712	19,583	20,165	20,401	19,812	16,008
Non-powered Canoe	120,518	101,430	85,656	109,390	89,237	69,876	61,125
Total	133,723	120,142	105,239	129,555	109,638	89,688	77,133

Source: Federal Department of Fisheries

Table 7 Number of Artisanal Fishermen by Year

	1980	1981	1982	1983	1984	1985	1986	1987
Full-time Fishermen	312,460	280,540	240,902	199,349	144,499	174,619	237,455	252,711
Part-time Fishermen	146,605	160,052	176,057	272,773	197,720	127,615	171,517	184,750
Total	459,065	440,592	416,959	472,122	342,219	302,234	408,972	437,461

Source: Federal Department of Fisheries

The number of artisanal fishermen engaged in the coastal and the brackish water fisheries is the largest in Cross River State at approximately 60,000, followed by Rivers State at 36,000 and Bendel State. The total number of fishermen in states along the coastal areas is approximately 330,000.

(4) Industrial Fisheries (Trawling)

Sea water fisheries in Nigeria began to prosper in the late 1960's due to the introduction of modern fishing boats following the development of shrimping grounds in the offshore area of the Niger River delta and also due to the establishment of joint companies with foreign capital. After 1980, however, the development of shrimping grounds by other countries and the worldwide sluggishness of the shrimp market together with the deteriorated Nigerian economy have caused these companies to move into trawling to supply fish for domestic consumption in addition to the traditional shrimping.

All fishing boats owned by fishing companies are made of steel. The number of boats in 1987 was 274, of which 65 (approximately 24%) were stern-trawlers with gross registered tonnage of 30 - 50 tons (mostly out-rigger type), 134 (approximately 50%) were trawlers of 100 - 150 tons (with refrigeration facilities) and 36 were large boats of more than 150 tons. Table 3 shows the catch by these boats.

Fishing fleets operate from Lagos and Port Harcourt. At Lagos, those companies with many boats have their own landing areas and small companies without their own landing areas have agreements with the larger companies to have access to the landing areas. Mooring quays, cold storages, ice plants and offices are provided at the landing areas, but many of those in Lagos have deteriorated. A 500 m long public quay for landing fish has been constructed at Tincan Island in the Apapa District in Lagos but has only been used for the landing of frozen fish by large transport vessels. No local fishing boats use this quay to land fish but sometimes use it for mooring.

According to the survey on private fishing companies conducted by the Study Team, 28 companies with 281 boats (139 for shrimp trawling and 142 for fish trawling) are registered in Lagos in 1989 and have formed a Trawlers' Association, the members of which are directors of the companies, to negotiate with the government. The main existing regulations on trawling are as follows:

- Fishing in the 2 mile zone from the coastline is prohibited.
- Trawling by boats exceeding 25.3 m in length and a gross tonnage exceeding 150 tons is prohibited in the zone between 2 miles and 30 miles from the coastline.
- Fishing boats permitted as shrimp trawlers must not exceed 23.5 m in length and a gross tonnage of 100 tons.
- The meshes of cod ends (section to catch fish) used by shrimp trawlers and fish trawlers must not be smaller than 44 mm and 76 mm respectively.

In addition to the above, there are also regulations on foreign fishing boats, transport vessels for imported fish and designated landing areas, etc. and penalties are imposed in the case of violations.

Port Harcourt has a 360 m long quay constructed by the government in 1985 and various other facilities, including cold storages, a radio station, fish market, slipways, ice facility, fish processing plant and a repair workshop. Trawlers use these facilities for landing their catches, loading and repair. A total of 38 boats (1989) are jointly operated by all fishing companies from this port. The government has commissioned the entire management of the port to private fishing companies but maintains an on-site supervisory section with several full-time staff.

Table 8 gives the number of trawlers by year.

Table 8 Number of Trawlers

	1980	1981	1982	1983	1984	1985	1986	1987
Fish Trawlers	35	45	52	81	96	116	173	170
Shrimp Trawlers	45	36	34	39	37	47	77	82
Distant Water Trawlers	0	0	0	0	27	11	36	22
Total	80	81	86	120	160	174	286	274

Source: Federal Department of Fisheries

(5) Aquaculture

Nigeria has a vast inland water area of 1 million ha, consisting of the Niger and the Benue rivers and their tributaries, Lake Kainji and Lake Chad, etc., and also a brackish water area of 750,000 ha in the Niger River delta and numerous lagoons near Lagos. Using these water areas, there is a strong possibility for the development of aquaculture. The mainstays of aquaculture are currently such freshwater fish as catfish, tilapia and carp. The aquaculture of sea fish and shrimp in the

brackish water area is still in the elementary stage and development of the technical level has a long way to go.

The aquaculture production volume is less than 5% of the total fish production volume and state governments are trying to expand aquaculture by constructing nurseries (hatcheries) and by actively conducting fry production and research on appropriate fish types in order to promote aquaculture by local inhabitants. However, the number of supervisory personnel providing advice on aquaculture techniques is small and their technical level is low.

The Aquaculture Section of the NIOMR, which plays a leading role in aquaculture in Nigeria, is conducting various kinds of research on the subject and also producing fry which are distributed to private aquaculture operators. The African Regional Aquaculture Centre (ARAC) which was originally established under an FAO/UNDP assisted project near Port Harcourt, the capital of Rivers State, was fully taken over by the NIOMR in 1987 to become an aquaculture research station on both brackish water culture and freshwater culture.

(6) Distribution of Fisheries Products

The fish distribution system in Nigeria has not yet been fully developed. The catch of artisanal fishermen, that of industrial fisheries (trawling) and imported fish all have their own distribution channels. Publicly controlled distribution facilities such as wholesale fish markets and public markets are non-existent.

The catch of artisanal fishermen is sold to consumers either directly by fishermen or their families or by female merchants called market mammies. Fish is sold at stalls in local markets and there are no fishmongers with permanent buildings.

The catch of industrial fisheries is landed and stored in cold storages owned by the fishing companies and later sold to market mammies via registered wholesalers (agents for the fishing companies). Part of the catch is transported to cold storages in inland areas by refrigerator

trucks and then sold.

Most imported fish is frozen. It is stored in cold storages owned by the importers and its then sold via the same channel as that for the catch of industrial fisheries.

Fish is largely sold either fresh or frozen. The most popular processed fish is smoked fish which is sold nationwide and which is mostly prepared by artisanal fishermen using the traditional method. Although the quality is poor, it is widely consumed due to the strong public preference for it.

Other processed fish includes sun-dried salted fish and tinned fish. The domestic production of tinned fish commenced in 1985 and there are currently three tinning factories which are, however all out of operation due to the termination of the fish supply (imported sardine, herring and mackerel).

The research and development of fish processing is conducted by the Fish Technology Section of the NIOMR which is trying to develop processed fish products for wide consumption using processing facilities provided by Japan to make experimental products, including tinned fish using the catch of the NIOMR's research vessels.

(7) Fisheries Equipment and Facilities

The number of places (docks and repair shops) to repair fishing boats and their engines is extremely small in Nigeria and there is a scarcity of capable technicians. While fishing net factories (2 in Lagos and 1 at Port Harcourt) have been constructed for the domestic production of fishing nets (which among all fishing gear have the most direct bearing on the production volume), they are only operating at one-tenth of capacity due to import restrictions on the raw materials. The resulting fishing net shortage, together with the small quantity of imported nets due to restrictions, has largely contributed to the decline of the fish production volume.

(8) Official Organizations Relating to Fisheries

The Government of Nigeria has three fisheries-related organizations, i.e., the Federal Department of Fisheries under the jurisdiction of the Federal Ministry of Agriculture, the NIOMR and the National Institute for Fresh Water Fisheries Research (NIFFR) in New Busa under the jurisdiction of the Federal Ministry of Science and Technology. Each state government also has an organization for fisheries administration although the parent organization differs from state to state.

The Federal Department of Fisheries and the state fisheries organizations jointly or independently conduct the following:

1) control of fishermen's cooperatives
2) control of fishing companies
3) compilation of fisheries statistics
4) activities to encourage fisheries
5) management of various fisheries promotion programmes

In reality, many of the fisheries promotion programmes have been delayed or scaled down because of the deterioration of the Nigerian economy. The Federal Department of Fisheries mainly functions as a coordinating organ between the national fisheries administration and the state governments while the NIFFR conducts research and training in freshwater fisheries and the NIOMR is responsible for surveys, research, training and development in the fisheries sector, especially brackish water and marine fisheries.

Separated from the Marine Research Division of the Federal Department of Fisheries in 1975 and currently part of the Federal Ministry of Science and Technology, the NIOMR has an annual budget of 6,388,702.18 nairas (approximately 912,000 US$) and is under the control of the Management Committee with 9 divisions and 16 sections, including the African Regional Aquaculture Centre at Port Harcourt. It has various facilities, including a research laboratory building, fish processing factory, vessel maintenance workshop, net repair workshop, library and a number of educational/training facilities, as well as 4 research and

training vessels, 2 of which were donated by the Government of Japan and which are in operational condition and 1 of which is moored near the jetty and is currently not in use because of equipment breakdown and general deterioration. It also has 2 freshwater fish nurseries at Ikoyi Island near Lagos and at Aluu near Port Harcourt and 1 brackish water fish farm at Buguma near Port Harcourt for related research and development activities. As of 1989, the NIOMR has a total staff of 363, ranging from directors, researchers and janitors to teachers of the affiliated FFS.

Fisheries education by the government commenced in 1965 through the Federal Department of Fisheries Service, the predecessor of the Federal Department of Fisheries, to train fishing boat crews. The education and training section was subsequently established to efficiently conduct the relevant activities, leading to the founding of the FFS. With the several organizational changes in the past, the FFS sent 2,228 graduates into society in the period between 1970 and 1988 and these graduates have provided the basis for the development of Nigerian fisheries and have made an invaluable contribution to this field.

2.2.2 Fisheries Promotion Programme and Manpower Development

(1) Direction of Fisheries Promotion and Development

The development and promotion of fisheries in Nigeria is given high priority together with agriculture in order to increase food production for the public and to reduce foreign currency spending by improving the food supply self-sufficiency rate and reducing the food import volume. The increase of production in the future is, therefore, an extremely important task for the development of Nigeria.

The Fifth National Development Plan, the highest level plan of the Government of Nigeria, gives first priority to agricultural development and the Federal Ministry of Agriculture has announced its programme for the development and promotion of each field of the agricultural sector, i.e., agriculture, stock raising, fisheries and forestry, with the

targets, period for programme completion and strategy, etc. The targets for fisheries are as follows:

1) establishment of a self-sufficiency system
2) promotion of the modernization of fishing boats, fishing gear and fishing methods to increase the production volume and development of fish processing and distribution
3) earning of foreign currency by the increased export of marine products (shrimp, crab, shellfish and shark fin, etc.)
4) improvement of the welfare facilities in villages of artisanal fishermen
5) stable work availability for fishermen through an increase of the catch
6) clarification of the available fish resources and research on the control and development methods for these resources
7) manpower development to support fisheries development by strengthening the existing fisheries education system
8) nationwide promotion of higher fisheries education
9) effective utilization of non-edible waste generated at the production stages of agriculture, stock raising and fisheries
10) development and increased production of cultured fry by the provision of guidance, training and necessary loans for private operators
11) urgent development of aquaculture

The related implementation plan was also prepared for the completion of the above targets in a 5 year period.

The development strategy consists of special benefits for fisheries, loans, subsidies, provision of fisheries information and subsidies for fishermen's cooperatives, etc., for the development and promotion of fisheries to take a favourable direction. The following two points are particularly stressed in regard to the direction of fisheries development.

1) Promotion of Ocean Fisheries by Development of New Fishing Grounds and Resources

The promotion of ocean fisheries and the increase of the production volume must be attempted based on the following concrete measures.

i) expansion of the fishing grounds by the development of new grounds in the deep sea area (the continental shelf deeper than 50 m and the deep sea area of 200 - 300 m below sea level)

ii) development of the surface fish resources, including skipjack, in the 200 nautical mile exclusive economic zone

iii) promotion of ocean fishing by the legal expansion of the fishing grounds based on fisheries agreements with such regional countries as Equatorial Guinea, Cameroon, Gabon and Senegal, etc.

2) Promotion of Brackish Water and Inland Water Fisheries

i) promotion of brackish and inland water fisheries by means of the provision of guidance, diffusion of appropriate fishing techniques and the supply of fishing gear for local fishermen and also by means of consolidating the fish processing and distribution systems.

ii) promotion of aquaculture by means of research and development and the diffusion of guidance on technologies.

(2) Requirements for Development of Fisheries-Related Manpower

One of the reasons for the sluggish fisheries production in Nigeria is the shortage of fisheries specialists. The production decline in the case of artisanal fishermen can be explained by the fact that their traditional means of production have not been updated, indicating a lack of guidance for these artisanal fishermen due to the shortage of fisheries advisors.

The mainstay of Nigerian industrial fisheries is trawling and the number of trawlers equipped with modern equipment has been increasing annually to meet the large demand for fish. While this increasing trend is expected to continue in the future, traditional operations in the shallow water area (up to a sea depth of 50 m) have limited scope for expansions and advancement into the deeper sea is becoming increasingly important, necessitating the research and development of new fishing grounds by such governmental organizations as the Federal Department of Fisheries and the NIOMR, the introduction of large advanced fishing boats and the fostering of certified crews which are capable of operating such boats.

The fostering of Nigerian fishing crews, especially mid-level and senior crew members, is urgently required as most mid-level and senior crew members aboard fishing boats are currently foreign engineers.

The Federal Fisheries School is the only fisheries school in Nigeria training mid-level crew members (mates and engineers) to alleviate the manpower shortage. However, the FFS is not equipped to train senior crew members (captains and chief engineers) with the result that some fishing companies send their employees to rating schools abroad, i.e., Ghana, at their own expense to enable them to obtain the necessary qualifications. This practice is now becoming difficult due to the deterioration of the Nigerian economy, generating a strong desire in Nigeria for domestic training courses for senior fishing boat crews in addition to courses for engineers in view of the development of ocean fisheries as described earlier.

2.3 Present Conditions of Federal Fisheries School

2.3.1 History and Organization

A. History

The Federal Fisheries School (FFS) is Nigeria's only middle level school specializing in marine fisheries. Since its foundation, the organization and curricula have been modified in response to the changing requirements.

Education and training activities were first commenced in 1965 by the Federal Fisheries Service, the predecessor of the current Federal Department of Fisheries, for fishing boat crews employed by the Government of Nigeria in view of the government's enforcement of the Merchant Shipping Act (1963) based on the British Law of Admiralty, requiring crew members to have the relevant qualifications.

The FFS was opened in 1969 as the first school specializing in fisheries-related education and training in Nigeria under the jurisdiction of the Federal Department of Fisheries to systematically continue the above training and education activities and 9 month courses to train coxswains and mates and short courses (several weeks) for active fishermen were initially introduced.

Pursuant to the Agricultural Research Institute Decree of 1975, the FFS and the Marine Research Division were separated from the Federal Department of Fisheries in the same year and were reorganized to form the Nigerian Institute for Oceanography and Marine Research (NIOMR) under the jurisdiction of the Federal Ministry of Science and Technology with the FFS becoming an educational and training organization within the NIOMR.

Around the same time, not only coastal states but also inland states established fisheries departments to promote local fisheries and the demand for manpower development in view of the development of and guidance on fisheries consequently increased. In response to this demand, the FFS newly

introduced 2-year Fisheries Assistant and Fisheries Superintendent Courses to educate and train state staff for fisheries administration. These two courses were subsequently upgraded in 1981 to Ordinary National Diploma (OND) and Higher National Diploma (HND) General Fisheries Courses respectively.

While larger boats were introduced in accordance with the development of trawling, most of the senior crew members of these boats were foreigners. The Nigerian Enterprise Promotion Decree in 1977, however, called for the replacement of senior foreign crew members by Nigerians, necessitating the upgrading of Nigerian fishing boat crews. Against this background, the FFS then upgraded the existing Mate Fishing and Motorman II Courses to the Nautical Science and Fishing Diploma Course and the Marine Engineering Diploma Course respectively to train mid-level fishing boat engineers.

The introduction of these OND and HND courses gave FFS graduates similar qualifications to those of graduates of agricultural and technical colleges, thus encouraging students to complete the courses and promoting the advancement of capable young men in various fisheries fields. Pre-diploma courses were also introduced as the preparatory stage for the OND courses.

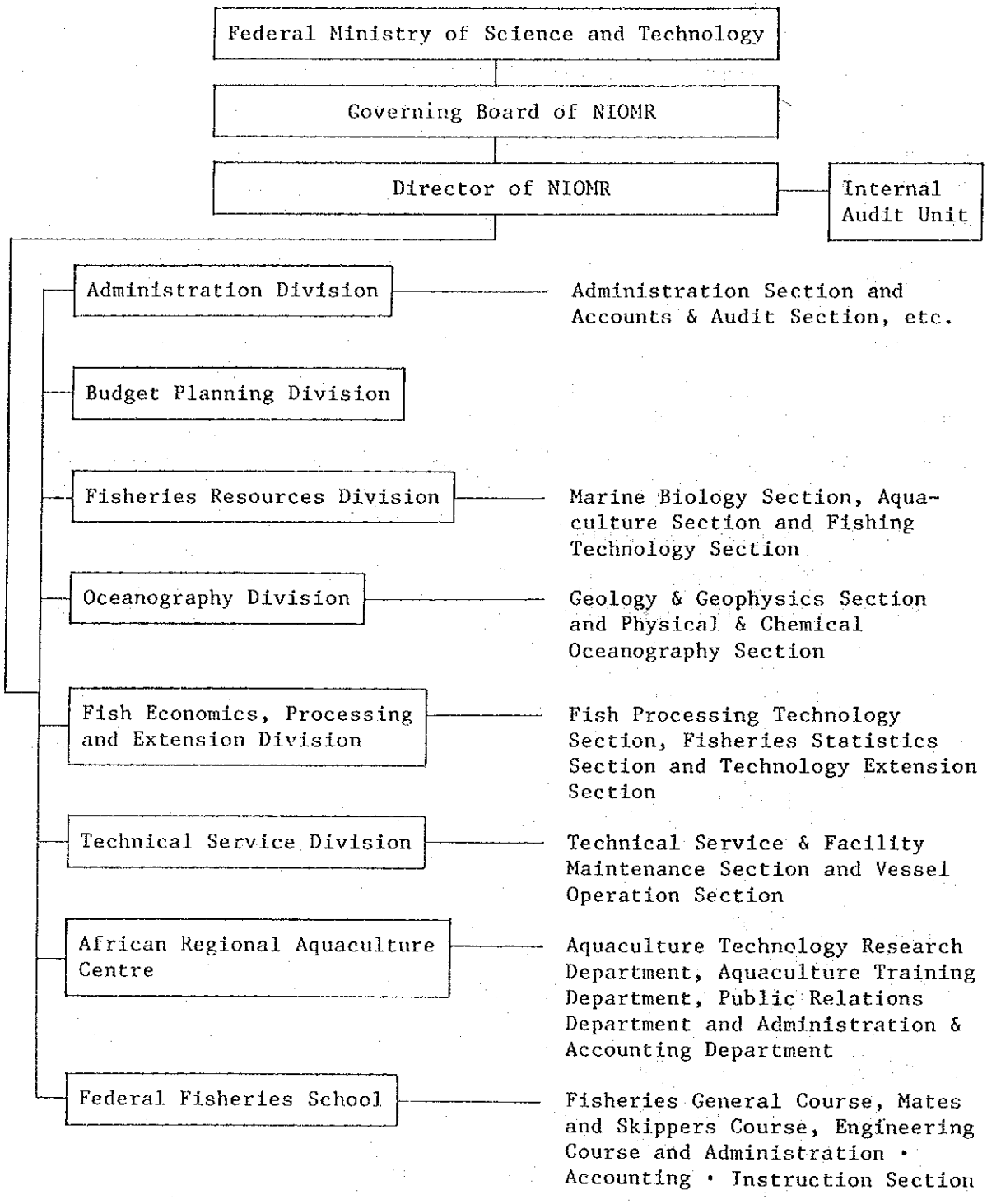
Initially a kind of vocational training school for fishing boat crews and fishermen, the FFS has now been upgraded to a technical school providing OND and HND courses to educate and train personnel with general knowledge and skills in various fisheries fields, ranging from aquaculture to fish processing, who are capable of developing fisheries, aquaculture and fish processing as well as conducting business management activities and providing guidance on fisheries in general. This upgrading of the FFS is the result of the high priority given to not only the development of sea fisheries but also to inland water fisheries and aquaculture.

B. Organization

The present FFS is the educational and training section of the NIOMR which is one of the 18 agricultural research institutes under the jurisdiction of the Federal Ministry of Science and Technology (see the organization of the NIOMR on the following page). All teaching and administration staff of the FFS, including the principal, are either research or technical staff of the NIOMR. and the FFS as yet lacks its own administration and accounting sections as the related work is handled by the Administration Section of the NIOMR.

Organizational reform is, however, deemed necessary to further consolidate the educational contents of the FFS as a technical school and this reform is supported by the recommendation issued by the National Board for Technical Education (NBTE) of the Federal Ministry of Education. As a result, the FFS started preparatory work in the 1988/89 school year to secure full-time lecturers and to establish administration, accounting and instruction sections. The organization of the FFS is, therefore, now at a turning point.

Organization of the NIOMR



2.3.2 Current Activities

The current educational activities of the FFS are outlined below.

A. Courses

The following 6 courses are provided at present.

Title	Course Duration	Capacity	Number of Enrollments
			(1st year + 2nd year = total)
OND			
1. General Fisheries	2 years	40	(40 + 40 = 80)
2. Nautical Science and Fishing	2 years	40	(40 + 40 = 80)
3. Marine Engineering	2 years	40	(40 + 40 = 80)
HND			
4. General Fisheries	2 years	40	(40 + 40 = 80)
Others			
5. Pre-National Diploma	1 year	60	(60 + 0 = 60)
6. Coxswain Fishing	6 months	40	(40 + 0 = 40)
			(Total 420)

The contents of each course are described below.

(OND Courses)

1. General Fisheries - to foster capable manpower for a wide range of fields, including fisheries operation, administration, guidance, research and development/management of new projects, etc. Students are taught general knowledge and technologies relating to fisheries operation, aquaculture, fish processing and fish distribution, etc.

2. Nautical Science and Fishing - to foster fishing personnel, especially those engaged in the navigation as well as operation of fishing boats.

Students are taught fishing techniques, fishing boat operation and navigational techniques, etc. Graduates are entitled to sit the National Examination for Mate after one year's actual experience onboard a fishing boat.

3. Marine Engineering - to foster engineers responsible for the engine operation and maintenance of fishing boats. Students are taught specialized knowledge and skills relating to engines, electrical equipment and refrigeration, etc. Graduates are entitled to sit the National Examination for Marine Engineer III after one year's actual experience onboard a fishing boat.

(HND Course)

4. General Fisheries - to foster manpower for not only fisheries operation but also for fisheries administration, guidance, research and development/management of new projects. For those students who have completed the OND General Fisheries Course with one year's actual experience after graduation or those with similar qualifications. Students are taught general theories and technologies of a wide range of fields, including fisheries operation, aquaculture, fish processing and distribution, while selecting one main subject from fisheries, aquaculture, fish processing and fisheries management, etc.

(Others)

5. Pre-National Diploma - those students hoping to advance to one of the OND courses are taught general subjects to acquire the basic knowledge required for the OND courses.

6. Coxswain - to foster mid-level fishing boat crew members and coxswains. Students are taught specialized knowledge of fisheries, navigational techniques and fishing boat steering, etc. Graduates are entitled to sit the National Examination after a certain period of actual experience onboard a fishing boat.

ß. Syllabus (Subjects)

The syllabus of each OND and HND course is as follows.

OND	
o General Fisheries:	Fisheries Biology, Fishing Methods and Materials, Manufacture of Fishing Gear, Seamanship, Oceanography, Meteorology, Aquaculture, Fish Technology, Cooperatives, Economics, Mathematics, Biology, Chemistry and Physics, etc.
o Nautical Science and Fishing:	Navigation, Chart Work, Seamanship, Maritime Laws, Marine Signals, Fishing Methods and Materials, Handling and Processing of Catch, Ship Design, Ship Construction, Navigational Instruments, Meteorology, Mathematics, Physics, Geography, English and Practical Navigation, etc.
o Marine Engineering:	Mathematics, Ship Engineering, Marine Diesel Engine, Ship Power Plant, Refrigeration, Thermodynamics, Electrical Technology, Applied Mathematics, Engineering Design and Drawing, Shipyard Technology, Workshop Technology, Practical Diesel Engine, Physics and Chemistry, etc.
HND	
o General Fisheries:	Fisheries Biology, Fisheries Practicals, Fishing Methods and Materials, Oceanography, Aquaculture, Fish Technology, Fishery Economics, Fisheries Management, Cooperatives, Statistics and Research Techniques, etc.

Theoretical study and training on the campus in the first year and practical training off the campus for 3 - 5 months of the first semester in the second year are conducted for all the OND and HND courses. Students of the Nautical Science and Fishing Course and those of the Marine Engineering Course undergo practical training onboard fishing boats owned by private fishing companies while students of the General Fisheries Course undergo practical training at a federal or state government institution, research institute or private company. All students undergoing one type of practical training or another have a special research theme which is decided based on consultations with a tutor and must submit a report following the completion of the training. Theoretical studies are conducted in the second semester of the second year.

Graduates of the Nautical Science and Fishing Course and those of the Marine Engineering Course are entitled to sit the National Examination for Mate and the National Examination for Marine Engineer III respectively after one year's actual experience onboard a fishing boat.

The teaching schedule for the first semester of the 1988/89 school year is attached as an appendix to this Report.

C. School Staff

Researchers and technical staff of the NIOMR originally held concurrent positions, including teaching positions, for the FFS. Following the recommendation of the National Board for Technical Education (NBTE), however, the full-time staff shown in the table below were recruited for the 1988/89 school year. Organizational reform is still in progress and the table also shows the final number of staff in 1992 when the planned staff increase will be completed.

Staff of the FFS

	Grade (USS)	Current Number	Planned Number	Increase
Principal	14	1	1	
Vice Principal	13	1	1	
Asst. Chief Fisheries Officer	12	1	1	
Principal Fisheries Officer	11	1	1	
Principal Lecturer (Marine)	11	1	1	1
Principal Lecturer (Nautical)	11	-	1	
Senior Fisheries Officer	09	2	2	
Principal Lecturer Grade II (Marine)	09	1	1	1
Principal Lecturer Grade II (Nautical)	09	-	1	
School Secretary	09	1	1	
Fisheries Officer Grade I	08	4	4	
Senior Lecturer (Marine)	08	-	2	
Senior Lecturer (Nautical)	08	2	2	3
Administration (Chief)	08	1	1	
SEO Accountant	08	1	1	
Audio-Visual Engineer	08	-	1	
Higher Lab. Technologist	07	-	4	
Fisheries Officer Grade II	07	4	6	
Lecturer Grade I (Marine)	07	2	2	
Lecturer Grade I (Nautical)	07	1	1	7
HEO Accountant	07	1	1	
Confidential Secretary	07	1	1	
Staff Nurse	07	-	1	
Senior Typist	06	2	2	1
Library Officer	06	-	1	
Asst. Marine Engineer	05	-	2	2
Senior Clerk	04	1	2	2
Craftsman	04	-	1	
Typist	03	1	1	
Library Assistant	03	1	1	3
Coxswain	03	-	2	
Motor Driver and Mechanic	03	2	3	
Clerical Asst. (Admin./Account.)	02	2	2	
Workshop Attendant	02	-	2	
Machine Operator	02	-	1	
Electrician	02	-	1	10
Plumber	02	-	1	
Carpenter	02	-	1	
Laboratory Assistant	02	1	4	
Messenger	02	1	2	

	Grade (USS)	Current Number	Planned Number	Increase
Laboratory Attendant	01	1	4	
Cleaner	01	3	6	
Gateman	01	3	5	13
Porter (Guardman)	01	-	3	
Cook/Steward	01	-	2	
Total		44	87	43

D. Application Trend and Future of Graduates

The FFS is Nigeria's only technical school specializing in fisheries and most students find jobs immediately after graduation. As a result, entrance to the FFS is extremely competitive as shown in the table below which gives the number of applicants for each students place.

	1984/85	1985/86	1986/87	1987/88
OND				
General Fisheries	4.76	5.12	4.80	4.55
Nautical Science and Fishing	3.94	12.73	7.58	6.06
Marine Engineering	6.21	6.48	6.45	5.55
HND				
General Fisheries	3.00	3.80	3.67	3.69
Pre-National Diploma	-	5.38	4.67	4.50
Coxswain	4.25	6.89	6.00	5.56

With regard to the future of graduates, the places of their employment are shown below for the 5 year period between 1984 and 1988. As many graduates have been employed by the government agencies and private fishing companies, the educational performance of the FFS in this aspect has been highly appreciated. While the FFS previously focused on the training of technicians for government positions, the number of graduates employed by private companies is increasing due to the strong demand in the private sector.

	Government Positions		Private Companies			Private Fishing	Others	Total
	Officer	Seaman	Fishing	Technical	Others			
OND								
General Fisheries	140	10	50	2	3	10	59	274
Nautical Science and Fishing	25	8	60	-	2	3	13	111
Marine Engineering	30	11	90	4	-	6	20	161
HND								
General Fisheries	200	5	36	-	-	30	47	318
Coxswain	10	10	60	-	-	-	16	96
Total	405	44	296	6	5	49	155	960

Source: FFS

E. Activities of Research and Training Vessels

The NIOMR currently has 4 research and training vessels to conduct such work as oceanographic research, fishing ground surveys and the testing of fishing gear and these are used by the FFS for the practical training of students. The vessels are operated by the Vessel Operation Section to which the crew members belong.

1 M.V. Yemoja (stern trawler, 390 tons, purchased from West Germany in 1981)

2 M.V. Federal Argonaut (double rigger shrimp trawler, 110 tons, purchased from the US in 1978)

3 M.V. Okion (stern trawler, 170 tons, donated by the Government of Japan in 1980)

4 M.V. Sarkim Baka (skipjack pole and line fishing boat, 280 tons, donated by the Government of Japan in 1984)

Of these 4 vessels, the M.V. Yemoja is currently out of operation due to general deterioration, including that of equipment, and water leaks and is moored near the NIOMR's wharf. All the remaining vessels, M.V. Federal Argonaut, M.V. Okion and M.V. Sarkim Baka, the latter two of which were

donated by the Government of Japan, are operated under the instructions of Japanese experts onboard who also assist in the research and training work using these vessels.

(1) Past Performance and Present Conditions of M.V. Okion

The main assignment of the M.V. Okion is research and survey work for the NIOMR, including fish type surveys, fishing ground surveys, oceanographic research and geological surveys of the seabed. It is also used for the ocean training of FFS students. Furthermore, it irregularly conducts joint oceanographic research and seabed surveys with major oil companies in addition to providing assistance to the University of Lagos for biological research.

1) Annual Operation Schedule for Student Training and Other Purposes

The diverse activities of the M.V. Okion are conducted based on the following annual operation schedule.

Nautical Science and Fishing Course	(40 2nd year students)	30 days/year
Marine Engineering Course	(40 2nd year students)	15 days/year
Coxswain Course	(40 students)	15 days/year
General Fisheries (OND)	(40 2nd year students)	5 days/year
Fish Type and Fishing Ground Surveys (NIOMR)	4 times/year	(15 days each)
Seabed Geology Survey (NIOMR)	twice/year	(10 days each)
Seabed Geology Survey (with Oil Company)	twice/year	(10 days each)
Biological Research (with University of Lagos)	4 times/year	(day trip)

In addition to the above activities, the M.V. Okion is also engaged in commercial trawling and all earnings from the catch are used to meet part of the vessel's operation cost. Although the planned

operation days a year are approximately 250 days, the actual operation rate is some 70% except for commercial trawling.

2) Research and Training Achievements

The achievements of the research and survey work conducted by the M.V. Okion include a general understanding of the seabed conditions of Nigeria's continental shelf based on data accumulated in the past 8 years of research work and the discovery of new trenches near the coast which were previously uncharted. Trawling has also proved extremely useful in terms of discovering new types of useful fish and distribution of bed fish.

With regard to the training of FFS students, 70% of those students who have undergone training onboard the M.V. Okion pass the national examination at the first attempt each year. Many graduates secure employment with private fishing companies as senior crew members and there is now a strong demand for FFS graduates with the wide recognition of their high quality.

3) Problems of M.V. Okion

There are some problems regarding the future operation of the M.V. Okion. The first is a shortage of fishing gear for survey purposes while the second is the deterioration of the ship's body together with frequent equipment breakdowns. As the M.V. Okion is engaged in the search for new fishing grounds, its fishing gear wears very rapidly. Moreover, special fishing gear is required to search for fishing grounds in rough deep- sea areas. However, the inadequate equipment budget and frequent lack of this fishing gear in the local market has made the replacement of this fishing gear difficult, constituting an obstacle vis-a-vis the M.V. Okion's research operation.

With regard to the second problem, the deterioration of the M.V. Okion has been accelerated by the fact that the poor conditions of the mooring jetty at the time of the M.V. Okion's delivery to the

NIOMR made it impossible to properly protect the vessel. By the time of the subsequent improvement of the maintenance system and the new construction of a mooring jetty and engine workshop, the deterioration had already progressed to a considerable extent. As the vessel is now 8 years old, its full repair requires a substantial sum which is not readily available and, therefore, the present operation of the M.V. Okion is maintained by a series of partial repairs. The present conditions of the M.V. Okion and its equipment are as follows.

(Shell Plates)

There is a high degree of corrosion everywhere and the following holes caused by corrosion are observed.

- 20 - 50 mm above the through deck near the center of the port side (near kitchen) ..... 3 holes
- 30 mm below the through deck near the center of the starboard side (near engine room) ..... 1 hole
- corner of the runner on the right side of the slipway ..... 1 hole

In addition, patches of 0.3 m x 1 m are seen on both sides of the body at the quarter point from the bow. Both bullworks at the stern deck have been renewed and penetration of the shell plate up to 20 - 30 mm between the frames is observed across the bullworks. (The current bullwork condition cannot pass inspection and total replacement would be required if the M.V. Okion was a Japanese ship. The poor conditions of the previous mooring jetty made the M.V. Okion continuously bump against the jetty, causing damage to the shell plates.)

(Wooden Deck)

Damage to the wooden deck is generally severe. The long front deck is particularly damaged and, therefore, the corrosion of the steel plates under the wooden deck may be fairly advanced.

(2) Past Performance and Present Conditions of M.V. Sarkim Baka

The M.V. Sarkim Baka was introduced as a skipjack pole and line fishing boat to study development possibilities and to promote fisheries vis-a-vis large migratory fish, particularly skipjack, in view of exploiting unutilized offshore fish resources. As a result, it acts as a pioneer in the finding of promising bait fishing grounds as well as skipjack fishing grounds and the migrating routes of skipjack and also in the diffusion of the relevant fishing techniques. The roles played by the M.V. Sarkim Baka have an important bearing on the future of Nigerian fisheries.

1) Research and Training Achievements

The M.V. Sarkim Baka was brought to Lagos in 1985 and its operation commenced following the NIOMR's establishment of the management and maintenance system. It is currently operating in good condition in the execution of its assigned research and training work.

One of the M.V. Sarkim Baka's achievements so far is the now firm prospect for securing bast raising grounds which are essential for skipjack fishing. Stable fishing grounds for skipjack have been secured with the installation of floating blocks to gather fish. As shown in the appendix (Operation Performances), the catch of skipjack in 1989 increased by almost 5 times that in 1988, showing the real possibility of commercial skipjack fishing. Private fishing companies are paying close attention to the performance of the M.V. Sarkim Baka and may commence skipjack fishing in the near future.

The good performance of the M.V. Sarkim Baka proves the high quality of the technical training it provides to foster Nigerian fishing crews and, together with the M.V. Okion, it has made great achievements in student training.

In general, the M.V. Sarkim Baka conducts oceanographic surveys twice or three times a year and joint surveys with researchers from

neighbouring countries were conducted in 1989.

2) Problems of M.V. Sarkim Baka

As described earlier, the maintenance conditions of the M.V. Sarkim Baka are fairly good and there are no problems with the vessel except for some minor equipment breakdowns. However, there are problems in regard to its operation. Since the live fish used as bait for skipjack are as small as 4 cm, they do not live long, limiting the operation area of the vessel. In addition, the mesh of the fishing nets used to catch bait fish is too large to increase the yield rate. The difficulty of procuring net materials to improve the nets is another problem.

Both quantitative and qualitative improvements of the bait fishing are urgently required as the securing of a stable supply of bait will enable operations following the seasonal migration of skipjack.

(3) Operation Performances of M.V. Okion and M.V. Sarkim Baka

The operation performances of the NIOMR's research and training vessels, i.e., the M.V. Okion and M.V. Sarkim Baka, for the last two years are included in this Report as an appendix.

2.3.3 Present Conditions of Facilities and Equipment

A. Present Conditions of Facilities

The FFS is located in the southwestern corner of Victoria Island in Lagos. The NIOMR site is located some 200 m from the front of the FFS where the student dormitories and canteen of the FFS are located. The present main facilities of the FFS are as follows:

(1) 2-Story Classroom Buildings

The four 2-story school buildings were constructed between 1969 and

1974 and are the core of the FFS facilities. The exteriors of these buildings were repainted in 1988 in view of the preliminary inspection by the National Board for Technical Education and, although the exteriors appear clean at first glance because of the repainting, there are many structural cracks in addition to damage to the roofs, rainwater leaks and the corrosion of the window frames. The power and water facilities are also highly worn, suggesting the general deterioration of the buildings. Furthermore as the buildings are the result of a series of extensions, they also have structural faults, including the lack of joints between structural components. The following rooms are located in these buildings.

1)	Classrooms	9	54.9 m^2 (average)
2)	Biology Laboratory	1	73.2 m^2
3)	Chemistry Laboratory	1	73.2 m^2
4)	Library	1	73.2 m^2
5)	Marine Engineering Course Practical Application Rooms		
	Machine Tool	1	60.0 m^2
	Machine Assembly and Disassembly	1	24.0 m^2
	Outboard Engine	1	18.0 m^2
	Refrigeration	1	24.0 m^2
6)	Staff Rooms		
	Principal's Office	1	73.2 m^2 (including a secretary's office and a waiting room)
	Vice Principal's Office	1	24.4 m^2
	Lecturers' Rooms	4	15.3 m^2
7)	Machine Room, etc.		

(2) 3-Story Classroom Building

This was built in 1986 as part of grant aid cooperation by the Government of Japan and adjoins one of the previous four classroom buildings. It has so far been well maintained. The following rooms are located in this building.

1)	Classrooms	1	100.4 m^2, 60.8 m^2
2)	Lecturer's Room	1	13.5 m^2
3)	Chart Work Room	1	58.5 m^2
4)	Mock Bridge Room	1	27.0 m^2

(3) Marine Engineering Course Workshop (105 m^2)

This is a single- story building which was originally built for practical training on fishing gear but was later converted to a workshop for the Marine Engineering Course. The building is in imperfect condition and part of the roof leaks.

(4) Dormitory Buildings (1,914 m^2)

The two 2-story dormitory buildings have a total of 56 rooms. Each room originally accommodated 2 students but now accommodates 4 - 6 students to meet the increase students. The conditions of these buildings are generally poor and deterioration of the power and water facilities is particularly noticeable.

In short, all the buildings of the FFS are fairly deteriorated except for the 3-story classroom building. The four 2-story school buildings have structural faults and various deteriorated facilities and, therefore, are unsuitable for long-term use in the future.

B. Present Conditions of Equipment

The FFS does not have a wide range of educational and training equipment with the exception of the navigational equipment for the Nautical Science and Fishing Course and the machine tools for the Marine Engineering Course.

While the training equipment (navigational instruments and others) in the mock bridge for the Nautical Science and Fishing Course is well maintained, there is a noticeable shortage of equipment for the other courses and the laboratories are particularly poorly equipped.

One reason for the poor provision of educational and training equipment at the FFS is that, because of the access to NIOMR facilities and equipment, there has been no practical requirement for the FFS to have its own equipment. At present, the main equipment owned by the FFS is as follows. (Those with an "o" were provided through the request for individual equipment by the JICA experts.)

Place	Equipment	No.	Condition
Mock Bridge	Navigational Equipment for Display and Operation Practice		
	Radar	1	good o
	Mock Autopilot and Steering Unit	1	good o
	Fish Finder	1	good o
	Sonar	1	good o
	Data Recorder	1	good o
	(connected with fish finder and sonar to send data signals)		
	Direction Detector	1	good o
	Radio Telephone (SSB)	1	good o
	Facsimile	1	good o
Marine Engineering Workshop	Machine Tools and Others		
	Drill	1	operable
	Shaper	1	repair required (damaged bearings of driving axle) o
	Lathe	1	operable
	Powered Metal Cutter	1	operable
	Grinder	1	operable
	Hand Drill	1	operable
	Air Compressor	1	operable
	Electric Welder	1	operable
	Gas Welder	1	operable
	Pipe Bender	1	operable
	Pipe Cutters	2	operable
	Tools		
	Hammers	5	
	Chisels	10	
	Metal Measures	5	

Place	Equipment	No.	Condition
	Files	33	
	Metal Cutters	11	
	Micrometers	2	
	Calipers	10	
	Ruler Blocks	4	
	Anvils	2	
	Auxiliary Equipment for Educational Purposes		
	Marine Diesel Engine Model	1	repair required o (clogging of cooling water pipe)
	Assembly and Disassembly Work		
	Second-Hand Diesel Engines	2	
	Second-Hand Outboard Engines	5	
	Freezer Simulator	1	repair required o
Biology Laboratory	Laboratory Tables	6	
	Refrigerator	1	out of operation
	Centrifuge	1	out of operation
	Microscopes (2 types)	9	
	Precision Balance	1	out of operation
Chemistry Laboratory	Laboratory Tables	6	
	Draft Chamber	1	out of operation
	pH Meter	1	out of operation
	Glass Apparatus	small quantity	

C. Improvement Recommendation of National Board for Technical Education

The FFS recently received a recommendation to improve its management organization and the school facilities from the National Board for Technical Education (NBTE) of the Federal Ministry of Education, following the latter's preliminary inspection of the FFS in October 1988.

There are a total of 36 agricultural colleges and technical schools, including the FFS, in Nigeria which were established by various federal ministries and which have been managed under the respective rules and regulations. As a result, the facilities, curricula and educational levels

of these colleges and schools are not coordinated and the awarding of such certificates as the OND or HND is based on the standards adopted by each school.

The Decree on the Establishment of Technical Schools and Their Minimum Standards was enforced by the Government of Nigeria in 1985 to rectify the existing situation of higher education where the maintenance of an appropriate educational level was impossible and the technical education policy of the country was difficult to achieve. Pursuant to the Decree, the NBTE was required to introduce minimum standards for technical schools and to inspect and certify the syllabus of each OND and HND course. All technical schools in Nigeria were, therefore, subject to the Decree and had to satisfy the standards set by the NBTE in order to be certified by the NBTE. The FFS was not exempt from the above requirements. The inspection results and the subsequent improvement recommendation by the NBTE are summarized below.

(1) Organization

1) The official status of the FFS as part of the NIOMR is based on the Agricultural Research Institute Decree of 1975 but the Decree does not provide the FFS with any authority to award the OND or HND. The Ministry responsible for the FFS must take up the procedure to give the FFS official technical school status.

2) Since the FFS does not have its own management and accounting sections, it cannot be considered an independent technical school. Appropriate management and accounting sections must be established to run the school independently.

(2) Syllabus

OND and HND courses require 1,800 or more teaching hours a year. At present, however, the General Fisheries Course for the Ordinary National Diploma falls short of this requirement and the teaching hours for this course must be increased. General subjects are also important for OND and HND courses and must account for 10% - 15% of the total teaching hours. Therefore, the teaching hours for general subjects must be

increased for those courses which do not meet this requirement.

(3) Facilities and Equipment

1) Classrooms

The poor maintenance conditions must be improved.

2) Library

The library must be extended to provide seats for at least 30% of the total number of students.

3) Laboratories

The available laboratory facilities are poor and inadequate. The following laboratories must be provided together with necessary services and equipment for conducting OND and HND courses.

Biology Laboratory (Fisheries Biology)	 1
Physics Laboratory	 1
Chemistry Laboratory	 1

4) Medical Treatment Room

A medical treatment room must be provided.

(4) Staff

1) The FFS has no full-time staff*1 and all teachers are also NIOMR researchers. As this is not an acceptable situation for a technical school, full-time teachers for the FFS must be employed.

2) A sufficient number of laboratory technicians must be employed.

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*1 : NBTE's inaccurate observation. FFS has a few full-time staff.

3) Appropriate instruction, accounting and administration sections must be established, together with an increase of full-time staff.

(5) Budget

The budget for the FFS should be separated from the budget of the NIOMR and the FFS should make its own budgetary request. A substantial sum will be required to raise the school facilities to the certifiable level.

Response of the FFS to the NBTE Recommendation

In view of the above recommendation by the NBTE, the FFS must improve its organization, budget, facilities and equipment in order for the school to be certified by the NBTE. The FFS has in fact already commenced consultations with the NIOMR and the Federal Ministry of Science and Technology on the following points and improvement efforts are in progress.

1) establishment of instruction, accounting and administration sections and allocation of the respective staff
2) appointment of full-time staff, including lecturers
3) separation of the budget for school management from the NIOMR budget

2.3.4 Management System and Budget

The FFS constitutes an educational and training institute of the NIOMR and its daily management is conducted by the Principal under the supervision of the Director of the NIOMR. As the activity and budget plans of the FFS are examined by the Administration Division of the NIOMR and are adjusted vis-a-vis the plans of other divisions, they are largely affected by the plans of other divisions at both the preparation and implementation stages. The FFS also receives much cooperation from the other divisions in terms of the provision of lecturers and access to the facilities and equipment of these divisions.

After receiving the recommendation for improvement from the NBTE, the FFS commenced preparations in 1988/89 for the appointment of full-time staff, the establishment of independent administration, accounting and instruction sections and the introduction of an independent budget and some improvement efforts are already in progress.

2.3.5 Background and Contents of the Request

The development and promotion of fisheries are important tasks in Nigeria to promote this primary industry and to firmly establish a self-sufficient food supply. There is a strong demand for both mid-level and senior fishing boat crew engaged in offshore fisheries and for fisheries engineers engaged in the promotion of coastal and inland water fisheries, aquaculture, fish processing and distribution. Consequently, the importance of manpower development in the field of fisheries is growing ever stronger.

Since its establishment, the FFS has tried to foster the required manpower for the fisheries field by expanding its courses and increasing the number of student places. However, the school facilities have remained largely unchanged except for those provided by a Japanese grant in 1986, and in view of the natural deterioration of the facilities and the general equipment shortage, the FFS is currently not fully capable of meeting the educational and practical requirements of the students. In addition, a further increase of the number of student places appears impossible.

The Government of Nigeria has been conducting a nationwide review of the organization, curricula, facilities and equipment of technical colleges and technical schools with a view to improving the educational standard. As a result, the FFS is now required to improve both its facilities and equipment.

Against this background the FFS has planned the Project for Improvement of the FFS to improve the school's facilities, equipment and curricula and to introduce new courses together with the consolidation of the school's staff and organization. This Project has been approved by senior government organizations and the Government of Nigeria has requested the Government of Japan to extend grant aid cooperation for the construction of facilities and

the procurement of equipment essential for the realization of the project. The requested facilities and equipment are as follows:

(1) Construction of Facilities

1) A multi-story block to accommodate the following rooms.

- classrooms (10)
- laboratories (4)
- library (seating capacity: 150)
- assembly hall (seating capacity: 1,000)
- computer room
- audio-visual room
- principal's office/lecturers' rooms
- administration, accounting and instruction offices
- medical treatment room
- others

2) A workshop building to accommodate the following rooms.

- drawing room
- machine assembly and disassembly room
- practice room
- tool store
- net loft
- others

3) Dormitory Building

To be equipped with a kitchen, dining hall and warden's room, etc.

4) Accommodation Facilities for Visitors

5) Machine Building

(2) Equipment

1) Necessary equipment for laboratories, workshop, classrooms and dormitory, etc.

2) Multi-Purpose Training Vessel

3) School Bus and Others

CHAPTER 3

PROJECT DESCRIPTION

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3.1 The Objectives of the Project

Since its establishment in 1969, the FFS has been playing an important role in the education of fisheries technicians as Nigeria's only technical school in the fisheries field. Despite the increased number of students following the introduction of new courses, however, the original facilities have not been extended. In view of the current deterioration of these facilities and the poor provision of equipment, it now appears difficult to further upgrade the educational and training levels of the FFS as well as to increase the number of enrollments.

The Project aims to upgrade the FFS as a technical school by improving its present conditions and to contribute to the promotion of Nigerian fisheries and the increase of fisheries production by fostering mid-level engineers who can play a control role in the fisheries sector through the teaching and training provided by the FFS.

3.2 Evaluation of Requested Items

3.2.1 Evaluation of Feasibility of the Plan

The direct objective of the Project is to upgrade the FFS as a technical school by achieving the following targets.

1) Improvement of School Facilities and Consolidation of Educational Equipment

Construction of a number of new school facilities, including a classroom building, workshop and dormitory building, and consolidation of the necessary equipment, including that for educational purposes, to make the FFS a true technical college in both the facility and equipment aspects.

2) Introduction of New Courses

In addition to the existing courses, introduction of Skipper and Marine Engineer II Courses to consolidate the course range provided by the FFS.

3) Improvement of Staff and Organization

Increase of the number of teachers and clerical staff and establishment of the independent character of the FFS by the introduction of its own administration, accounting and instruction sections.

The above targets are examined below together with the background of the request.

(1) Improvement of Facilities and Equipment

The promotion of fisheries is an important task for Nigeria, together with the development of agriculture, in order to establish a self-sufficient food supply. Manpower development is essential for such promotion and the role of the FFS, Nigeria's only technical school in the field of fisheries, is becoming increasingly important.

The FFS has been responding to this requirement by introducing new courses, reforming old courses and increasing the number of enrollments. Originally a kind of vocational training centre providing short courses for fishing boat crews and fishermen, the FFS has been upgraded to the level of an agricultural college or technical school with the introduction of new courses to foster personnel for a wide range of fisheries fields, i.e., administration, research, project management and fisheries guidance, etc., in addition to its provision of traditional courses to educate mid-level fishing boat crews, and graduates are awarded national diplomas.

However, as facility and equipment expansion and improvement have lagged behind the consolidation of the teaching courses, the educa-

tional activities of the FFS are greatly hampered. Moreover, the facility and equipment shortage has also prevented the expansion of the FFS in terms of both student enrollment and teaching staff. The FFS has already received an improvement recommendation from the NBTE relating to the school facilities, equipment and organization and is now required to conduct various improvements in order to be certified by the NBTE as a technical school providing OND and HND courses.

The improvement of the facilities and equipment under the Project is, therefore, essential to enable the FFS to attract capable students and to educate them as leaders for Nigerian fisheries, thus fulfilling its important role, and the timing of the project implementation is highly appropriate.

(2) Introduction of New Courses

The enactment of the Merchant Shipping Act in 1963 based on a similar British law has made it necessary for crew members of fishing boats to possess the relevant qualifications while the Nigerian Enterprise Promotion Decree of 1977 requiring the indigenization of crew members further necessities the fostering of Nigerian seamen with the proper qualifications. Furthermore, the government policy for ocean fisheries development stresses (i) the development of new fishing grounds and (ii) the development of offshore fishery resources, etc. To achieve these objectives, expansion of the fishing fleet by the introduction of larger and more modern fishing boats is necessary, which in turn requires engineers capable of operating and maintaining these fishing boats.

The FFS already provides the Nautical Science and Fishing Course and the Marine Engineering Course, paving the way for the graduates of these courses to sit the respective national examinations for Mate and Marine Engineer III after one year's actual experience onboard a fishing boat. However, no educational institute in Nigeria as yet provides courses which allow the graduates to sit the national examinations for Skipper and Marine Engineer II.

The Mate Certificate and Certificate of Marine Engineer III only allow the holders to act as the captains or chief engineers of fishing boats of less than 30 tons and the captains and chief engineers of inshore or offshore fishing boats must possess the Certificate of Skipper or Certificate of Marine Engineer II. Up until now, those hoping to obtain these qualifications have gone to rating schools abroad (for example, in Ghana) at their own or company expense. However, the recent poor performance of the Nigerian economy is now making this practice difficult.

The number of those Nigerian mid-level crew members with the required experience hoping to obtain higher certificates is increasing and, therefore, the demand for a domestic educational system and facilities awarding the necessary qualifications to sit the national examinations for higher certificates is growing.

As described earlier, the FFS has acquired the necessary know-how for new courses through its experience with the Nautical Science and Fishing Course and the Marine Engineering Course and, as teaching staff are already available, the FFS is now judged to be capable of conducting the required level of education and training for new courses. The FFS is also preparing to further consolidate its teaching staff in the nautical science and marine engineering fields and the improvement of the syllabus is under discussion with the NBTE as well as the Federal Ministry of Transportation which is the organization responsible for the national examinations for seamen. In accordance with the progress of this preparatory work, together with the consolidation of the teaching facilities and equipment, the FFS should be fully capable of introducing the Skipper and Marine Engineer II courses.

In view of the above situation, it is both necessary and appropriate for the FFS to newly introduce these two higher level courses through the implementation of the Project. As these new courses will foster high level engineers, they are essential for the future promotion of Nigerian fisheries.

According to the plan of the FFS, each of the new courses will accept a

total of 40 students, as in the case of the existing courses, and students will be either graduates of the existing courses or those currently working in the respective fields. Most students of the Nautical Science and Fishing Course and the Marine Engineering Course are showing strong interest in enrolling in the higher courses as the graduates of the new courses will be regarded as equivalent to HND holders. Their strong interest is motivated not only by their entitlement to sit the national examinations for higher certificates but also by the fact that they hope to obtain better jobs with the government or engineering companies, etc., after one year's service with the National Youth Service Corps following graduation.

The demand of the federal and state governments, fishing companies and engineering companies for highly qualified engineers is extremely strong in Nigeria. Specialists in the fields of mechanical engineering, electrical engineering and refrigeration are particularly required for various factories. Given the fact that the FFS is the only technical school in the fisheries field in Nigeria, preparations to maximize the number of enrollments for the new courses must be made and classes of 40 students are deemed appropriate based on the experience with the existing courses.

(3) Consolidation of Staff and Organizational Improvement

At present, the Principal and lecturers of the FFS hold concurrent positions as researchers of the NIOMR. This dual holding of research and teaching positions should be abolished in view of the consolidation of the educational activities of the FFS and full-time lecturers must be appointed. In addition, independent administration, accounting and instruction sections with full-time staff must be established for the FFS to conduct its own administration and budget management in view of the establishment of the FFS as an independent entity.

These points were included in the improvement recommendation of the NBTE and the FFS has been consulting with the NIOMR and the Federal Ministry of Science and Technology with a view to reforming its organization. Some of the planned reforms, including a staff increase