

Japan International Cooperation Agency (JICA)

Ministry of Fishery and Marine Transportation (MPTM)

Republic of Senegal

**THE STUDY ON THE DEVELOPMENT PROGRAM
FOR
NORTHERN FISHING AREAS
IN
THE REPUBLIC OF SENEGAL**

**Final Report
Main Report**

November 1997

JICA LIBRARY



J 1140603 (0)

SYSTEM SCIENCE CONSULTANTS INC.

A F F
J R
97-57



Japan International Cooperation Agency (JICA)

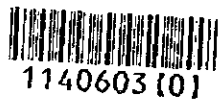
**Ministry of Fishery and Marine Transportation (MPTM)
Republic of Senegal**

**THE STUDY ON THE DEVELOPMENT PROGRAM
FOR
NORTHERN FISHING AREAS
IN
THE REPUBLIC OF SENEGAL**

**Final Report
Main Report**

November 1997

SYSTEM SCIENCE CONSULTANTS INC.



1140603 {0}

PREFACE

In response to the request from the Government of the Republic of Senegal, the Government of Japan decided to conduct the Study on the Development Program for Northern Fishing Areas and entrusted the study to Japan International Cooperation Agency (JICA).

JICA sent to Senegal a study team headed by Mr. Tateo Kusano, System Science Consultants Inc., three times during the period from October 1996 to October 1997.

The team held discussions with the officials concerned of the Government of the Republic of Senegal, and conducted field studies at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

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

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

November, 1997



Kimio Fujita
President
Japan International Cooperation Agency

November 1997

Mr. Kimio Fujita
President
Japan International Cooperation Agency
Tokyo, Japan

Dear Mr. Kimio Fujita:

Letter of Transmittal

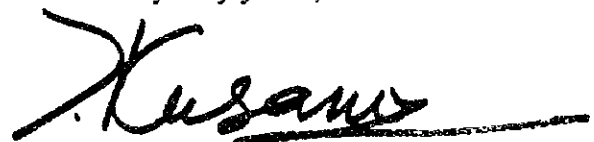
We are pleased to submit to you the report on the Study on "the Development Program for Northern Fishing Areas in the Republic of Senegal". The report contains the advice and suggestions of the relevant authorities of the Government of Japan and the Government of Senegal as well as the results of the above mentioned Study.

This study was conducted by System Science Consultants Inc., based on a contract with JICA, from September 24, 1996 to November 28, 1997. In this study, we formulated a master plan of the northern coast (Grande Côte) and feasibility study of the priority projects in the study area.

In view of the urgency of improving the artisanal fisheries sector and the fish marketing and distribution system in the northern coast, we recommend that the Government of Senegal implement the proposed priority project in the Study.

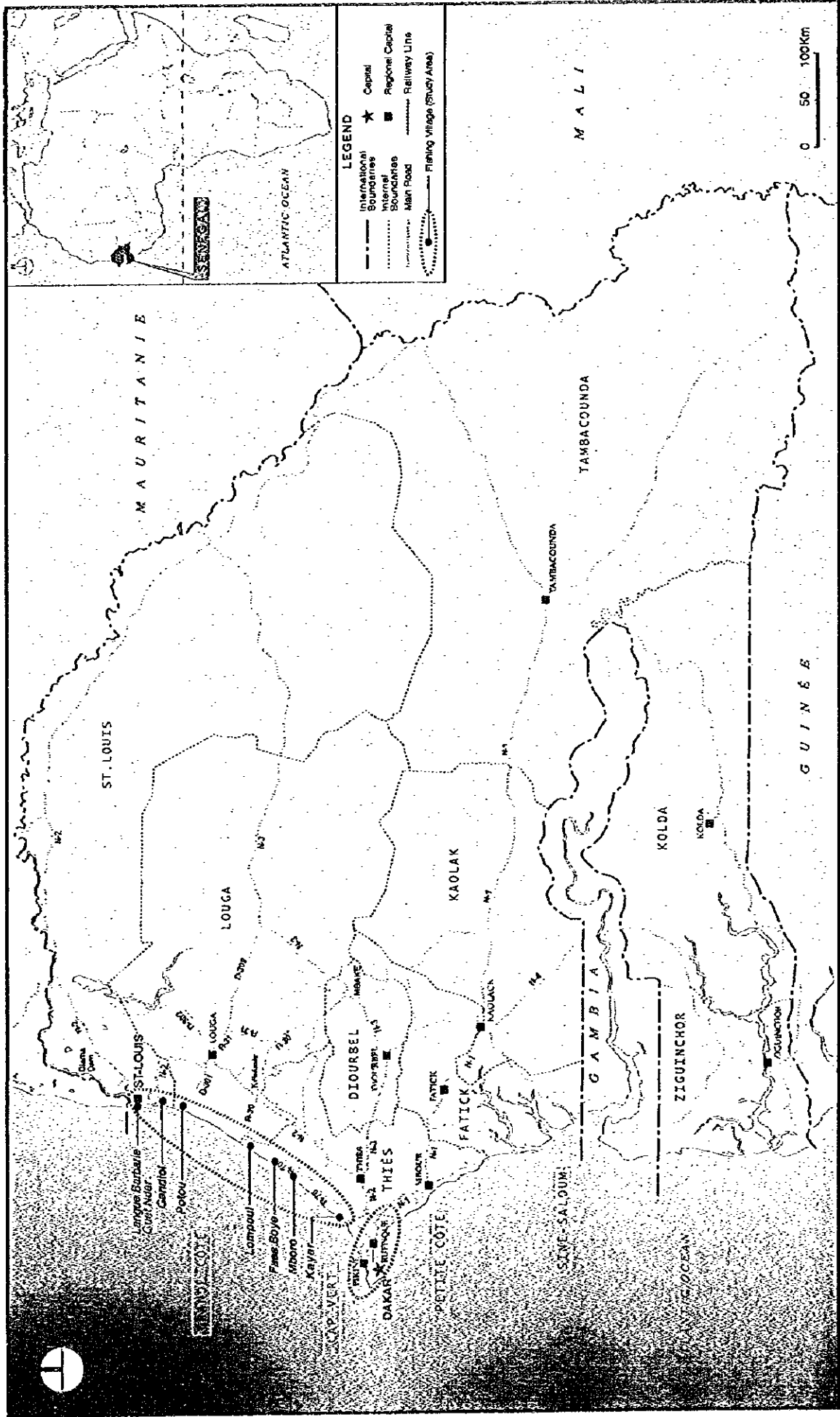
We wish to take this opportunity to express our sincere gratitude to the relevant officials of JICA, the Ministry of Foreign Affairs and the Ministry of Agriculture, Forestry and Fisheries in Japan. We also wish to express our deep gratitude to the concerned officials of Ministère des Pêches et des Transports Maritimes (MPTM), Direction de l'Océanographie et des Pêches Maritimes (DOPM), other relevant agencies, and the JICA Representative Office and the Embassy of Japan in Senegal for their close cooperation and assistance extended to the Team during the Study.

Very truly yours,

A handwritten signature in black ink, appearing to read "Tateso Kusano", with a horizontal line underneath it.

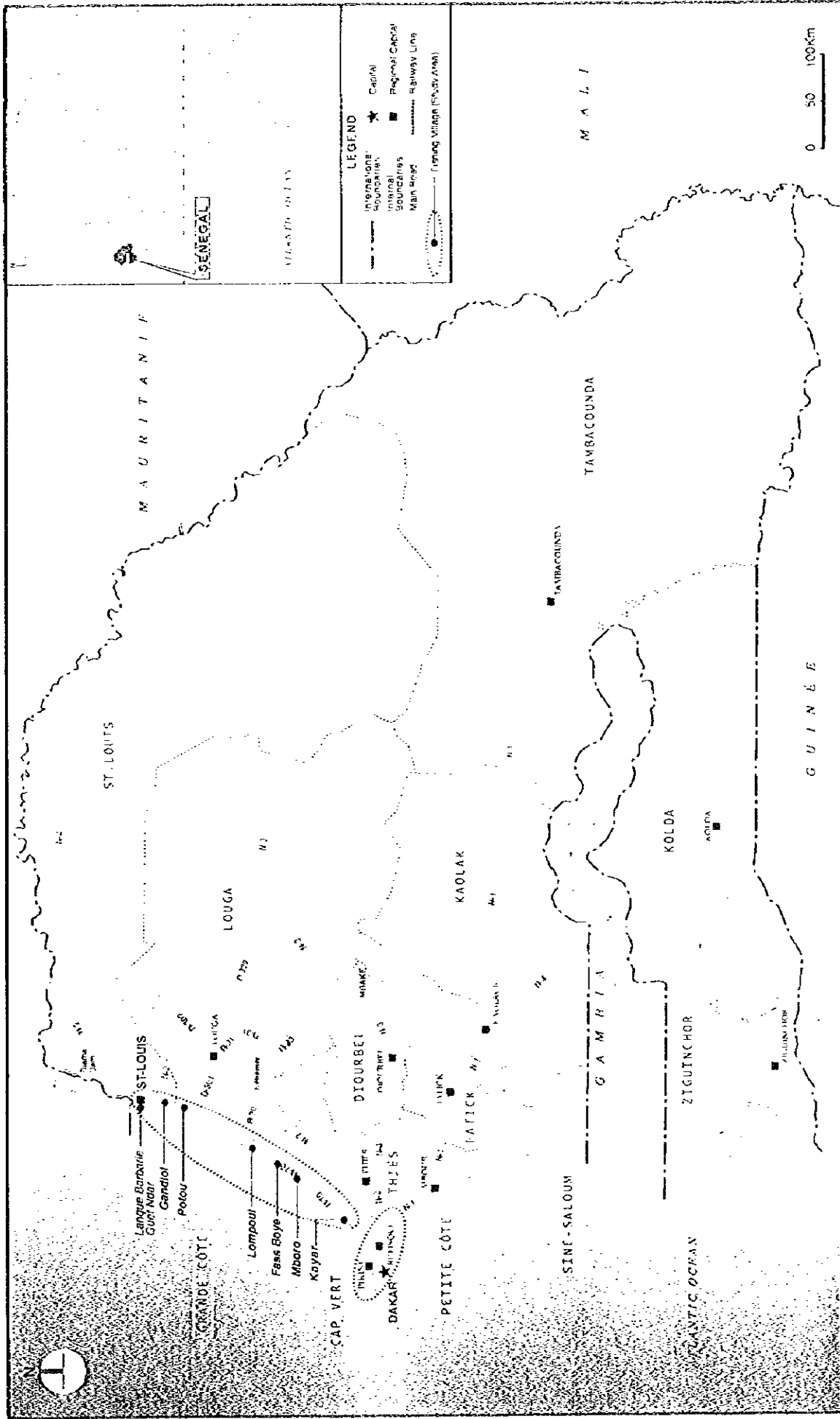
Tateso Kusano
Team Leader

The Study on the Development Program for
Northern Fishing Areas in the Republic of Senegal
System Science Consultants Inc.



THE STUDY ON THE DEVELOPMENT PROGRAM
 FOR NORTHERN FISHING AREAS
 IN THE REPUBLIC OF SENEGAL
 JAPAN INTERNATIONAL COOPERATION AGENCY

Survey Map : General



THE STUDY ON THE DEVELOPMENT PROGRAM
FOR NORTHERN FISHING AREAS
IN THE REPUBLIC OF SENEGAL
JAPAN INTERNATIONAL COOPERATION AGENCY

Survey Map : General



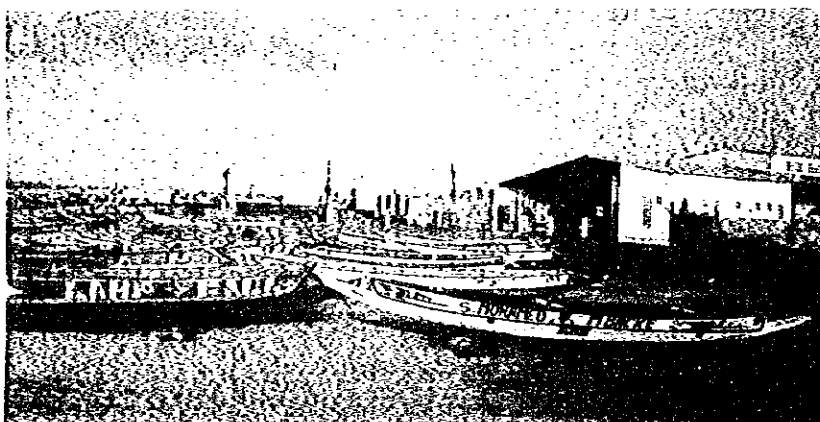
Artisanal processing area close to sardinelle landing site in Guet Ndar - St. Louis



A pirogue landing sardinelles



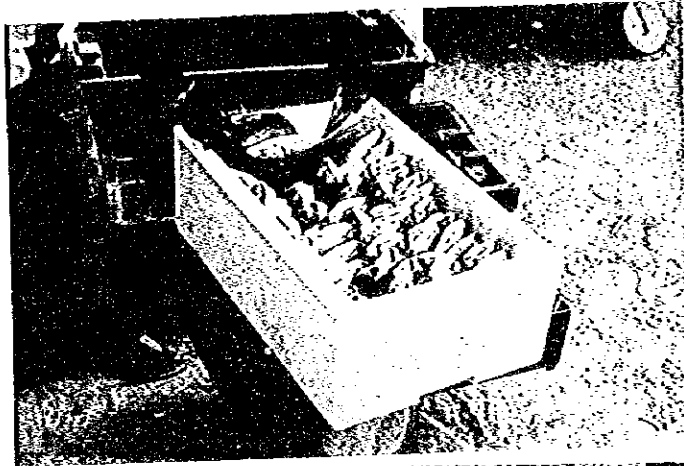
Sardinelles in "ronier" baskets waiting for icing and loading



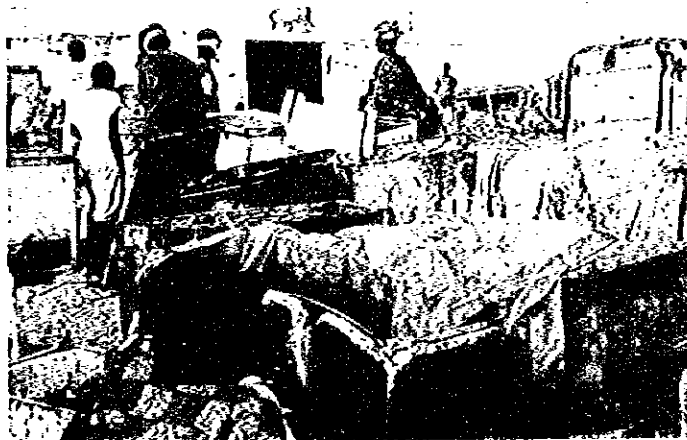
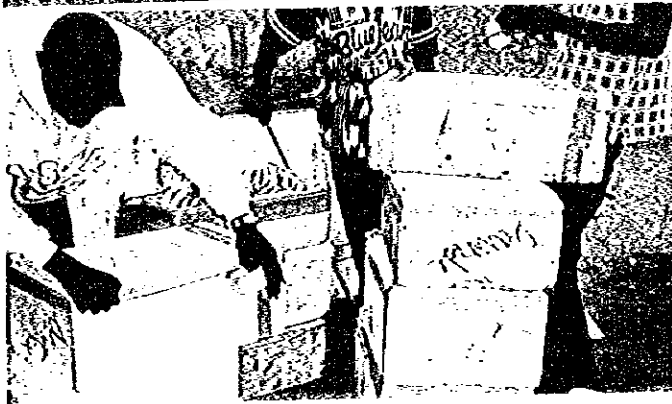
A scene of Kayar landing site with pirogues (building in the rear is CAPAS ice plant (plate ice))



Negotiation between fisherman and collector for high price fish (pageot) at a Kayar landing site



High price fish sorted, weighed and packed at a collection point for transport to Dakar



Temporary storing area for women processors for purchased fish prior to processing (St. Louis)



A typical scene of congested artisanal processing site in Guet Ndar - St. Louis



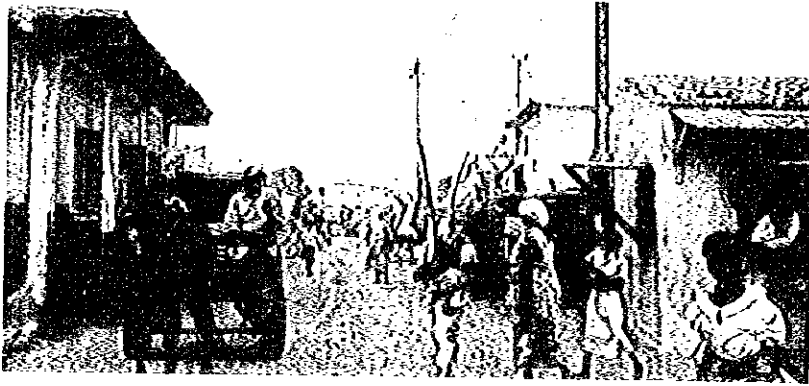
An improved artisanal processing site with concrete floor and tables in Guet Ndar, St. Louis



Women preparing for processing (head cutting and gutting) in Lompoul where most of the landings are processed.



Artisanal processing area close to temporary fishing village (for migrant fishermen) in Potou. Houses are made of straw



A scene showing
fishing community
living environment in
Guet Ndar



Presentation by Team
Leader at a workshop
in Saint Louis on May
27, 1997



Participants
(fishermen, traders,
women processors &
micro-wholesalers) at
a workshop in Kayar
on June 3, 1997



Group meeting and
discussion with
wholesalers, women
processors, etc. during
the workshop in St.
Louis



Group meeting and discussion with GIE leaders, women processors, etc. during the workshop in Kayar



Presentation by Team Leader at Dakar workshop on June 23, 1997, and participants from different agencies attended.

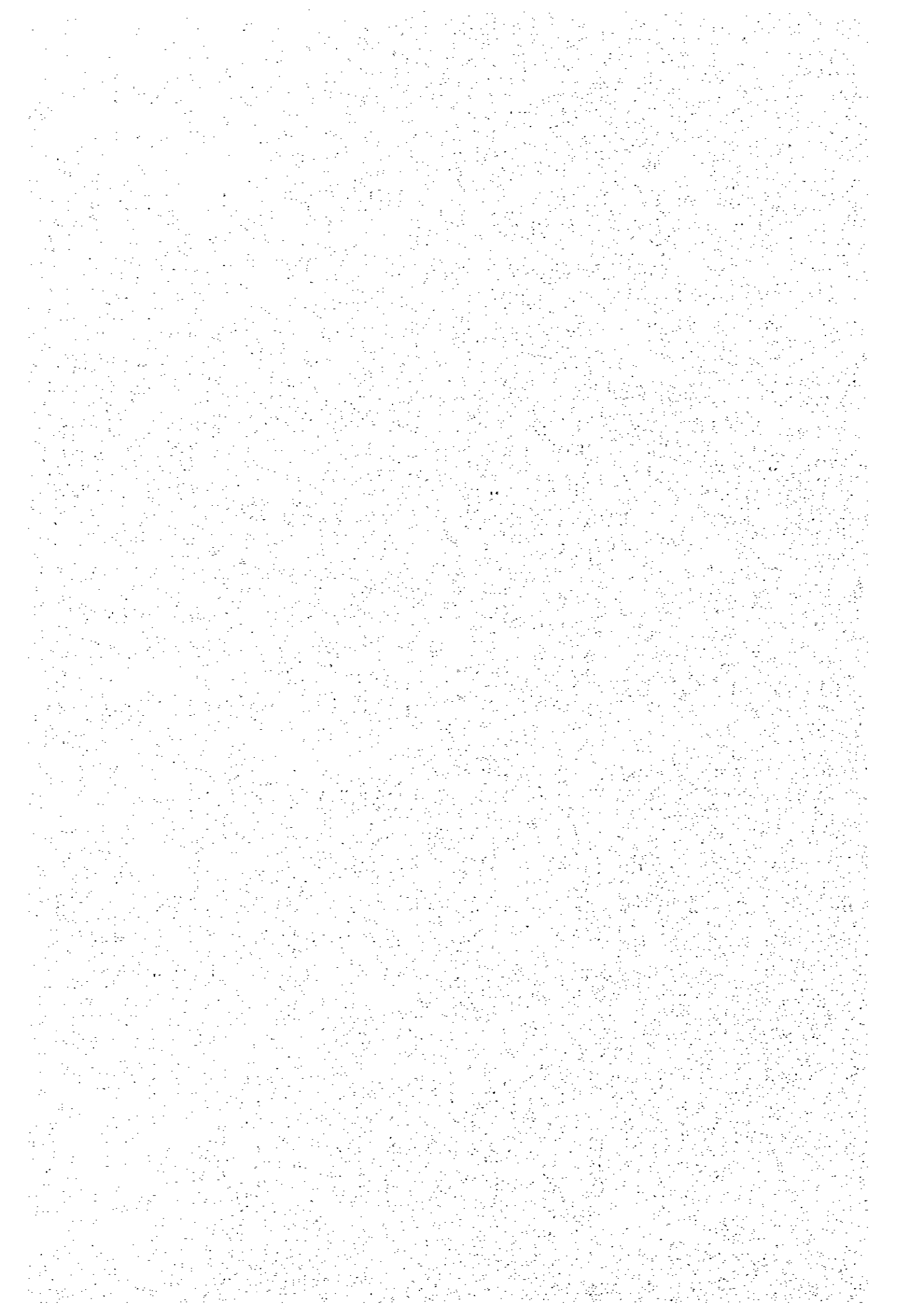


National Seminar in Dakar held on September 30, 1997 to explain the contents of the master plan to beneficiaries, govt. officials and donors.



Participants listening to simultaneous interpretation (Wolof, French) of the seminar

SUMMARY



SUMMARY

The government of Senegal requested the government of Japan to improve the fisheries sector in the northern coast of Senegal. In compliance with this request, a S/W (Scope of Work) mission was sent to Senegal in March 1996 and the development study was implemented from September 24, 1996 to November 28, 1997.

The objective of this study was to compile a comprehensive master plan that would include measures to improve the fishing technology, fish processing, fish marketing and the livelihood of fishing villages. In addition, a feasibility study of the priority projects which were selected based on this master plan was also included.

The approach adopted in this study was the implementation of periodic discussions with counterparts and participation in workshops at regional level in Saint Louis and Kayar and at central level in Dakar.

This report is the Final Report, a compilation of the data obtained from the Phase I and Phase II surveys, and it is based on discussion and comments on the Draft Final Report with the Senegalese side. A seminar was held on September 30, 1997 to explain the contents of the master plan to the officials, beneficiaries as well as donors. A summary of this report is presented below.

1. Analysis of Existing Conditions in the Study Area

(1) Fish Production

- 1) The fish landing volume of fishing villages in the Saint Louis region was about 37,952 tons in 1995; and there was a fishermen population of about 15,000.
- 2) The fish landing volume of the northern Thies region (centered around Kayar) was about 19,724 tons in 1995; and the maximum number of fishermen was about 3,000, including migrant fishermen.
- 3) The fish landing volume in the Louga region was 1,744 tons in 1995; and the fishermen population numbered only 312 members who were mainly migrant fishermen.
- 4) The fish landing volume in the Dakar region was 27,763 tons; and the fishermen population was about 10,000, including migrant fishermen.

(2) Fish Marketing

- 1) Marketing system: Different marketing patterns exist for different fish species which are roughly divided into the three groups of sardinelle, high price fish, and other kinds of fish. In addition, different issues in marketing patterns exist for fresh or processed fish and according to the distinctive characteristics of the consumption region (local consumption, Dakar, inland areas, or for export).
- 2) Fish marketing regulations: Although there is no nationwide system of uniform fish marketing regulations, such regulations have been established in recent years at the Dakar Central Fish Market and at each regional fisheries centers, based on the characteristics of each market.
- 3) Fish marketing information system: The only source of information available is the statistical data compiled by DOPM. An organized public system of information on statistics or data for use in marketing transactions does not exist.

(3) Fish Processing

Nearly all of the workers engaged in fish processing activities are women who directly purchase the raw ingredient from fishermen and process the fish either individually or in GIE groups. The processing technique is simple and artisanal; and many are apprehensive about difficulties of employment opportunities in future due to a rise in the fish processing population, etc. In addition, their working conditions are inferior and the work itself is harsh. The sanitary environment of processing areas is so poor that it has become a serious social issue in the urban suburbs. Processed fish is a precious source of protein for the inland regions of Senegal and its neighboring countries and the demand is anticipated to grow in future.

(4) Fish Quality and Price

Fairly suitable quality control measures are exercised in view of the fishing methods, fish species harvested, climate conditions and other overall conditions. The problem lies in the fish handling methods employed during fish landing and delivery to the consumption area. Due to an inadequate fish marketing infrastructure and related marketing regulations and organization at the production site, there is a prominent loss in fish quality, time, and cost during the marketing stage. A system of establishing fish prices at the production site does not exist and only a limited number of distributors has access to fish price information at the consumption markets. As a result, an impartial pricing mechanism which is necessary in free competition does not exist.

(5) Credit System

CNCAS has been the official source of financing available, but it has been unsuccessful despite the great demand for financing in the fisheries industry and the fishing villages. In lieu of CNCAS, small-scale financing in the form of mutual funds have started to become an effective means of financing.

(6) Fishing Community Development and Gender Analysis

1) Transmigrant fishermen

Saint Louis which has been targeted in this study has traditionally been known for its superior fishing technology. The area contains a large population of transmigrant fishermen in the south. These fishermen move alone or with their families and many are known to settle down in the region they have transmigrated to. There is an exchange of fishing techniques and living patterns between regions, in conjunction with transmigrating fishermen. Although there were initially many troublesome incidents between the original inhabitants and the newcomers, the two groups have gradually come to terms through a coordination council comprised of representatives from both groups, which meet frequently to coordinate the profits between the two groups. This coordination council has been officially recognized in some regions.

2) Women's environment

Polygamy has been traditionally practiced in the fishing villages and wives are actively engaged in fish processing and marketing activities to support their families. Due to the large number of transmigrant fishermen families, the family base extends over a wide area and their means of livelihood is prosperous. However, a system of credit which would assist the wives in need of financing for their economic activities is not available. This lack of financing has been a major factor which has impeded their selling activities as well as employment opportunities. Health care centers, primary schools, improved literacy rates, etc. are anticipated from the Basic Human Needs (BHN) approach.

(7) Living Environment Conditions

The living environmental problems in the study area are as follows.

- Inadequacy and/or lack of an proper drainage system
- High concentration of industries in Dakar region
- Anarchy urbanization in towns or villages

- Clandestine removal of sea sand and shells.
- Coastal erosion in Dakar region
- Invasion of sand dunes in basins of market gardening in Niayes

(8) Infrastructural Conditions

With the exception of Dakar and its surrounding area, infrastructural improvements are lagging in the northern region. In particular, improvements in modernized fishing, fish marketing, processing, and living infrastructure in Saint Louis and Kayar which comprise the largest areas of the northern region, have fallen behind. In the small fishing villages between Saint Louis and Kayar which are mainly comprised of transmigrant fishermen, fishing related infrastructure is nonexistent. Forming a consensus within the community prior to implementing infrastructural improvements and establishing an organized system in the wake of such improvements, have become major issues in each region.

2. Master Plan

(1) Development Goals

The objectives of this project are to improve the income and living standards of artisanal fishing villages in the northern region of Senegal and to strengthen fishery production which is faced with both quantitative and qualitative resource-related-problems.

(2) Development Strategies

- 1) Develop an optimum institutional system and infrastructure for the northern regional fishing villages which are the base for fishermen actively transmigrating along the coastline of Senegal and its neighboring countries.
- 2) Organize a fishing and fish marketing base of operations through activities to modernize fisheries and establish a wide networking system linking each base.
- 3) Promote effective use of fishery products by modernizing fish marketing, processing, and quality control

(3) Basic Development Policy

Separate plans for sector and zone based on the development strategies outlined above are to be compiled, in order to successfully attain the development strategy and accelerate comprehensive development by incorporating all sectors into each zone.

1) Sector Plan

a. Sector 1 : Fishery Resources and Production

Introduce an effective resource management system that aims to increase and promote effective fishing and fish landings

b. Sector 2 : Fish Marketing and Distribution

Institute an effective and efficient fish marketing and distribution system and provide equal opportunities to all fish marketing related beneficiaries. In order to achieve these goals, the fish marketing system will be centralized at the new fishing complex, the fish distribution and transport system will be organized, fish freshness and quality will be improved to promote exports, a fish marketing information system will be promoted, and the sanitation environment of the market will be improved.

c. Sector 3 : Artisanal Fish Processing and Quality Control

The aim is to modernize fish processing technology, to strengthen the system of quality control and inspection of high price fish, and to improve the income and working environment of traditional fish processors. In order to achieve these aims, the traditional fish processing system will be organized, the working and marketing conditions will be improved through education and training measures and improved infrastructure, a demonstration plant will be set up to promote modernized processing and exports, and the quality control and inspection system will be strengthened in close linkage with the DOPM quality control system.

d. Sector 4 : Fishing Community Development

Primary education and the literacy rate will be improved as well as the Primary Health Care (PHC), the retail market, and community infrastructure, in order to improve the living conditions of the village inhabitants.

e. Sector 5 : Education and Training

Education and training programs will be implemented for the main management staff of the proposed project, fishermen, wholesalers (particularly small wholesalers), traditional processors, community leaders and staff members, women of the Project. The educational and training programs will be divided between basic or general and specialized courses.

f. Sector 6 : Institution and Organization

An appropriate institution/system will be established in order to guarantee the effectiveness of the proposed projects and to ensure their sustainable management and operations. In order to achieve these aims, the credit system will be improved, a fish marketing information system will be created, a system to control the sanitary environment will be set up, and the management system for the proposed projects will be strengthened.

2) Zone Plan

a. Zone 1: Saint Louis Project

The objective of this project is to contribute to the improvement of the largest and most attractive fishing and fish marketing base in the northern region. In order to accomplish this, the existing fish landing, distribution and transport facilities scattered along the 3 km coastline stretching from Guet Ndar must be integrated. These functions and facilities will be integrated into the new fishing complex located on the public land owned by DOPM. The major aims of this project are as follows.

- Create a more effective fish distribution and transport system at the fish landing site
- Integrate fishery related organizations at the regional level
- Support efforts to organize fishermen, fish processors, and distributors
- Indirectly support improvements in the living environment of fishing villages

b. Zone 2: Kayar Project

The objective of this project is to improve fish consumption in Dakar and to create a major supply base of fresh and processed fish exported through Dakar. The major aims of this project are given below.

- Strengthen harmonious community relations between permanent inhabitants and the transmigrant fishermen and their families
- Relocate existing facilities and establish an effective fish marketing complex
- Improve the living standards of transmigrant farmers and their families

c. Zone 3: Dakar Project

The objective of the project is to support the functions of the Central Fish Market (CFM) in the urban Dakar region. A new fishery base will be established at Rufisque in order to improve the environment and to effectively utilize existing facilities at each fish landing site. It will be established as a

technical extension base for other fish landing sites in Dakar. A closely integrated system linking this base where modern fishing skills were developed by the CAEP project, with Rufisque will be created to effectively utilize infrastructure in Rufisque.

d. Zone 4: Project for Satellite Areas

The small fishing villages located between zones 1 and 2 will be categorized as satellites of these two large fishing bases and functional fishermen support facilities will be installed at each fishing village. In addition, mobile facilities and services will be provided from these two bases.

3) Education and Training

The most significant objective of the education and training activities is to achieve sustained operations of the project after construction activities have been completed. As a result, emphasis must be placed on fostering human resources which will be involved in project management and operations. The targeted human resources are the Management Body of the project and users who will be participating in managing the project. There are two types of human resource development measures. The first aims to improve the literacy rate and to disseminate general knowledge and information on managing the facilities. The second targets the transfer of specialized technical knowledge. Education and training will be implemented by Senegalese experts, but technical assistance is expected for training and educational activities in facility management and modernization.

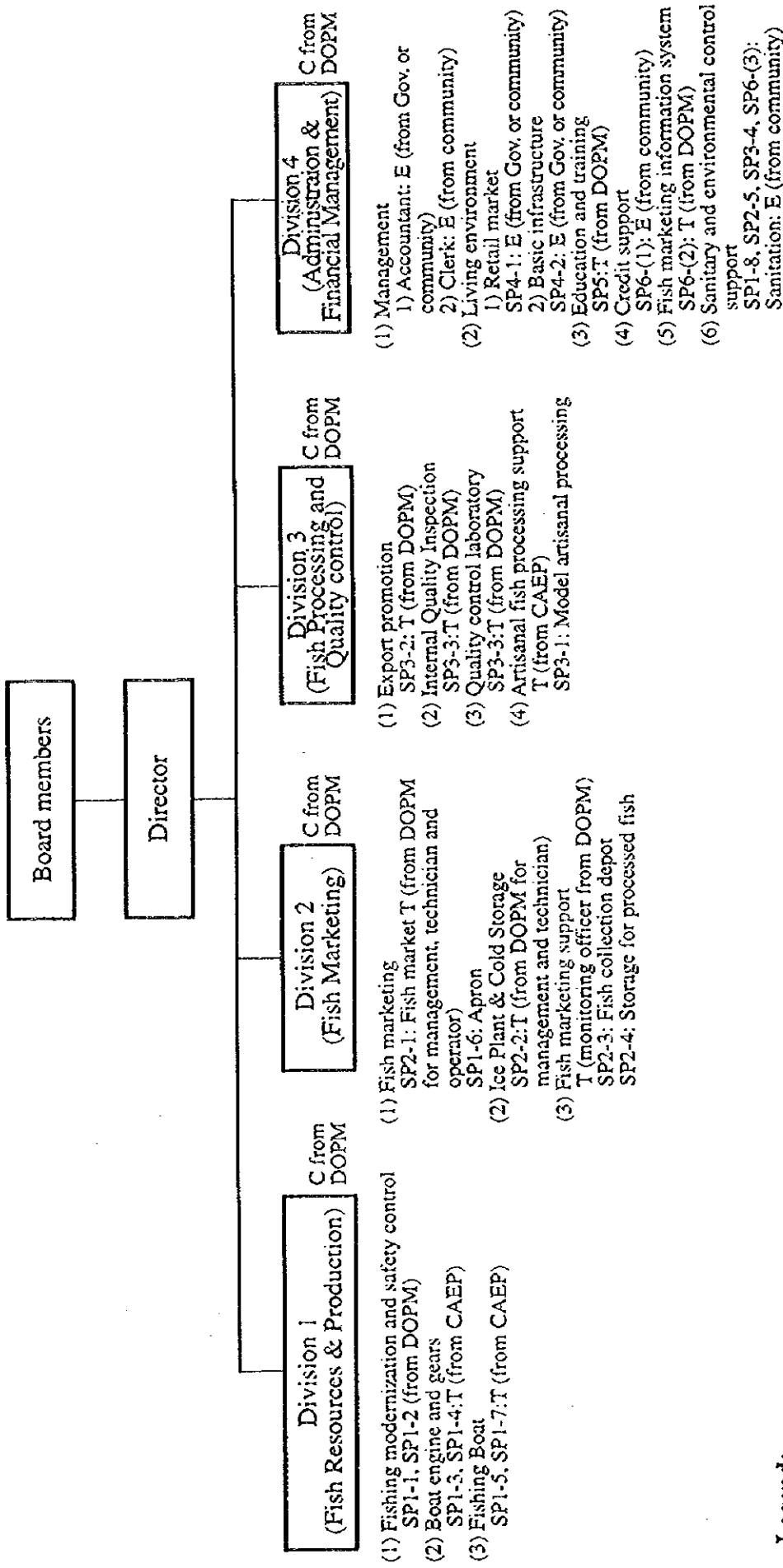
4) Institution and Organization

A Coordination Committee will be established for development measures in the northern region. They will be responsible for formulating basic development policies and deciding basic policies on project operations. Management Committees will be set up in each zone which will work under the Coordination Committee. These Management Committees will have the right to make decisions since they will be directly involved in project operations.

The respective committees will be comprised of representatives from official agencies from the central and autonomous regional governments as well as representatives from beneficiary groups.

The Management Body which is in charge of project operations will prepare an annual plan based on the decisions of these committees and it will

be responsible for implementing this plan on a daily basis. It will be designated as an autonomous body independent of the central and regional autonomous governments. The functions and scope of operations of each Management Body will differ according to their human resources and the amount of financial burden they will shoulder, but if human resource support by the central government (allocating central government officers as key staff members of the project) and financial resource support (project would not have to include depreciation costs) were made available, an integrated project would be feasible.



Legend:

- C Chief
- T Technician
- E Employed on contract basis
- Gov. Municipal government or local government

Organization Chart of Autonomous Body (Saint Louis and Kayar)

3. Selection of Priority Projects

Zones 1 and 2 which were proposed in the Master Plan were selected as priority zones due to their functions as an integrated fishing, marketing, and processing base. They were selected as priority zones for the following reasons.

- (1) These are the two most active fishing areas in the northern region.
- (2) Both are zones where modernized fisheries, an improved and effective fish marketing system, and reforms in the traditional processing system are most needed.
- (3) They are zones where effective regional decentralization has taken place. In other words, there is a great need to integrate the operating systems of scattered organizations.
- (4) There is a high need to encourage transmigrant fishermen to resettle due to population growth.

4. Action Plan

(1) A Coordination Committee which will authorize the fisheries development plan for the northern region, will be set up and the Management Committee for the first priority project and its Management body will be created and placed under the Coordination Committee. In conjunction with these organizations, the general consensus of the inhabitants in Zone 1 (particularly the approval of a system of fish marketing regulations) and legal measures must be taken in order to secure the land for the fishing complex in zone 2 and the land which will be used for a segment of the homes which will be relocated. Any fisheries project in the northern coast of Senegal should take into consideration the results of the Study including master plan and feasibility study for implementation.

(2) Transmigrant fishermen are the main targets of the development plan for the northern region. This group of fishermen comprises nearly one half of the fishing population during the peak fishing season and this is the priority project in Zone 2 which is near the large consumption area of Dakar. A coordination system has been established in this area which coordinates community affairs between the local inhabitants and the transmigrant fishermen. It is an active supporter of the new fishing complex, in addition to operating the existing ice and cold storage facilities.

When the project facilities have been completed, they are in a position to participate in project management activities.

(3) Although the demand for a fishing complex in Saint Louis (Zone 1) is just as great as those of Kayar, the organized activities of fishermen have lagged. This has been compounded by the fact that the existing fishing villages are distantly located from the fishing complex. Therefore, their participation in project management activities is difficult unless they establish adequate coordination within their fishermen groups.

(4) In conjunction with the projects in these two zones, establishing linkage with the CAEP project on modernized fishing is desirable. If the CAEP's extension activities to modernize fisheries is disseminated to each project, the modernization process can be accelerated.

(5) It is recommended that the projects for the satellite zones are implemented after the improvements in zones 1 and 2 as the fishery base of the northern region, are completed.

5. Feasibility Study

5.1 Saint Louis Project

5.1.1 Sector 1 : Fishery Resources and Production

(1) Development Goals

- 1) Increase production using modernized fishing techniques and effective resource management.
- 2) Secure the safety of fishermen at fish landing points.
- 3) Transfer the fish landing functions and existing fish landing sites to the proposed fishing complex.

(2) Basic Development Measures

- 1) Modernized fisheries: Modernized fishing techniques will be gradually disseminated. The short-term goal on initial investments will be limited to the pilot project.
 - a. Coastal fisheries: Existing production levels will be maintained out of concern for high price fishery resources. Increased production levels will only be considered for other fish species.
 - b. Offshore fisheries: Offshore fisheries will be promoted by the introduction of modern fishing boats, engines, and equipment.

- 2) **Safety control:** Safety control services are an effective means of support for fishermen utilizing the fishing complex. The education and training program for safety control, strengthening PSPS functions and improved infrastructure will reduce the incidence of accidents on the open seas.
- 3) **Fishermen support facilities:** Workshops, fishing gear and a boatyard will effectively integrate the fish landing functions at the fishing complex for the short-term period. These facilities and fishing gear will be made available to fishermen who are selected for their fishing experience and their desire to modernize fishing operations.

5.1.2 Sector 2 : Fish Marketing and Production

(1) Development Goals

- 1) The landing and wholesale functions which are scattered along the three kilometer coast that lies between the traditional fishing villages of Guet Ndar and Gokhou Mbathie will be collected and concentrated into the fishing complex that will be built on DOPM public land adjacent to Hydrobase where a new fishing village is under construction. A fish collection point will be created in the traditional fishing villages mentioned above and they will serve as a relay point for the fishing complex.
- 2) A suitable pricing mechanism will be established.
- 3) Fish supply functions will be expanded for Dakar, the inland areas, and export activities.

(2) Basic Development Measures

With the exception of a segment of the fish consumed locally, nearly all fish products will be transacted at the consumption market which will be constructed at the fishing complex. The fish will be brought in directly from the landing site to the market or via the collection points. Fish transacted at the complex will be transported to other areas from the truck terminal at the complex. In addition, a fish marketing information system will be introduced to support these functions. This information system will enable pricing information to become public and allow transactions to be actively conducted at the complex. Transactions which are currently conducted at scattered points will be concentrated at this complex due to the fish marketing information system.

5.1.3 Sector 3 : Artisanal Fish Processing and Quality Control

(1) Development Goals

- 1) Improve the work environment of women artisanal processors.
- 2) Improve the sanitation environment of the processing factory and the product quality of both traditionally processed fish and processed fish for export.
- 3) Expand the processing functions of processed fish exported to the EU and other African countries.
- 4) Improve the processing technology and level of processing skills.

(2) Basic Development measures

1) Improve processing factories

Facility improvements such as a roofed working area, lighting at night, etc. in order to improve the work environment, a reduction of the work volume and hours of artisanal processors will be introduced, in addition to equipment which will improve work efficiency. The objective is to foster leaders and activities will be limited to the pilot project level.

2) Improve the quality of processed products

a. Traditional processing: Measures will mainly focus on improving the sanitation environment rather than on efforts to modernize processing technology since traditionally processed products meet the dietary needs of the people. Allocation of washing water and improving the waste disposal functions of toilets will indirectly support product quality.

b. Exported processed products: Processing facilities which will meet EU standards will be constructed and processed products that meet export demands will be developed. The impact of demonstrations will be monitored and a segment of export inspection functions will be adopted.

3) Export license support: In order to foster exporters in Saint Louis, support services will be available at the required areas issuing DOPM export licenses.

4) Support for organizing activities: Traditional women processors will be organized into women's groups and a system linking collection / processing of raw fish, and sales of fish processed will be created. This in turn, will lead to transfer of technical processing knowledge, effective use of the processing area, and improved access to financing.

5.1.4 Sector 4 : Fishing Community Development

(1) Development Goals

The strategy is to improve the living environment of fishing village inhabitants.

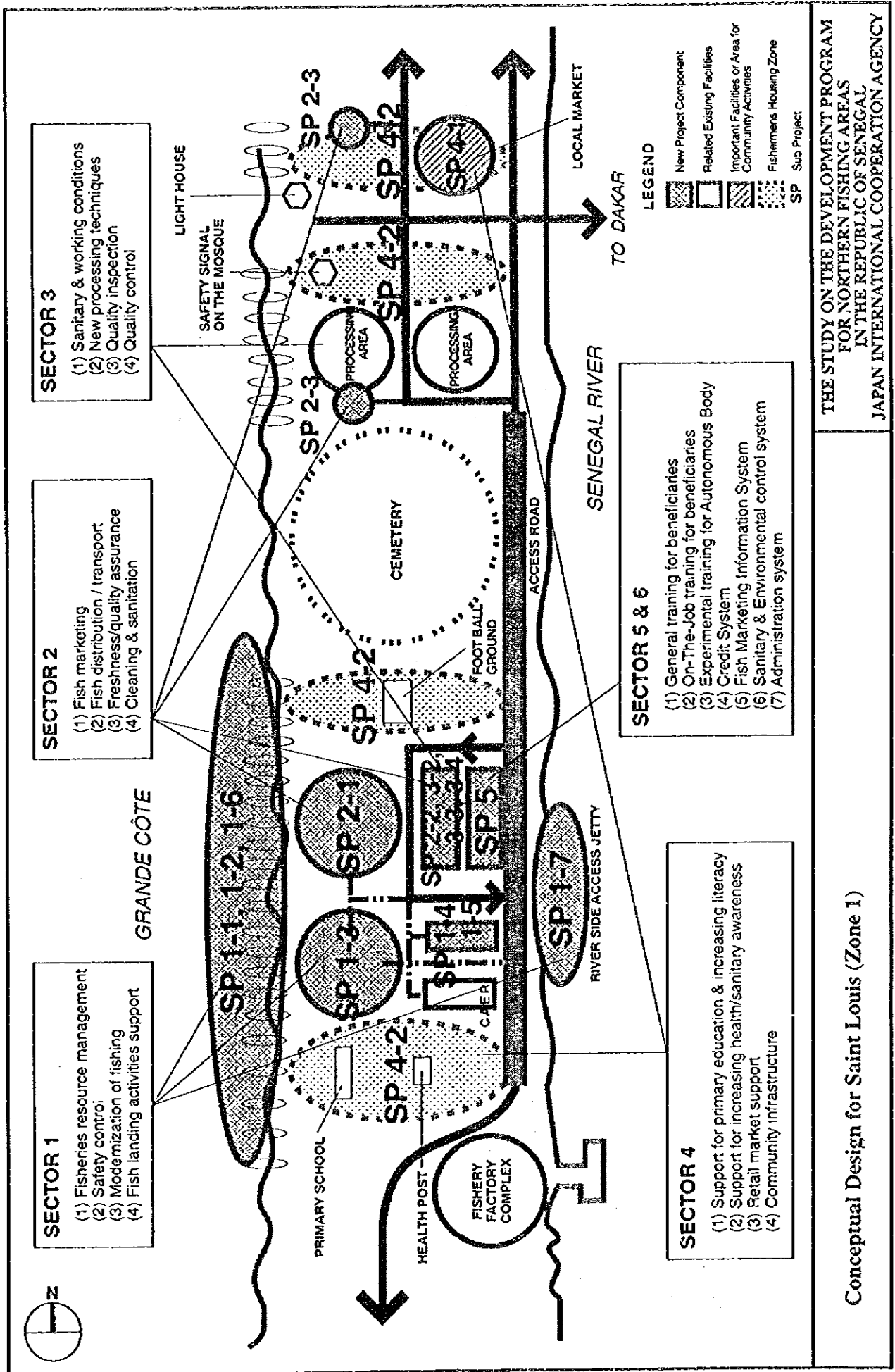
(2) Basic Development Policy

Improvements in infrastructure that will improve the living environment according to the urban development plan authorized by the municipal government, will be supported.

The management body of the proposed project that is supported by CAEP will implement the respective support activities submitted to this management committee which includes the autonomous government representative. The UOPGC women's group will play an important role in implementing practical and effective education and training programs.

5.1.5 Project Plan

The layout of the zone facility and equipment is shown in the following page.



THE STUDY ON THE DEVELOPMENT PROGRAM FOR NORTHERN FISHING AREAS IN THE REPUBLIC OF SENEGAL, JAPAN INTERNATIONAL COOPERATION AGENCY

Conceptual Design for Saint Louis (Zone 1)

5.1.6 Estimated Project Costs

Facilities & Equipment		Zone 1
		Cost (FCFA)
SP1-1	Navigation lights/sign, safety gear, office	46,292,000
SP1-2	Model boat/gear	451,458,000
SP1-3	Fishing Gear Storage	343,750,000
SP1-4	Workshop & Equipment	208,542,000
SP1-5	Ship-building yard	75,625,000
SP1-6	Service Apron	412,500,000
SP1-7	Service Facilities for Riverside	183,333,000
SP1-8	Research Post	80,208,000
SP1-9	Sanitation facilities / equipment related to production	146,667,000
SP2-1	Market Hall, Truck Berth, & Office	1,450,625,000
SP2-2	Ice Plant & Cold Storage	462,229,000
SP2-3	Fish Collection Depot	178,750,000
SP2-4	Storage for Processed Fish	43,542,000
SP2-5	Sanitation facilities / equipment related to marketing	358,875,000
SP3-1	Model Artisanal Processing Area	45,833,000
SP3-2	Export Promotion Services	148,958,000
SP3-3	Quality Control Laboratory & Equipment	68,750,000
SP3-4	Sanitation facilities / equipment related to processing	917,000
SP4-1	Facilities / equipment for Retail Market	27,500,000
SP4-2	Basic infrastructure/services	
	For Community	165,917,000
	For Complex	237,417,000
SP5	General Education & Training Facilities & Equipment	248,417,000
SP6	Administration & monitoring equipment	476,758,000
SP7	Miscellaneous Support Facilities & Equipment	732,417,000
Cost of Project		6,595,280,000
Consultancy Fee (8%)		527,622,400
Physical Contingencies (5%)		329,764,000
Price Escalation (3%) for construction to start 1998		197,858,400
Re-Mobilization cost (5%) for 2 phase construction		-
Total Cost of Project (CFA)		7,650,524,800

5.1.7 Project Evaluation

(1) Economic Evaluation

If all sectors are incorporated into the project, realizing a project based on the government of Senegal's own financial resources or a loan based project will be difficult.

If the focus is placed on improving the fisheries industry by targeting only the two highest revenue generating sectors (improving fish production and fish marketing and distribution), the viability of the project will be significantly improved, but it will not be viable as a loan or privately financed project.

Although the economic internal rate of return (EIRR) is too low for the project to become a private sector project, it is suitably qualified as a public investment project; and it is also qualified to receive overseas financial assistance.

(2) Financial Evaluation

If depreciation costs are not considered, the project will be in sound financial condition after a certain period of time. If depreciation costs are included, the scope of the project must be reduced. As revenue is anticipated from sectors 1 and 2, the project will be feasible if these sectors alone are targeted and the salaries of key staff of the project management body are paid by the national government.

(3) Environmental Assessment

Adverse environmental impact will be minimized if workers from Saint Louis are employed and proper control and management of construction activities are carried out. During the stage of project operations, the Management Body and the user groups should oversee the project to ensure that the facilities and equipment are impartially utilized by all users. Furthermore, adverse environmental impact will be further minimized if the users actively participate in managing the facilities and equipment, in project planning, design, and waste disposal. In order to achieve this, education and training activities must be strengthened. Social benefits stemming from increased awareness, knowledge, and social services brought about by this project will contribute to an improvement in the basic human needs of the rural fishing community.

5.2 Kayar Project

5.2.1 Sector 1 : Fishery Resources and Production

(1) Development goals

- 1) Achieve increased production through modernized fishing techniques and resource management activities.
- 2) Support the safety of fishermen at sea.
- 3) Gradually relocate the fish landing sites near the fishing complex.

(2) Basic Development measures

The basic development policy on modernized fishing, prevention of accidents at sea, and creation of support facilities for fishermen is the same as the development policy for Saint Louis.

5.2.2 Sector 2 : Fish Marketing and Distribution

(1) Development Goals

- 1) Wholesale functions which are scattered at transmigrant fishermen villages and traditional artisanal fishing villages will gradually be transferred to the new fishing complex. With the exception of locally consumed fish, all landed fish will be transacted at the wholesale market at the new fishing complex.
- 2) A suitable pricing mechanism will be created.
- 3) The production base of fish earmarked for the urban area of Dakar, the inland areas, and for export will be expanded.

(2) Basic Development Measures

There are two types of fishing villages which coexist in this area - villages engaged in traditional artisanal fisheries and villages of transmigrant fishermen; and wholesalers are scattered between these two types of villages. Mutual understanding in the area of fish production has evolved among the inhabitants of these two villages and a Coordination Council at the provincial governor's level has been approved and is actively engaged. This framework of coordination will be expanded and measures to coordinate the marketing sector will also be carried out in order to raise the effectiveness and utilization rate of the new complex. A fish distribution system, similar to the one which will be created in Saint Louis, will be established and the concentration of wholesale activities will be promoted. A model fish distribution and processing center will be developed in the outskirts of Dakar that will incorporate the activities of transmigrant fishermen in accordance with this project.

5.2.3 Sector 3 : Artisanal Fish Processing and Quality Control

(1) Development Goals

- 1) Improve the work environment of women artisanal processors.
- 2) Improve the sanitation environment of the processing factory and the product quality of both traditionally processed fish and processed fish for export.
- 3) Expand the processing functions of processed fish exported to the EU and other African countries.
- 4) Improve the processing technology and level of processing skills.

(2) Basic Development measures

The basic development measures is the same as in Saint Louis project.

5.2.4 Sector 4 : Fishing Community Development

(1) **Development Goal**

The development goal is to improve the living environment of the fishing village inhabitants, particularly the living environment of transmigrant fishermen and their families which is especially inferior.

(2) **Basic Development Measures**

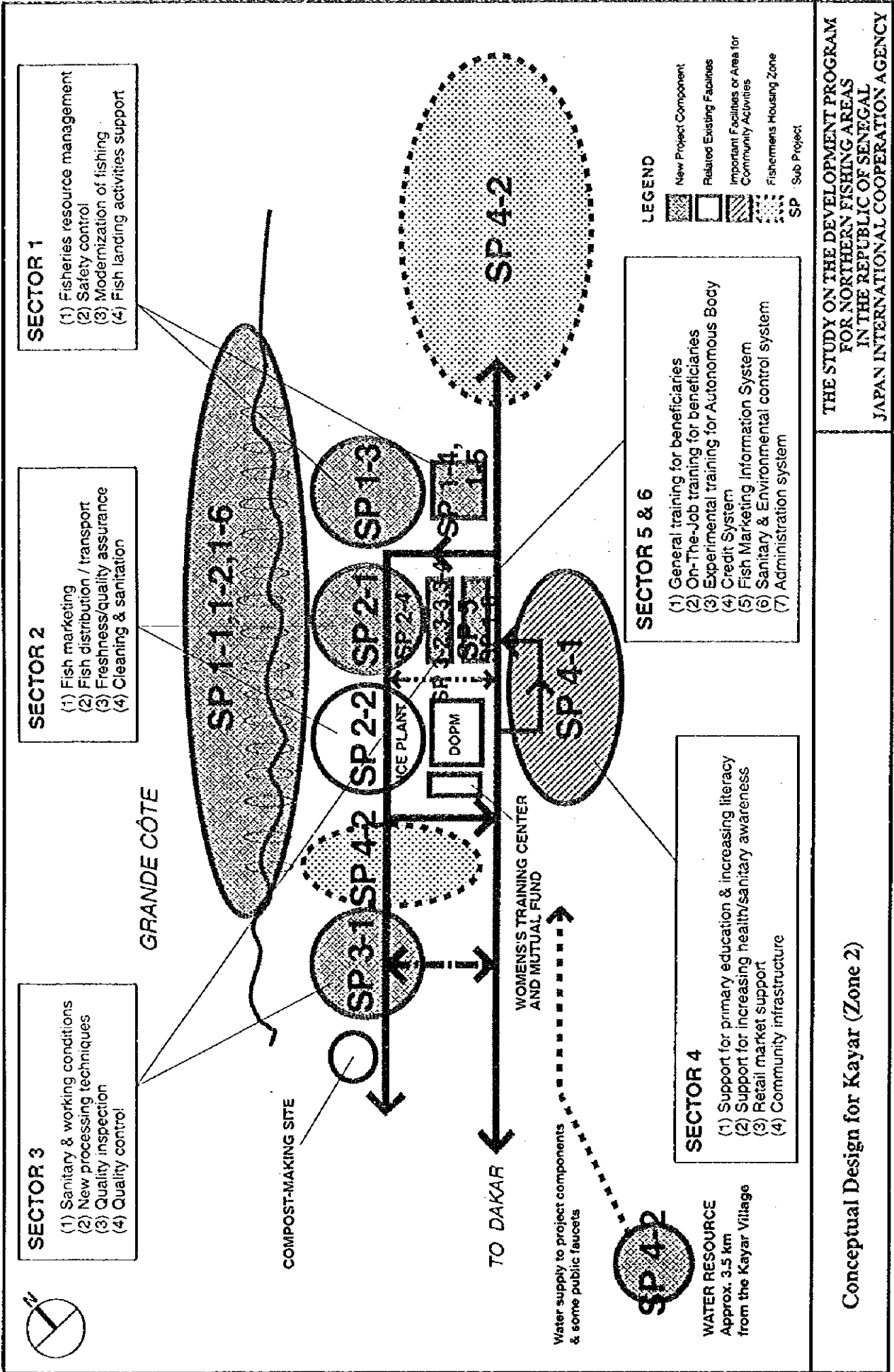
Improvements in infrastructure that will improve the living environment according to the area development plan authorized by the rural council, will be supported.

The management body of the proposed project which will be supported by CAEP will implement the respective support activities submitted to this management committee which includes the autonomous government representative. The UOPGC women's group will play an important role in implementing practical and effective education and training programs.

In order to ensure that education and training programs are effective and practical, coordination with relevant ministries and agencies is essential.

5.2.5 Facilities and Equipment Improvement Plan

The layout of the zone facility and equipment is shown in the following page.



5.2.6 Estimated Project Costs

Facilities & Equipment		Zone 2
		Cost (FCFA)
SP1-1	Navigation lights/sign, safety gear, office	44,000,000
SP1-2	Model boat/gear	376,979,000
SP1-3	Fishing Gear Storage	171,875,000
SP1-4	Workshop & Equipment	155,833,000
SP1-5	Ship-building yard	61,875,000
SP1-6	Service Apron	206,250,000
SP1-7	Service Facilities for Riverside	0
SP1-8	Research Post	80,208,000
SP1-9	Sanitation facilities / equipment related to production	146,667,000
SP2-1	Market Hall, Truck Berth, & Office	1,026,667,000
SP2-2	Ice Plant & Cold Storage	233,063,000
SP2-3	Fish Collection Depot	0
SP2-4	Storage for Processed Fish	34,375,000
SP2-5	Sanitation facilities / equipment related to marketing	180,125,000
SP3-1	Model Artisanal Processing Area	643,958,000
SP3-2	Export Promotion Services	93,958,000
SP3-3	Quality Control Laboratory & Equipment	43,542,000
SP3-4	Sanitation facilities / equipment related to processing	116,417,000
SP4-1	Facilities / equipment for Retail Market	96,250,000
SP4-2	Basic infrastructure/services	
	For Community	165,917,000
	For Complex	699,188,000
SP5	General Education & Training Facilities & Equipment	55,000,000
SP6	Administration & monitoring equipment	328,900,000
SP7	Miscellaneous Support Facilities & Equipment	577,958,000
Cost of Project		5,629,297,000
Consultancy Fee (8%)		450,343,760
Physical Contingencies (5%)		281,464,850
Price Escalation (3%) for construction to start 1998		168,878,910
Re-Mobilization cost (5%) for 2 phase construction		-
Total Cost of Project (CFA)		6,529,984,520

5.2.7 Project Evaluation

(1) Economic Evaluation

If all sectors are included in this project, the social welfare aspects must be emphasized rather than economic development. If the focus is placed on improving the fisheries industry by targeting only the two highest revenue generating sectors (improving fish production, fish marketing and distribution), the economic internal rate of return will improve. But the economic activities of this type of project is also more suited and effective as a social welfare project. It is particularly suitable as an

overseas financial assistance project which will help resolve the national issue regarding the resettlement of transmigrant fishermen, etc.

(2) Financial Evaluation

If depreciation costs are not considered, the project will be in sound financial condition after a certain period of time. If depreciation costs are included, the scope of the project must be reduced. Since revenue is anticipated from sectors 1 and 2, the project will be feasible if these sectors alone are targeted and the salaries of the project management body are paid by the national government.

(3) Environmental Assessment

The same countermeasures adopted for Saint Louis will be employed during the construction and management phases of this project. As a result, the social benefits are anticipated to be large. In particular, the consensus of the inhabitants must be obtained in order for the users engaged in fisheries or retail activities to move into the area. In addition, the government must formulate specific countermeasures that will provide added incentives and benefits for users relocating to the region.

Table of Contents

Survey Map	
Summary	
Table of Contents	
List of Figures	
List of Tables	
Acronyms	
Introduction	

I. EXISTING CONDITIONS

1.	EXISTING CONDITIONS OF THE ARTISANAL FISHERIES.....	I - 1
1.1	Fisheries Policy.....	I - 1
1.2	Fishery Resources and Production.....	I - 3
1.2.1	Fishery Resources.....	I - 3
1.2.2	Fish Production.....	I - 6
1.2.3	Safety Control	I - 12
1.3	Fish Marketing and Distribution.....	I - 22
1.3.1	Domestic Supply and Demand.....	I - 22
1.3.2	Export.....	I - 23
1.5	Credit System for Fisheries Sector.....	I - 32
1.6	Gender Analysis on the Fishery Sector.....	I - 39
1.7	Institutions in the Fishery Sector	I - 44
1.8	Environment and Natural Conditions	I - 56
2.	EXISTING CONDITIONS IN THE STUDY AREA	I - 67
2.1	Outline of the Study Area.....	I - 67
2.2	Fish Production.....	I - 71
2.3	Fish Marketing and Distribution.....	I - 76
2.4	Artisanal Fish Processing	I - 92
2.5	Fish Quality and Pricing Mechanism.....	I - 98
2.6	Credit System in the Fishery Sector.....	I - 106
2.7	Fishing Communities and Gender Analysis.....	I - 113
2.8	Infrastructure Development	I - 121
2.9	Environmental Findings and Natural Conditions.....	I - 139

II. MASTER PLAN

1.	Development Goals	II - 1
2.	Development Strategies.....	II - 1
3.	Development Approaches	II - 1
3.1	Sector Plan.....	II - 1
3.2	Zone Plan.....	II - 2
4.	Sector Plan	II - 2
4.1	Sector 1 : Fishery Resource and Production	II - 2
4.2	Sector 2 : Fish Marketing and Distribution.....	II - 3
4.3	Sector 3 : Artisanal Fish Processing and Quality Control	II - 4
4.4	Sector 4 : Fishing Community Development.....	II - 4
4.5	Sector 5 : Education and Training	II - 5
4.6	Sector 6 : Institution and Organization.....	II - 6

5.	Zone Plan.....	II - 7
5.1	Zone 1 : Saint Louis Project.....	II - 7
5.2	Zone 2 : Kayar Project.....	II - 8
5.3	Zone 3 : Dakar Project.....	II - 10
5.4	Zone 4 : Plan for Satellite Areas.....	II - 12
6.	Integration of the Sector Plan and the Zone Plan.....	II - 12
7.	Education and Training.....	II - 13
8.	Project Coordination and Management.....	II - 15
8.1	Coordination Committee.....	II - 15
8.2	Management Committee.....	II - 16
8.3	Autonomous Body.....	II - 17
8.4	Sector 1 : Fishery Resources and Production.....	II - 17
8.5	Sector 2 : Fish Marketing and Distribution.....	II - 18
8.6	Sector 3 : Artisanal Fish Processing and Quality Control.....	II - 20
8.7	Sector 4 : Fishing Community Development.....	II - 20
8.8	Sector 5 : Education and Training.....	II - 21
8.9	Sector 6 : Institution and Organization.....	II - 21
8.10	Users' Association.....	II - 22
9.	Selection of priority Zones for Feasibility Study.....	II - 24
10.	Action Plan.....	II - 24

III FEASIBILITY STUDY

1.	Saint Louis Project.....	III - 1
1.1	Sector 1 : Fish Resources and Production.....	III - 1
1.1.1	Projection.....	III - 1
1.1.2	Development Goals and Concept.....	III - 4
1.1.3	Fish Resource Management.....	III - 4
1.1.4	Fish Production.....	III - 6
1.1.5	Fisheries Support Facility.....	III - 8
1.1.6	Safety Control.....	III - 10
1.1.7	Training and Technical Assistance.....	III - 11
1.1.8	Institution and Organization.....	III - 12
1.2	Sector 2 : Fish Marketing and Distribution.....	III - 17
1.2.1	Existing Conditions and Future Prospects.....	III - 17
1.2.2	Sector Plan.....	III - 19
1.3	Sector 3 : Artisanal Fish Processing.....	III - 35
1.3.1	Existing Conditions and Future Prospects.....	III - 35
1.3.2	Sector Plan.....	III - 36
1.4	Sector 4 : Fishing Community Development.....	III - 43
1.4.1	Existing Conditions and Future Prospect.....	III - 43
1.4.2	Sector Plan.....	III - 47
1.5	Credit System.....	III - 53
1.6	Physical Design.....	III - 56
1.7	Project Cost.....	III - 65
1.8	Project Evaluation.....	III - 72
1.8.1	Economic Evaluation.....	III - 72

1.8.2	Financial Evaluation.....	III - 76
1.8.3	Other Benefits.....	III - 78
1.9	Environmental Impact Assessment.....	III - 89
2.	Kayar Project	III - 97
2.1	Sector 1 : Fish Resources and Production.....	III - 97
2.1.1	Projection.....	III - 97
2.1.2	Development Goals and Concept.....	III - 100
2.1.3	Fish Resource Management.....	III - 100
2.1.4	Fish Production.....	III - 101
2.1.5	Fisheries Support Facility	III - 104
2.1.6	Safety Control	III - 105
2.1.7	Training.....	III - 106
2.1.8	Institution and Organization.....	III - 106
2.2	Sector 2: Fish Marketing and Distribution.....	III - 109
2.2.1	Existing Conditions and Future Prospects	III - 109
2.2.2	Sector Plan.....	III - 111
2.3	Sector 3 : Artisanal Fish Processing	III - 124
2.3.1	Existing Conditions and Future Prospects	III - 124
2.3.2	Sector Plan	III - 125
2.4	Sector 4 : Fishing Community Development.....	III - 129
2.4.1	Existing Conditions and Future Prospect.....	III - 129
2.4.2	Sector Plan.....	III - 133
2.5	Credit System.....	III - 140
2.6	Physical Design.....	III - 143
2.7	Project Cost.....	III - 152
2.8	Project Evaluation	III - 159
2.8.1	Economic Evaluation.....	III - 159
2.8.2	Financial Evaluation.....	III - 163
2.8.3	Other Benefits.....	III - 165
2.9	Environmental Impact Assessment.....	III - 176
IV	CONCLUSION AND RECOMMENDATION	
1.	Master Plan.....	IV - 1
2.	Feasibility of Priority Project	IV - 4
3.	Education and Training	IV - 5
4.	Improving Organization and Institutions	IV - 5
5.	Action Plan.....	IV - 6

Appendices

Appendix - 1	List of Personnel
Appendix - 2	Scope of Work (S/W)
Appendix - 3	Minutes of Meeting of Scope of Work (S/W)
Appendix - 4	Minutes of Meeting of Inception of Report (IC/R)
Appendix - 5	Minutes of Meeting of Interim Report (IT/R)
Appendix - 6	Minutes of Meeting of Draft Final Report (DF/R)
Appendix - 7	List of Information Data/Information Collected
Appendix - 8	List of Persons Contacted

List of Figures

Fig. 1	Work Flow of the Study.....	3
Fig. I.1.2-1	Extension Process of Diesel Engine.....	I - 13
Fig. I.1.2-2	Extension Process of Diesel Engine for Fishing Modernization (Pilot Project).....	I - 14
Fig. I.1.3-1	Total Fresh Fish Supply to Dakar Central Fish Market in 1995	I - 24
Fig. I.1.4-1	Work Flow of Artisanal Fish Processing Activities.....	I - 31
Fig. I.1.6-1	Projects Related to Women's Empowerment	I - 41
Fig. I.1.6-2	Map of Past and On-going Projects Related to Fishing Community.....	I - 42
Fig. I.1.7-1	Organizational Chart of Direction of Oceanography and Marine Fisheries.....	I - 53
Fig. I.1.7-2	Organizational Chart of Dakar Central Fish Market.....	I - 54
Fig. I.1.7-3	Organizational Chart of Centre de Mareyage de Kayar	I - 54
Fig. I.1.8-1	Requirement of Impact Study by the New Environmental Law	I - 60
Fig. I.1.8-2	Direction and Force of Dominant Wind.....	I - 61
Fig. I.1.8-3	Rainfall Isohyet Per Zone (1951-1990).....	I - 62
Fig. I.1.8-4	Monthly Annual Temperature.....	I - 62
Fig. I.1.8-5	Ocean Current Movement	I - 63
Fig. I.1.8-6	Flow Chart of Initial Environmental Examination.....	I - 64
Fig. I.1.8-7	Initial Environmental Examination Check-Sheet.....	I - 65
Fig. I.2.3-1	Fish Marketing Pattern and Volume of Saint Louis (1995)	I - 81
Fig. I.2.3-2	Flow Volume of Fresh and Processed Fish by Destination from Saint Louis (1995)	I - 82
Fig. I.2.3-3	Fish Marketing Pattern and Volume of Kayar (1995).....	I - 83
Fig. I.2.3-4	Flow Volume of Fresh and Processed Fish by Destination from Kayar (1995).....	I - 84
Fig. I.2.3-5	Fish Marketing Pattern and Quantity Flow of Hann (1995).....	I - 85
Fig. I.2.3-6	Fish Marketing System for Sardinelle Fishing.....	I - 86
Fig. I.2.3-7	Fish Marketing System for Line and Gill Net Fishing.....	I - 87
Fig. I.2.3-8	Fish Marketing Information System	I - 88
Fig. I.2.5-1	Freshness Test of Sardinelle Sampled in Dakar Region (Rufisque).....	I - 101
Fig. I.2.5-2	Changes in K-value of Sardinelle at Ambient and Iced Condition.....	I - 101
Fig. I.2.5-3	Market Cost and Margins of Three Fish Species	I - 102
Fig. I.2.7-1	Movement of Fishing Boats along the Coast of Senegal (1983)	I - 118
Fig. I.2.8-1	Existing Infrastructure Condition in Saint Louis	I - 126
Fig. I.2.8-2	Existing Infrastructure Condition in Kayar.....	I - 127
Fig. I.2.8-3	Existing Infrastructure Condition in Dakar Region.....	I - 128
Fig. I.2.8-4	Existing Infrastructure Condition in Hann	I - 129
Fig. I.2.8-5	Existing Infrastructure Condition in Rufisque	I - 130
Fig. I.2.8-6	Existing Infrastructure Condition in Yene.....	I - 131
Fig. I.2.8-7	Existing Infrastructure Condition in Potou.....	I - 132
Fig. I.2.8-8	Existing Infrastructure Condition in Lompoul	I - 133
Fig. I.2.8-9	Existing Infrastructure Condition in Fass Boye	I - 134

Fig. II.1	Project Zoning and Improvement Aspects for Each Zone	II - 29
Fig. II.2	Conceptual Design for Saint Louis (Zone 1)	II - 30
Fig. II.3	Conceptual Design for Kayar (Zone 2)	II - 31
Fig. II.4	Conceptual Design for Dakar (Zone 3)	II - 32
Fig. II.5	Conceptual Design for Zone 4	II - 33
Fig. II.6	Relationship of Proposed Project and Sector Plans	II - 34
Fig. III.1.2-1	Fish Marketing Pattern and Volume of Saint Louis (1995)	III - 27
Fig. III.1.2-2	Existing Fish Landing and Marketing System in Saint Louis (1995).....	III - 28
Fig. III.1.2-3	Fish Marketing Pattern and Volume without the Project of Saint Louis (2010)	III - 29
Fig. III.1.2-4	Fish Marketing Pattern and Volume with the Project of Saint Louis (2010)	III - 30
Fig. III.1.2-5	Fish Landing and Marketing System in Saint Louis with the Project (2010).....	III - 31
Fig. III.1.2-6	Fish Marketing Information System with the Project (short- term)	III - 32
Fig. III.1.2-7	Fish Marketing Information System with the Project (long- term)	III - 33
Fig. III.1.4-1	Population Growth from 1995 to 2010 in the Fishing Villages in Saint Louis	III - 50
Fig. III.1.4-2	Flow of Implementation, Operation and Maintenance of Saint Louis Project.....	III - 51
Fig. III.1.6-1	Layout Plan of Saint Louis Complex (Facilities Plan).....	III - 60
Fig. III.1.6-2	Layout Plan of Saint Louis Complex (Zone Plan).....	III - 61
Fig. III.1.6-3	Layout Plan of Saint Louis Complex (Movement Plan).....	III - 62
Fig. III.1.6-4	Floor and Elevation Plan of Administration Building.....	III - 63
Fig. III.1.6-5	Floor and Elevation Plan of Market Hall	III - 64
Fig. III.2.2-1	Fish Marketing Pattern and Volume of Kayar (1995).....	III - 118
Fig. III.2.2-2	Existing Fish Landing and Marketing System in Kayar (1995)	III - 119
Fig. III.2.2-3	Fish Marketing Pattern and Volume without the Project of Kayar (2010).....	III - 120
Fig. III.2.2-4	Fish Marketing Pattern and Volume of Kayar with the Project (2010).....	III - 121
Fig. III.2.2-5	Fish Landing and Marketing System in Kayar with the Project (2010).....	III - 122
Fig. III.2.4-1	Classification of Migrating Fishermen in Kayar	III - 136
Fig. III.2.4-2	Population Growth from 1995 to 2010 in Kayar (Average in peak season)	III - 137
Fig. III.2.4-3	Population Growth from 1995 to 2010 in Kayar (Average in lean season)	III - 137
Fig. III.2.4-4	Flow of Implementation, Operation and Maintenance of Kayar Project	III - 138
Fig. III.2.6-1	Layout Plan of Kayar Complex (Facilities Plan)	III - 147
Fig. III.2.6-2	Layout Plan of Kayar Complex (Zone Plan).....	III - 148
Fig. III.2.6-3	Layout Plan of Kayar Complex (Movement Plan)	III - 149
Fig. III.2.6-4	Floor and Elevation Plan of Administration Building.....	III - 150
Fig. III.2.6-5	Floor and Elevation Plan of Market Hall	III - 151

List of Tables

Table I.1.2-1	Estimates of Exploitable of Fishery Resources and Level of Exploitation	I - 15
Table I.1.2-2	Marine Fish Production from Senegalese Waters in 1995.....	I - 15
Table I.1.2-3	Marine Fish Production of Senegal (1991-1995).....	I - 16
Table I.1.2-4	Summary of Artisanal Fish Landing by Major Fish Group and by Region (1995).....	I - 16
Table I.1.2-5	Artisanal Fish Landings by Species and by Region (1995)(1/2).....	I - 16
Table I.1.2-5	Artisanal Fish Landings by Species and by Region (1995)(2/2).....	I - 17
Table I.1.2-6	Artisanal Fish Landing by Month and by Region (1995).....	I - 18
Table I.1.2-7	Fishermen and Fishing Boats in Study Area (1990-1995).....	I - 19
Table I.1.2-8	Fishing Materials Prices Before and after FCFA Devaluation.....	I - 19
Table I.1.2-9	Comparison of Operation Cost of Gasoline and Diesel Outboard Engines in 1996.....	I - 20
Table I.1.2-10	Management Conditions of the Project and Users of Modernized Fishing by Diesel Engines.....	I - 20
Table I.1.2-11	Number of Accidents in Artisanal Fisheries in Senegal (1992-1997).....	I - 21
Table I.1.2-12	Annual Record of Accidents in Artisanal Fisheries in Saint Louis (1992-1997).....	I - 21
Table I.1.3-1	Supply and Demand of Fish Products in Senegal (1995).....	I - 25
Table I.1.3-2	Origin and Destination of Fresh Fish and Processed Fish by Region (1995).....	I - 26
Table I.1.3-3	Total Inflow Volume of Fish to Dakar Region via CFM by Origin.....	I - 27
Table I.1.3-4	Inflow Volume of Fresh Fish (Sardinelle and Other Fish) to Central Fish Market by Origin (Jan. - Nov. 1996).....	I - 27
Table I.1.3-5	Export of fish Products in Senegal (1991-1995).....	I - 28
Table I.1.3-6	Destination of Exported Fish Products (1995).....	I - 28
Table I.1.4-1	Type of Products, Materials and Process of Artisanal Fish Production.....	I - 31
Table I.1.6-1	Socio-economic Data Related to Women in Senegal (1995).....	I - 43
Table I.1.7-1	Revenue and Expenditure of Dakar Central Fish Market (1994-1995).....	I - 55
Table I.1.7-2	Revenue and Expenditure of Centre de Mareyage de Kayar (1995-1996).....	I - 55
Table I.2.2-1	Number of Boats, Fishermen, Processors and Wholesalers (1991-1995).....	I - 78
Table I.2.3-1	Artisanal Fish Production in Study Area and Its Consumption (1995).....	I - 89
Table I.2.3-2	Origin and Destination of Fresh Fish and Processed Fish in the Study Area (1995).....	I - 90
Table I.2.3-3	Distribution of Fish Landings by Category of Saint Louis (1995).....	I - 91
Table I.2.3-4	Distribution of Fish Landings by Category of Kayar (1995).....	I - 91
Table I.2.4-1	Production of Artisanal Fish Processing in the Study Area (1995).....	I - 96

Table I.2.4-2	Distribution of Fish Landings by Category of Saint Louis & Kayar (1995).....	I - 97
Table I.2.5-1	Classification of Fish by Retail Price (1995).....	I - 103
Table I.2.5-2	Fish Production by Value Categories in the Study Area (1995).....	I - 103
Table I.2.5-3	Fish Price Changes Before and After Devaluation	I - 104
Table I.2.5-4	Main Component of Fish Pricing of Sardinelle and Carpe Blanche	I - 104
Table I.2.5-5	Comparison of Operation Cost and Income Distribution	I - 105
Table I.2.7-1	Trends in Transmigrating Boats (September, 1985).....	I - 119
Table I.2.7-2	Share of Migration According to Fishing Method.....	I - 119
Table I.2.7-3	Fish Landings by Major Group and Month in Saint Louis and in Kayar (1995).....	I - 120
Table I.2.7-4	Monthly Changes in Number of Fishing Boats in Saint Louis and Kayar (1995).....	I - 120
Table I.2.8-1	Summary of Infrastructure Characteristics in the Study Area.....	I - 135
Table I.2.8-2	Summary of Infrastructure Characteristics of Potou, Lompoul and Fass Boye.....	I - 136
Table I.2.8-3	Summary of Infrastructure Characteristics of Dakar Region (1/2).....	I - 137
Table I.2.8-3	Summary of Infrastructure Characteristics of Dakar Region (2/2).....	I - 138
Table II.6-1	Relationship between Zone/Sector Plans and Facilities/Equipment.....	II - 35
Table II.6-2	Outline of the Six Sector Plans (1/2).....	II - 36
Table II.6-2	Outline of the Six Sector Plans (2/2).....	II - 37
Table II.6-3	Summary of Project Cost of the Four Zones.....	II - 38
Table III.1.1-1	Projection of Fishermen Population and Fish Production	III - 14
Table III.1.1-2	Revenue and Expenditure of Modernized Boat.....	III - 15
Table III.1.1-3	Summary of Project Training Courses and Equipment	III - 16
Table III.1.2-1	Estimation of Ice Demand and Supply in Saint Louis (1995).....	III - 34
Table III.1.2-2	Estimation of Ice Demand and Supply in Saint Louis (2010).....	III - 34
Table III.1.3-1	Education and Training Program	III - 42
Table III.1.4-1	Population and Number of Women and Fish Processors in Saint Louis (1995 & 2010).....	III - 52
Table III.1.5-1	Projected Capital Amount for the Saint Louis Project (until 2005).....	III - 55
Table III.1.5-2	Projected Management Cost of the Saint Louis Project (until 2005).....	III - 55
Table III.1.7-1	Estimated Cost of Facilities and Equipment (Zone 1) (1/6)	III - 66
Table III.1.7-1	Estimated Cost of Facilities and Equipment (Zone 1) (2/6)	III - 67
Table III.1.7-1	Estimated Cost of Facilities and Equipment (Zone 1) (3/6)	III - 68
Table III.1.7-1	Estimated Cost of Facilities and Equipment (Zone 1) (4/6)	III - 69
Table III.1.7-1	Estimated Cost of Facilities and Equipment (Zone 1) (5/6)	III - 70
Table III.1.7-1	Estimated Cost of Facilities and Equipment (Zone 1) (6/6)	III - 71

Table III.1.8-1	Financial and Economic Cost of Saint Louis Project (1/6)	III - 80
Table III.1.8-2	Annual Operation Cost of Saint Louis Project	III - 81
Table III.1.8-3	Project Cost and Physical Life by Components of Saint Louis Project	III - 82
Table III.1.8-4	Number of Personnel and Annual Personnel Cost of Saint Louis Project	III - 84
Table III.1.8-5	Revenue Accrued of Saint Louis Project	III - 85
Table III.1.8-6	Income Statement and Cash Flow of Saint Louis Project	III - 86
Table III.1.8-7	Income Statement and Cash Flow of Saint Louis Project (Revenue Earning Components).....	III - 87
Table III.1.8-8	Revenue and Expenditure of Ice Plant of Saint Louis Project	III - 88
Table III.1.9-1	Environmental Impact Assessment of Saint Louis Project (1/6).....	III - 90
Table III.1.9-1	Environmental Impact Assessment of Saint Louis Project (2/6).....	III - 91
Table III.1.9-1	Environmental Impact Assessment of Saint Louis Project (3/6).....	III - 92
Table III.1.9-1	Environmental Impact Assessment of Saint Louis Project (4/6).....	III - 93
Table III.1.9-1	Environmental Impact Assessment of Saint Louis Project (5/6).....	III - 94
Table III.1.9-1	Environmental Impact Assessment of Saint Louis Project (6/6).....	III - 95
Table III.2.1-1	Projection of Fishermen Population and Fish Production.....	III - 108
Table III.2.2-1	Estimation of Ice Demand and Supply in Kayar (1995).....	III - 123
Table III.2.2-2	Estimation of Ice Demand and Supply in Kayar (2010).....	III - 123
Table III.2.4-1	Population and Number of Women and Fish Processors in Kayar (1995 & 2010).....	III - 139
Table III.2.5-1	Projected Capital Amount for the Kayar Project (until 2005).....	III - 142
Table III.2.5-2	Projected Management Cost of the Kayar Project (until 2005).....	III - 142
Table III.2.7-1	Estimated Cost of Facilities and Equipment (Zone 2) (1/6)	III - 153
Table III.2.7-1	Estimated Cost of Facilities and Equipment (Zone 2) (2/6)	III - 154
Table III.2.7-1	Estimated Cost of Facilities and Equipment (Zone 2) (3/6)	III - 155
Table III.2.7-1	Estimated Cost of Facilities and Equipment (Zone 2) (4/6)	III - 156
Table III.2.7-1	Estimated Cost of Facilities and Equipment (Zone 2) (5/6)	III - 157
Table III.2.7-1	Estimated Cost of Facilities and Equipment (Zone 2) (6/6)	III - 158
Table III.2.8-1	Financial and Economic Cost of Kayar Project	III - 167
Table III.2.8-2	Annual Operation Cost of Kayar Project	III - 168
Table III.2.8-3	Project Cost and Physical Life by Components of Kayar Project	III - 169
Table III.2.8-4	Number of Personnel and Annual Personnel Cost of Kayar Project	III - 171
Table III.2.8-5	Revenue Accrued of Kayar Project.....	III - 172
Table III.2.8-6	Income Statement and Cash Flow of Kayar Project.....	III - 173
Table III.2.8-7	Income Statement and Cash Flow of Kayar Project (Revenue Earning Components).....	III - 174
Table III.2.8-8	Revenue and Expenditure of Ice Plant of Kayar Project	III - 175
Table III.2.9-1	Environmental Impact Assessment - Kayar Project (1/6).....	III - 177

Table III.2.9-1	Environmental Impact Assessment - Kayar Project (2/6).....	III - 178
Table III.2.9-1	Environmental Impact Assessment - Kayar Project (3/6).....	III - 179
Table III.2.9-1	Environmental Impact Assessment - Kayar Project (4/6).....	III - 180
Table III.2.9-1	Environmental Impact Assessment - Kayar Project (5/6).....	III - 181
Table III.2.9-1	Environmental Impact Assessment - Kayar Project (6/6).....	III - 182

Acronyms

ACDI	Agence Canadienne de Developpement International
ACEP	Alliance for Credit and Savings for Production
ADPES	Associations pour un Dynamique de Progres Economique et Social
AFNOR	Association Française Norm
AGETIP	Agence d'Execution des Travaux d'Interet Public
APIMEC	Association Professionnelle des Institutions Mutualistes ou Coopératives d'Epargne et de Crédit au Sénégal
ATEPAS	Assistance for Technology in Artisanal Fisheries in Senegal
BAD	Banque Africaine de Developpement
BCEAO	Banque Centrale des Etats de l'Afrique de l'Ouest
BCPH	Bureau de Contrôle des Produits Halieutiques
BHN	Basic Human Needs
BHS	Banque de l'Habitat du Sénégal
BIAOS	Banque International de l'Afrique de l'Ouest - Sénégal
BICIS	Banque International pour le Commerce et l'Industrie du Sénégal
BOAD	Banque Ouest Africain de Développement
BST	Banque Sénégal-Tunesienne
CAEP	Centre d'Assitance et d'Experimentation de la Peche et de Vulgarization
CAMP	Centre d'Assistance a la Motorisation des Pirogues
CAPAS	Centre d'Aide a la Peche Anisanale au Senegal
CBAO	Compagne Bancaire de l'Afrique Occidentale
CCCE	Caisse Centrale de Cooperation Economique
CFA	Communaute Financiere Africaine
CFD	Caisse Francaise de Développement
CFM	Dakar Central Fish Market
CICM	Centre International de Credit Mutuel
CIREP	Interministerielle de Retrocession des Equipements de Peche
CLS	Credit Lyonnais du Sénégal
CMS	Credit Mutuel du Sénégal
CNC	National Coordination Committee (of savings & loan mutuelles)
CNCAS	Caisse National de Credit Agricole de Senegal
CNPS	Collective National des Pecheurs du Sénégal
CNTS	Confederation Nationale des Travailleurs du Sénégal
COPACE	Comite des peches pour l'Atlantique Centre-Est
COPAR	Conseil et Parterairiat Entreprise
CPM	Centre de Pêche Mishirah
CREDETIP	Centre de Recherches pour le Développement des Technologies Intermédiaires de Pêche
CRODT	Centre de Recherches Océanographiques, Dakar-Thiaroye
CSE	Centre Suivi Ecologique
CSRP	Commission Sub-Regional de la Pêche
CTL	Conservation des Terres du Litoral
DAT	Fixed term deposit (dépôt à terme = Fr.)
DID	Developpement International Desjardins
DOPM	Direction de l'Océanographic et des Pêches Maritimes
DPS	Direction de la Prévision et de la Statistique
EEl	Examen de l'Environnement Initial
EIA	Environmental Impact Assessment
EPI	Expanded Programme of Immunization
ESAF	Extended Structural Adjustment Facility
EU	European Union
FAD	Fonds Africaine de Developpement
FAO	Food and Agriculture Organization

FCFA	Franc CFA
FED	Fonds European de Développement
FENAGIE	National Federation of GIEs
FNP	National of Federation of Fishermen
GAIPES	Groupement des Amateurs et Industriels de la Pêche au Sénégal
GDP	Gross Domestic Product
GIE	Groupement d'Intérêt Economique
GIMES	Groupement Interprofessionnel des Mareyeurs Exponateurs
GRT	Gross Registered Tonnage
HACCP	Hazard Analysis and Control of Critical Points
HP	Horsepower
ICSF	International Collective in Support of Fishworkers
IDAF	Integrated Development of Artisanal Fisheries (= DIPA Fr.)
IEE	Initial Environmental Examination
IFAD	International Fund for Agricultural Development (= FIDA Fr.)
IFC	International Finance Corporation
IFREMER	Institut Français de Recherche pour l'Exploitation de la Mer
ILO	International Labour Organization (= BIT Fr.)
IMF	International Monetary Fund (= FMI Fr.)
INFO-PECHE	l'Organisation Intergouvernementale d'Information sur la Commercialisation du Poisson en Afrique
ISRA	Institut de Technologie Alimentaire
IT/R	Interim Report
ITA	Institut de Technologie Alimentaire
JICA	Agence de Cooperation Internationale Japonaise
KVA	Kilovolt Ampere
LC	Letter of Credit
MASY	Maximum Annual Sustainable Yield
MCH	Maternal and Child Health
MCP	Marché Central aux Poissons de Dakar
MEFP	Ministère de l'Economie, des Finances et du Plan
MEPN	Ministère de l'Environnement et de la Protection de la Nature
MFDC	Mouvement des Forces Démocratiques de Casamance
MPTM	Ministère des Pêches et des Transports Maritimes
MSY	Maximum Sustainable Yield
MT	Metric tons
NGO	Non-Governmental Organization
NPA	New Agricultural Policy
NPI	New Industrial Policy
OAU	Organization of African Unity
OECD	Organization of Economic Cooperation and Development (= OCDE Fr.)
OJT	On the Job Training
O & M	Operation and Management
OMVS	Organisation de Mise en Valeur du Fleuve Sénégal
ONCAD	National Office for Cooperation and Development Assistance
ORANA	Organisme de Recherche sur l'Alimentation et la Nutrition en Afrique
ORSTOM	Office de Recherche Scientifique et Technique d'Outremer
PAFGC	Programme d'Autopromotion des Femmes de la Grande Côte
PAGPF	Project d'Appui aux Groupements de Promotion Feminine
PAMECAS	Project of Assistance to Savings and Loan Mutuelles
PAMEZ	Projet pour la Pêche Artisanale Maritime dans la région de Ziguinchor
PAPEC	Petite Côte Artisanal Fisheries Project

PASMEC	Programme d'Appui aux Structure Mutueliste d'Epargne et Cr�dit (CIDA-funded)
PATT	Project d'Appui Technique et Technologique
PHC	Primary Health Care
PME/PMI	Petites et Moyennes Entreprises/Petites et Moyennes
PNUD	Programme des Nations Unies pour le Developpement
PPE	Pauvret�/Population/Environnement
PROPAC	Casamance Artisanal Fisheries Project
PROPECHE	Canadian Fisheries Project (Grande C�te north of Dakar)
PSPS	Protection et Surveillance des Peches au S�n�gal
SARL	Limited Liability Company
SDR	Special Drawng Rights
Servi-Peche	Credit arm of Canadian-funded Pro-Peche project on Grande C�te
SGBS	Soci�t� Generale des Banques au S�n�gal
SIDA	Swedish International Development Agency
SOFSEDIT	Soci�t� Financiere S�n�galaise pour le D�veloppement de l'Industrie et du Tourisme
SONAGA	Soci�t�e Nationale de Garantie, d'Assistance et de Cr�dit
SP	Sub-Project
SRPM	Services R�gional de P�ches
UEMOA	Union Economique et Mon�taire Ouest-Africaine
UNDP	United Nations Development Programme (= PNUD Fr.)
UNICEF	United Nations Children's Fund
UOPAGC	Union des Operatrices de la Peche Artisanale de la Grande Cate
UPAMES	l'Union Patronale des Mareyeurs-Exponateurs
USAID	United States Aid
USD	United States Dollar
VAT	Value-Added Tax (Fr. = TVA)
WB	World Bank
WFP	World Food Programme
WHO	World Health Organization
WID	Women in Development
WTO	World Trade Organization (= OMC Fr.)
ZEE	Zone Economique Exclusive

INTRODUCTION

INTRODUCTION

The government of Senegal formally requested a study to improve in the existing fishery sector in the northern fishing areas in Senegal. In response to this request, Japan International Cooperation Agency (JICA) implemented the "Study on the Development Program for Northern Fishing Areas in the Republic of Senegal" (hereinafter, refer to as "the Study") from September 24, 1996 to November 28, 1997, according to the preliminary survey carried out in January 1996 and the S/W (Scope of Work) mission in March 1996.

The objectives of the Study were to grasp the conditions pertaining to artisanal fisheries in the target area and to formulate a master plan which focuses on improving the fishing communities, in order to enable beneficiaries such as the fishermen to achieve sustainable fishing, processing and marketing, and an improved standard of living. A feasibility study was carried out on selected priority projects, in order to draw up an equipment procurement plan and a facility design plan.

The Study was carried out for thirteen months in two phases from September 1996 through November 1997. The Phase I Study was implemented from September 1996 through March 1997 with the aim of developing the Master Plan, including the priority projects. The Phase II Study was conducted from May through November 1997 to implement a feasibility study on the priority alternative programs and plans selected in the Phase I Study.

The area targeted by the study was the northern coastal area (the Grande Côte) extending from Dakar to Saint Louis. Six fishing villages in the northern coast, including Saint Louis and Kayar, and ten fishing villages were selected in the Dakar region.

The Phase I Study was implemented for the purpose of formulating the Master Plan and the selecting the priority projects. The study team collected information on the existing conditions, with the participation of counterparts and representatives from the study area, through interview surveys and discussions. The Phase II study implemented a feasibility study on the priority projects. The participatory method was utilized through workshops conducted at the regional level in Saint Louis and Kayar and at the national level in Dakar with the assistance of counterparts. The master plan and action plan were revised based on the comments made in the workshops. A seminar was held on September 30, 1997 to explain the contents of the master plan to the officials, beneficiaries as well as donors. The work flow chart of the study is shown in Fig. 1. The list of JICA study team members and Senegalese counterparts is shown in Appendix-1.

This report is a final report which contains a summary, a main report and annex. The main report was organized into chapters describing the existing conditions of the artisanal fisheries sector, the master plan, the feasibility study of the Saint Louis and Kayar project, the institutions and organizations, the action plan, and the conclusion and recommendations, minutes of the meeting, the list of data collected and the list of the persons contacted for the study. The annex includes summary of the workshops conducted in Saint Louis, Kayar and Dakar, environmental impact assessment survey, fishing community development survey.

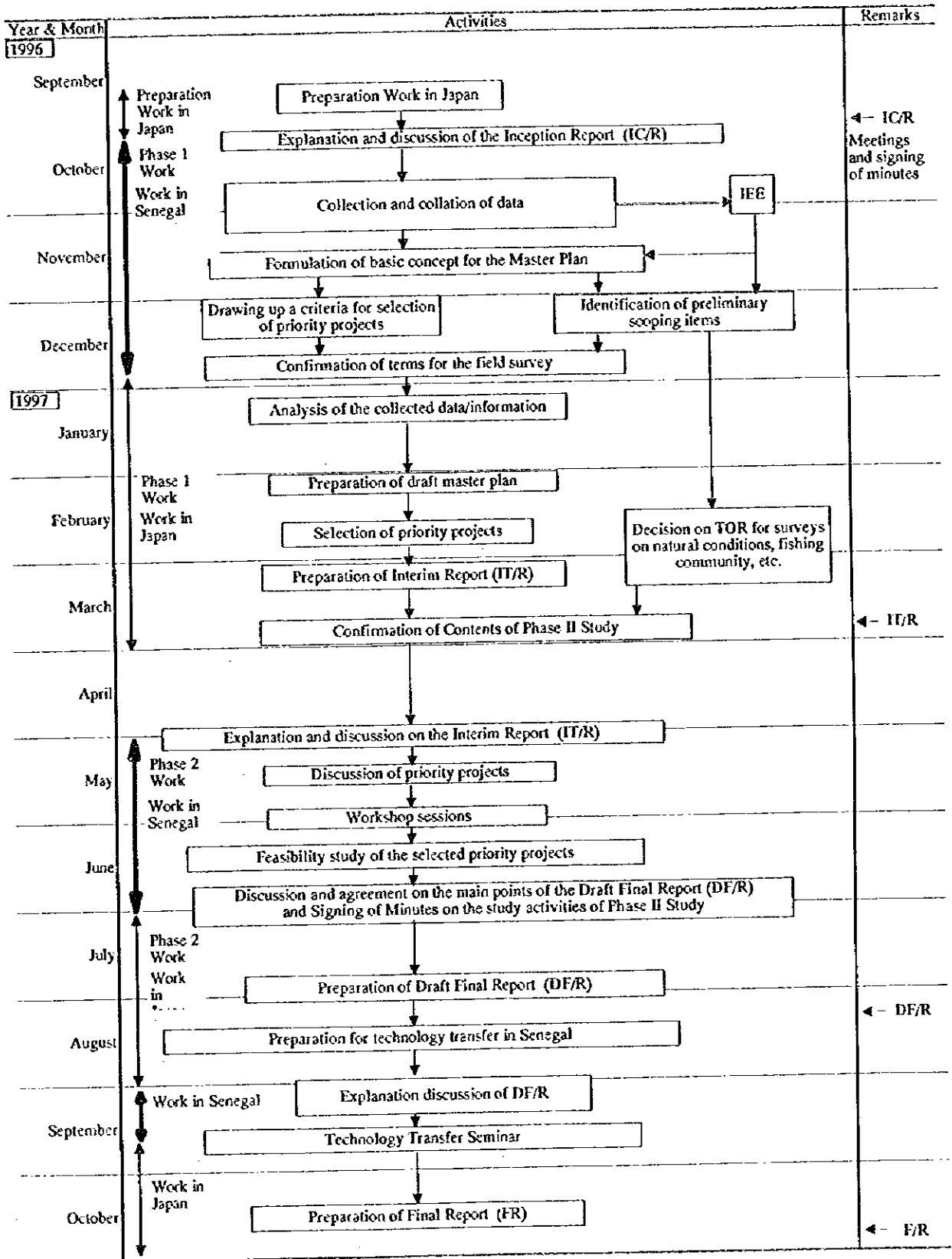


Fig. 1 Work Flow of the Study