

1.3 Sector 3 : Artisanal Fish Processing

1.3.1 Existing Conditions and Future Prospects

(1) Artisanal Processing

The artisanal fish processing industry in Saint Louis employs approximately 1,000 women. Two major factors which keep production at low levels are the lack of land and traditional production methods. In addition, fish production is not anticipated to increase, with the exception of some fish species, due the increased demand for fresh fish by a growing population. As a result, processed fish production is expected to remain at its current level. The objectives of this project are to promote improvements in work productivity and the work environment, as well as to secure employment for women. The prevailing issues and conditions for each type of processed fish product are summarized below.

Kethiakh: Sardinelle production levels fluctuate greatly throughout the year. It is estimated that future production levels will remain close to the 1995 volume of 25,000 tons (see chapter on fish production). Therefore, the supply volume of raw materials for Kethiakh will not increase greatly from present levels; and the production volume and the scope of the processing facilities are also expected to remain at current levels.

The amount of boiled fish which can be processed at one time is limited to 50kg which is the capacity of the drum cans that are used in the processing. Meanwhile, the remaining unused raw fish is left out in the sun which leads to a deterioration in fish quality. Lowered fish quality does not only signify an inferior tasting product, but also causes the fish to break apart and lowers the price of the product. In order to improve product quality, the work process needs to be speeded up, and the means of preserving the raw fish ingredient and storing the product must be improved. Nearly 75 percent of Kethiakh production is concentrated during a six month period from November to April of the following year. It is particularly important to raise the production efficiency rate during this period.

Sale Seche: There is still ample room for exploiting shark resources which are the common ingredient; and an increased production ratio of 40 to 145 percent is anticipated. The demand for shark meat in Senegal is extremely small and the majority of the shark harvested is processed artisanally and exported to other African countries. Artisanal processing showed a growth of 214 percent in the five year period from 1991 to 1995; and there is a high demand for salted shark meat in Ghana and the Congo. Due to these factors, the supply of raw fish ingredients for processing is anticipated to grow in conjunction with expanded processing facilities. This project will enable an increase of 500 tons or 40 percent of the 1995 production

volume. The amount of land which can be used by processing factories is limited in Senegal. As a result, processing facilities will be utilized jointly by processing groups in future and productivity in terms of land area will increase.

(2) Fish Processing of Exported Products

Fresh fish export: Increased production of exported fish species due to measures promoting offshore fisheries is anticipated. A high degree of fish quality is presently maintained during the shipping to air transport stages. With future improvements to the market, fish quality is expected to improve even further due to reduced shipping time. The transport cost to Dakar is anticipated to be curtailed in direct shipments from Saint Louis to EU countries, but the number of air flights is not expected to increase at present and this will be a long-term issue. As a result, the current distribution pattern of fresh fish shipments to Dakar is expected to continue for the long-term.

Frozen fish export: Typical frozen fish products selected for export are flounder and shrimp. Flounder which is largely harvested in Saint Louis (30 percent of the total national production) is transported to Dakar, of which 72 percent is processed into filet, frozen, and exported. However, flounder resources are fully exploited at present; and future supply volume is expected to remain at the 1995 levels of 1,342 tons. The bacteria count of frozen filet for export is extremely high and the quality is inferior (CPEI, 1996). In addition, the production volume of shrimp harvested at the rivermouth of the Senegal River is also anticipated to remain the same. The use of ice in the collection and handling of shrimp and the transport time are inadequate and as a result, low quality ingredients are supplied.

Processing highly fresh ingredients quickly and hygienically at the production site is more advantageous than processing the fish in Dakar. Therefore, flounder and shrimp processing in Saint Louis is anticipated to grow with the implementation of extension activities in hygiene technology.

1.3.2 Sector Plan

(1) Development Objectives and Concept

Development objectives

The four objectives of the project are listed below.

- 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

Development concept

- 1) Facility improvements such as a roofed working area, lighting at night, etc. will be implemented in order to improve the work environment, reduce the work volume and hours of artisanal processors, in addition to introducing 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. Artisanal processing: Measures will mainly focus on improving the sanitation environment 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 that 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 the 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 shipping, processing, and sales 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.

(2) Facilities and Equipment

1) Artisanal processing area

A model processing factory incorporating all the needed improvements will be constructed in the fishery complex and processors will be trained by OJT. Improved processing technology, equipment and facilities will be demonstrated to all the processors in Saint Louis. Existing facilities will be improved and a new processing factory will be constructed in conjunction with an increased supply of ingredients in future.

The two existing processing factories are located in Guet N'dar and Gokhoumbathic. The facilities of the former are presently undergoing improvements

under the development plan of Saint Louis and toilet facilities, night lights, shops, etc. are included in the plan. As a result, improvements to the Guet N'dar facilities will not be carried out in this project. However, gradual improvements to the facilities of Gokhoubathie, i.e. water supply, night lights, toilets, etc. will be implemented.

Model processing facility for artisanal products

a. Functions

- Foster model processor groups: Lending facilities to processor groups organized under the leadership of women who have received training and to implement on-the-job training activities
- Develop processing technology through OJT
 - Improve the productivity of each unit engaged in traditional processing through the joint use of improved equipment, improved assembly lines, and facility layout
 - Understand the quality control needs of processed products exported to other African nations (dried and salted shark meat and ray), technical improvement
- Education and training: Demonstrations targeting processors, implement training

b. Facilities

Processing area:

Salted and processed shark meat and traditionally processed products are targeted, in anticipation of an increased production volume of 500 tons. The facility which is planned in this project will be a demonstration facility aimed at increasing production by ten percent; and the scope of daily production levels is set at 200kg (150m²). The present handling volume per worker of 20kg/day is estimated for this facility and one group will be composed of ten workers and the facility will be loaned out for their use. It will contain a drying area, fish preparation area (cutting, gutting), and a salting area. A system which incorporates the entire work process into one area will be introduced. At present, each work stage is carried out separately.

Storage for processed products:

The entire production volume of traditionally processed products of 2,036 tons in Saint Louis will be targeted. A 120m² storage facility will be constructed based on the expectation of a two week storage period for the processed products.

c. Equipment

Artisanal processing equipment which is currently in use in Senegal will be employed and equipment requiring the training of new technical skills will not be included. In addition, only equipment which is manufactured and can be purchased in Senegal will be used. Equipment such as fish containers and carrying utensils, washing and salting tanks, drum cans, and baskets for handling boiling fish which will improve and raise the efficiency of processing techniques will be included. As expensive equipment will not be provided, processing groups will be expected to purchase this equipment. In addition, a system of purchasing the equipment using small credit may also be possible. As a result, the amount of purchased equipment used in the demonstration facility will be kept to a minimum. The needed equipment are: drying table, plastic tank, plastic basket, fish container, work table.

2) Demonstration plant for high quality export products

Exported processed products, particularly filet and shrimp processing and fresh fish packing activities will be targeted. The facility will be leased to private companies and on-the-job training in sanitation and quality control will be implemented. In addition, the DOPM quality inspection room will be used jointly, and product quality will be monitored. The production of a high quality product is targeted. The plant will maintain standards that will meet the EU criteria for exported products. The production capacity will be 800 tons/year, 80m², equivalent to the average standard of a small-scale export processing plant in Dakar. The equipment will include: air conditioning, working table, plastic container and tank, defroster, refrigeration and cold storage facilities.

3) Quality inspection room

Of the fresh fish landed in Saint Louis, the volume consumed domestically is usually heated. Therefore, a sensory test will be carried out to determine fish quality which will also be conducted on exported frozen fish. Processed filet will be required to undergo a bacteria test. The bacteria test will be limited to simple and inexpensive tests for general bacteria and coliform colonies. Other tests will be consigned to ITA or other institutions with laboratory facilities.

Equipment: Refrigeration and freezer facilities, incubator, glass utensils, digital measuring device, microscope, thermometer, testing table

(3) Education and Training

Training activities for the processors will be implemented according to the following stages.

1) Compile a list of processors and processing groups, registration of GIE

2) The DOPM staff who will be responsible for supervising the processors will be trained as extension staff members.

Targeted subjects: Five to ten inspectors from the DOPM in Dakar, Saint Louis, and Kayar

Instructors: ITA, NGO, foreign experts

Period: One year from the initial start of the project

Location: Dakar DOPM, CAEP, ITA

Approach: Courses (artisanal processing techniques, sanitation, quality, fish chemistry, fresh fish testing method, organizing women's groups, processing management) and observation studies (Africa regional project, IDAF, advanced nations, etc.)

3) **Fostering women leaders:** Technology and information required for women in leadership positions, i.e. leading women utilizing the model processing plant, training in group leadership, lectures, processing technology, sanitation management, micro-business management, financial management, credit access, etc. These women will also be trained as extension personnel for the private sector as well.

4) **Educational program and cultivation of development education:** Nearly half of the processors are women who are also housewives. Therefore, improvements that are relevant to the circumstances of these women should be considered and a comprehensive educational package should be developed.

5) **Education and training for general processors:** Refer to Table III.1.3-1 for an outline of the educational and training program.

(4) Institution and Organization

1) DOPM Regulations

DOPM is in charge of quality control, inspection of exported products, and issuing health certificates. But the tools and the means of inspection are inadequate. Specialized inspectors will be sent to the Saint Louis and Kayar offices to participate in activities to improve quality control, inspection, and education.

2) Rules on facility and equipment use, management and operations

Tools such as working tables, plastic tanks, etc. which will be provided in the project will be controlled by the Management Committee of the project. The fees collected for their use will be paid to the Management Body. The storage rooms will be managed and controlled by the processors' association. The following staff members will be needed in the processing sector to develop processing activities.

- Processing : one person
- Maintenance staff : one person

3) Formulation of fish processors association

A part of the GIEs already have their own system of working fund. It is better to improve the the formulation processors association. After further organization, buying, processing, selling, labour control, quality control and other things can be done efficiently further more. For the activities of these associations, a credit system is very important means.

Table III.1.3-1 Education and Training Program

Course	Contents	Target	Period	Instructor	Type of class	Equipment
Training for DOPM staff	Sanitation (bacteriology), fishery chemistry, fish processing, quality control, survey methodology, fish handling and freshness, packaging, HACCP implementation	Selected staff members (5 persons)	1-2 months/year, for 3 years in total	Experts of fishery sanitation and processing	Lecture and OJT in the complex	Classroom facilities within the complex and model plant facilities
Training for technicians in the complex	General matters on fish processing (salting, chilling, steaming, meal processing, etc.) sanitation, quality control	Selected staff with experience in processing (one person per complex)	1 month per one item, 6 months in total before the completion of the complex and OJT after the completion	Experts of fishery sanitation and processing	Lecture by DOPM staff + OJT in the complex, training abroad.	Classroom facilities within the complex and model plant facilities, private companies abroad..
Training for extension staff	Advanced artisanal processing techniques, marketing, management, facility maintenance, sanitation improvement, training techniques	Selected staff (3-5 persons)	1 month (full day) initially, and one week per six months (for follow up)	Experts of processing (DOPM staff)	Lecture and OJT in the complex	Classroom facilities within the complex and model plant facilities
Training in leadership	Advanced artisanal processing techniques, how to lead group activities, marketing, management, facility maintenance, sanitation improvement, training techniques	President of GIEs, group leaders in the GIEs, 20 - persons per class		Experts of group activities, extension staff	Lecture and OJT in the complex	Classroom facilities within the complex and model plant facilities

1.4 Sector 4 Fishing Community Development

1.4.1 Existing Conditions and Future Prospect

The constraints to improving the living conditions in the fishing villages in Saint Louis are mainly caused by the following three major problems.

- Overpopulation and continuous high growth rate of the population
- Limited employment opportunities
- Poor BHN (Basic Human Needs) infrastructure

Based the Population Census and Population Projection by the Ministry of Statistics in 1988, it is estimated that the population in 1995 was approximately 34,000 in the traditional fishing villages of Guet Ndar, Ndar Toute, and Gokhou Mbathie in Saint Louis. The population grew 13 percent from 1991 to 1995. The area of these three villages are about 0.14km², 0.2km², and 0.42km² respectively. The population density was extremely high, especially in Guet Ndar with 118,000 persons/km² in 1995. These villages are included in the Saint Louis Communes and are governed by the Saint Louis municipality. Migrant fishermen who seasonally move to other landing sites including Mauritania as well as Kayar, Joal, Mbour, and Casamance in Senegal originate from these traditional villages. The definition of "migrant fishermen" in Senegal can be summarized as follows:

"Fishermen and their families who seasonally transmigrate from Guet Ndar and the other traditional fishing villages following the movement of fish; they stay in the destination fishing villages for a certain period for fishing and doing fishery-related activities including micro-wholesaling and artisanal fish processing and sometimes formulating their fishing villages."

Assuming that the annual population growth rate is 2.3 percent based on the 1988 census, the total population in the fishing villages of Saint Louis will be 47,000 persons in 2010. The population structure of the fishing villages can be summarized as shown in the Fig. III.1.4-1. Currently, the municipal government has implemented a resettlement project for the people in Guet Ndar to the new village, Hydrobase in Saint Louis. The aim is to alleviate of the high population density in Guet Ndar which averages about 30 inhabitants in one housing lot (10m x 15m). A population of 8,000 persons will be transferred from Guet Ndar to Hydrobase until 2010.

The population of traditional villages has already reached maximum capacity. Therefore, the resident population residents in 2010 is projected to be the same as in 1995. It is assumed that the number of seasonal migrants will also remain the same

because of the congested fishing areas and the limited the fish resources. Approximately 5,000 persons need to be transferred from the traditional villages to the other fishing villages in 2010.

In these villages, the income earned by women is important for defraying daily expenditures due to the practice of polygamy and other traditions of fishermen families. Artisanal fish processing is one of the main income generating activities of women. Table III.1.4-1 shows the population, and the number of women and fish processors in 1995 and in 2010.

The number of the fish processors is projected to reach 1,400 in 2010, a 40 percent increase from 1995 levels. However, fish production is not expected to increase at the same rate as the population growth. Eventually, the production of processed fish and per capita income will decrease, and not a few women will lose their source of income.. The same thing may occur for fishermen and micro-wholesalers, if the population continues to grow. Developing employment opportunities is very limited in fisheries and fishery-related sectors, however, proper countermeasures should be taken by the relevant governmental agencies in order to provide them with alternative source of income.

All of these villages have electricity and water supply services, however, these facilities have not been well developed in Hydrobase. The main road in Goxon Mbaac was developed by a French cooperation, however, the main roads in Ndar Toute, Guet Ndar, and Hydrobase have not been well maintained and are in very poor conditions. The rural roads in the villages are not paved and need to be improved. Retail market facilities of the fishing villages are not functioning because of lack of renovation. Improvement of the facilities and retail market systems should be considered in order to expand marketing opportunities of retailers and micro-wholesalers of fishery and agriculture products.

It is estimated that there are approximately 3,700 boys and girls between the ages of 7 to 12 years in the traditional and newly developed villages. The four existing primary schools, three in the traditional villages and one in Hydrobase, are filled to full capacity, despite the introduction of a double shift system. Even at present with the double shift system, two classrooms need to be added in Hydrobase and three classrooms in the traditional village. In view of the population increase, it is projected that 5,500 children of primary school age will be living in these villages in 2010. At least another five classrooms are needed.

A detailed questionnaire survey on the fishing community was conducted during the Phase II study in order to identify the needs, constraints and potential of the community members. There were 150 interviewed, including 75 fishermen, 45 processors, 23 wholesalers, three carpenters, two mechanics, and two gasoline

sellers. The following issues were analyzed based on the data collected by the survey.

- Demographic structure and movement
- Productive activities
- Education and health services
- Social organization and professional structure of the migrants
- Performance of the economic groups and access to credit problems
- Income level and living conditions
- Needs and constraints at the village and professional group levels

The current conditions, needs, and constraints of the communities can be summarized as follows, based on an analysis of the data collected from the main field and the questionnaire surveys. The output of the questionnaire survey are shown in the Annex.

There is no health post in Hydrobase and the access to the regional hospital from Hydrobase is very poor due to the bad road conditions and limited transportation services. The health post in Goxon Mbaac, which is also located far from the regional hospital, does not have the infant delivery facilities.

There is no community centers or training facilities currently used in these villages. In Hydrobase, there is only a women's training center, which was built by the CIDA project and has been abandoned because of its distant location from the residential areas. Literacy classes for fishermen are currently implemented by CAEP, and those for female processors and micro-wholesalers are carried out by UOPAGC, using the facilities of primary schools. As for the UOPAGC literacy program, there are five classes held in Guet Ndar, Goxon Mbaac, Hydrobase etc. in Saint Louis. Part of the expenses, including the salaries of the instructors, are covered by the participants and the rest is paid by the CIDA project.

At present, community development plans are formulated and implemented through the municipal government in Saint Louis. However, it is necessary to formulate an appropriate organization for implementing and operating the project proposed by the Study, which incorporates various sectors and is linked to other projects in the northern fishing areas in Senegal. The organization will be required to have good coordination, management, planning, and project pursuing capabilities as well as relevant expertise in order to make the project successful and sustainable.

In the area of future plan formulation, it is desirable to establish a local system of problems and making plans using a community participation approach involving professionals and community leaders, in order to make the plans viable for actual local needs.

Finally, existing problems which need to be resolved in order to improve

living conditions in the traditional and newly developed villages are summarized as follows. These problems were pointed out through the workshops which were held on May 27 and in interviews with the community members and professionals, and through the Detailed Survey on Fishing Community Development conducted during the Phase II study:

Employment opportunity

- Poor access to formal employment opportunities
- Limited access for training to acquire income generating skills
- Limited access to information about formal and informal employment
- Limited access to credit for starting cottage industries
- Shortage of land for market gardening

Living Conditions in Households

- Congested households
- Poor sanitary conditions
 - Shortage of toilets and bathrooms
 - High humidity in rooms during the rainy season due to the limited number of windows
 - Poor drainage system in households
 - Cooking facilities located on the sand outside of houses
- Limited knowledge and awareness
 - Lack of awareness on the importance of primary education
 - Lack of knowledge on sanitation, hygiene, and primary health care
 - Lack of knowledge on gender, human rights, laws and regulations etc.

Access to the Social Services

- Limited access to credit systems
- Limited access to literacy classes
- Limited access to technical training classes
- Limited access to information about sanitation, hygiene, primary health care, child care, marketing, laws and regulations etc.
- Lack of knowledge on gender, human rights, laws and regulations etc.

Basic Infrastructure for BHN

- Lack of drainage systems
- Poor condition of main and local roads in the villages
- Lack of garbage disposal system
- Lack of water supply in the fish landing and processing areas
- Limited lighting facilities along the roads and in the working areas
- Lack of communication facilities (telephone center) in the new village
- Low enrollment rate in primary education and shortage of physical,

- financial, and personnel capacities of primary schools
- Lack of facilities and equipment of health post: especially infant delivery facilities and ambulance transport system
- Disorganized retail market system and poor facility and equipment conditions in the existing retail markets
- Lack of community centers and training facilities
- Lack of nurseries and kindergartens

1.4.2 Sector Plan

(1) Development Goal

The development goal is to contribute to an improved living environment

(2) Development Concept

The following components will be proposed as the supporting infrastructure for improvement in the living environment. The implementation should be carried out after their legal procedures following the urban development plan authorized by the municipal council.

The management body of the proposed project, supported by CAEP, will coordinate all the activities related to training, education, and institutional strengthening under the management committee, which includes representatives from the municipal government. In addition, the women's group of UOPAGC will play an important role in implementing training and education programs for the community.

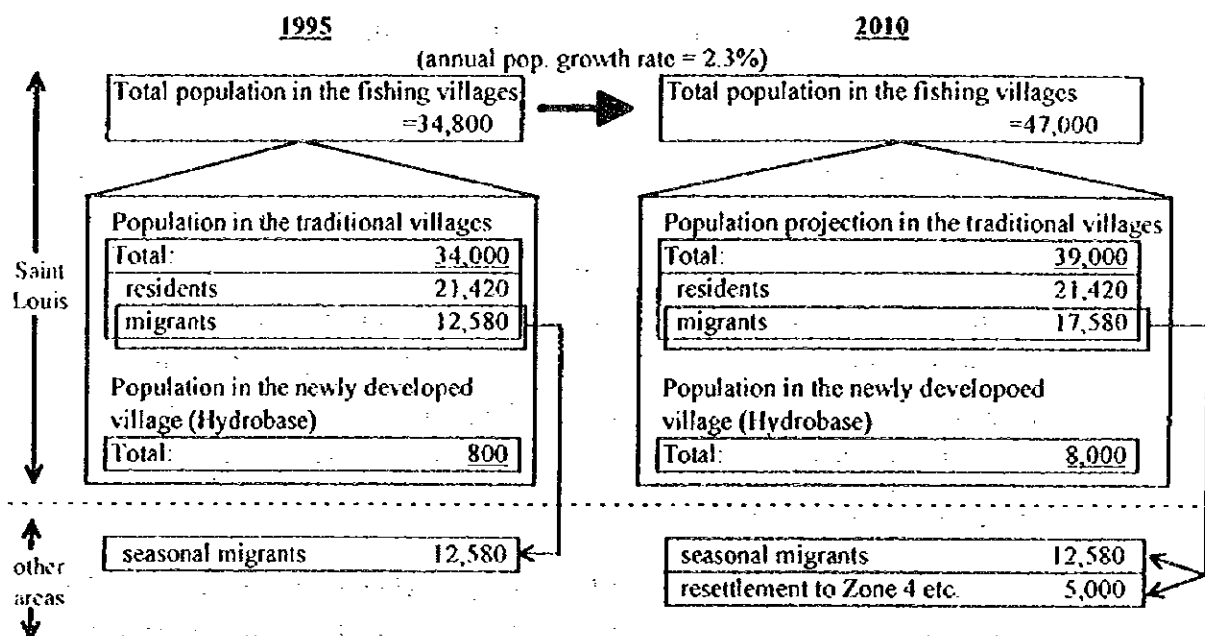
Technical cooperation from the Ministry of Health, Ministry of Education, Ministry of Women, Ministry of Environment, Ministry of Public Works, and Ministry of Alphabetization will be essential in order to organize and implement more practical and effective training and education

(3) Functions

- a. Extension of the existing primary school in Hydrobase
 - Construct two classrooms
 - Construct a basketball court
 - Renovate the existing football field
 - Human resource development: two additional teachers
- b. Construct a health post in Hydrobase
 - Location: Near the primary school
 - Construction of a health post with the national standard facilities
 - Human resource development: one registered nurse, three midwives, and three community health staff members

- c. Renovate the existing retail market in Ndar Toute: Various studies including a master plan study and a feasibility study are required before implementation
 - d. Renovate the access road and install street lights from Guet Ndar to the new complex
 - e. Install a water supply facility for the new complex and Hydrobase
 - f. Construct a telephone center for public use in the new complex (operated by the complex)
 - g. Nursery facilities in the new complex
- (4) Education and Training
- a. Technology transfer activities for the autonomous body staff, professionals, and community leaders in development plan formulation and implementation using the community participation approach
 - b. Leadership training program for leaders of groups and GIEs (marketing, management, facility operation/maintenance, sanitation improvement, leading groups, promoting group activities, communication etc.)
 - c. Family health care class 1 for women of reproductive age (15-49) (primary health care, hygiene, environment protection including rubbish collection, composting, reforestation etc.)
 - d. Family health care class 2 for women of reproductive age (15-49) (child care, nutrition, EPI etc.)
 - e. Literacy education class for community members (Wolof language including topics such as home economics, human rights, hygiene, importance of education, laws and regulations etc.), support for the CAEP and UOPAGC literacy classes
 - f. Resettlement Seminar for community members (planning, procedures, preparation, destination options, accommodation with destination communities etc.)
 - g. Promotion of community and group activities
- (5) Institution and Organization
- The Sector 4 sub-projects will be implemented, operated, and maintained through the relevant organizations as listed below (refer to the Figure III.1.4.-2).

- a. The Coordination Committee will approve plans for the sub-projects included in Sector 4 of the Saint Louis Project, following the Master Plan and the Action Plan by the Study.
- b. The ad-hoc committee of the coordination committee which will formulate detailed implementation program including financial and human resource allocations, will implement the sub-projects. The ad-hoc committee will be responsible for completing all the necessary procedures required for implementation, i.e. making implementation schedules, land acquisition, financial and personnel resources allocation, human resource development, detailed planning on operation and maintenance, facility construction, equipment procurement etc.
- c. The autonomous body of the Saint Louis Project will operate and maintain the sub-project as well as the facilities, equipment, and basic infrastructure in collaboration with community groups or members.
- d. The autonomous body will be responsible for formulating future community development plans based on community participation.



(Data source: compiled by the Study using 1988 Population Census, Ministry of Statistics)

Figure III.1.4-1 Population Growth from 1995 to 2010 in the Fishing Villages in Saint Louis

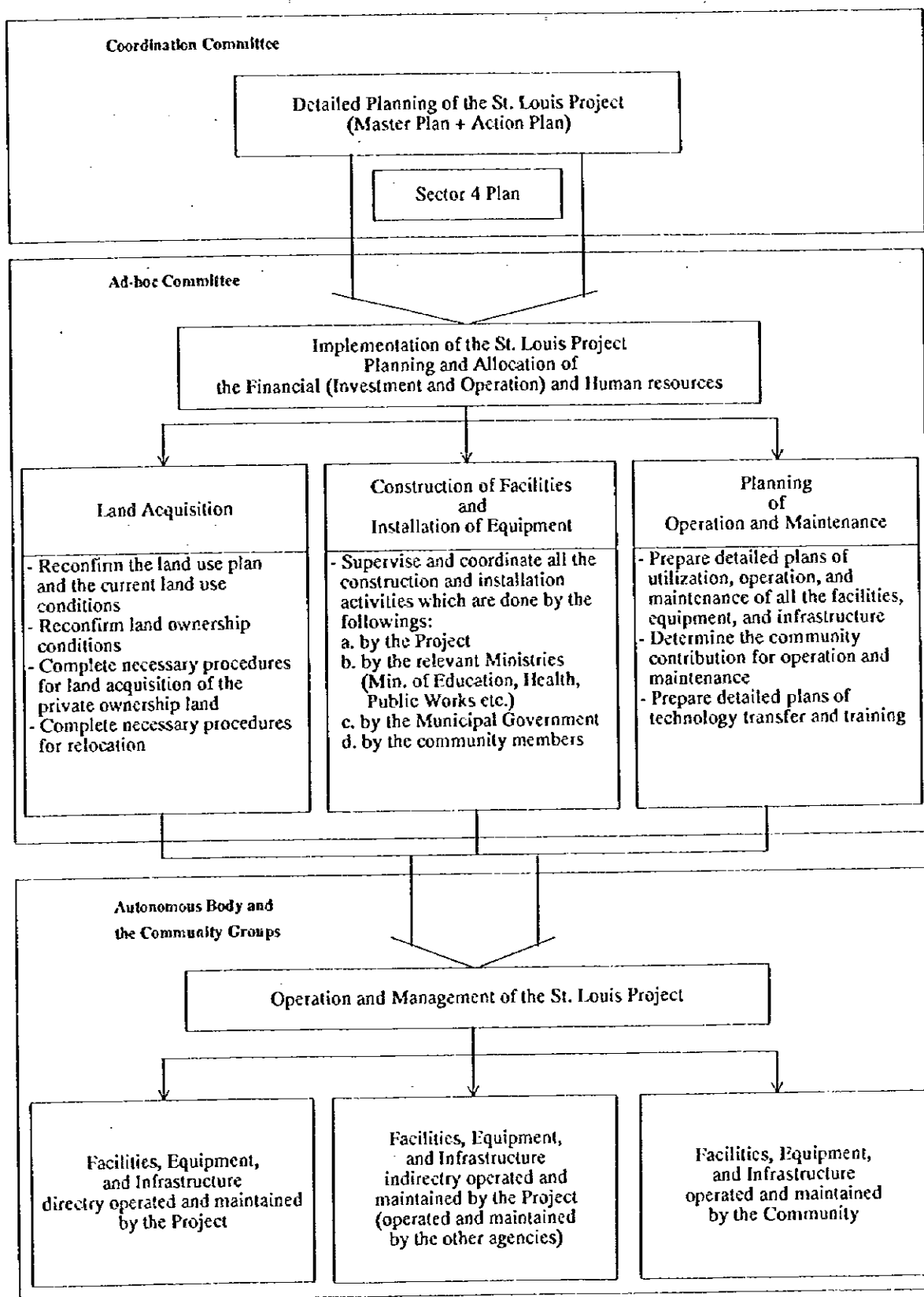


Fig. III.1.4-2 Flow of Implementation, Operation and Maintenance of Saint Louis Project

**Table III.1.4-1 Population and number of women and fish processors
in Saint Louis (1995 & 2010)**

	1995			2010		
	Traditional Villages	New Village	Total	Traditional Villages	New Village	Total
Total population	34,000	800	34,800	39,000	8,000	47,000
Women	17,340	420	17,760	19,890	4,080	23,970
Fish processors	1,000	30	1,030	1,150	250	1,400

Source: Compiled by the Study using 1988 Population Census, Ministry of Statistics

1.5 Credit System

The credit system which is proposed in this project is based on the system of mutual funds that was organized in Kayar under the support of CNCAS, the PROPECHE Project and PAMECAS. This system of mutual funds allows its members equal access to fund use. Centre International de Credit Mutuel (CICM) which is a system of mutual funds that is supported by France is mainly available for the agricultural sector, whereas PAMECAS, supported by Canada, will target the fisheries sector.

(1) Loan conditions

- 1) The source of the loan revenue will be based only on the deposits of the members of the fishery assistance fund.
- 2) This is a private fund owned by its members.
- 3) The capital will be loaned to GIE groups rather than to individual members.
- 4) GIE members will be jointly responsible for repaying the loan borrowed by a GIE group.
- 5) Fund members are required to have more than 20 percent of the borrowed amount.
- 6) A fund member who is a member of a GIE will be allowed to borrow a maximum of FCFA 100,000.
- 7) The owner of a purse seine may borrow a maximum of FCFA 500,000 on an individual basis.
- 8) Repayment period: Six months
- 9) Deposit rates: 6%
- 10) Loan rates: 12%

(2) Beneficiaries eligible for loans

Local residents, GIE, and owners of purse seines will be eligible for loans.

(3) Wholesalers and processors

Wholesalers and processors are mainly composed of women who will be eligible for loans as a GIE members. Each female member is eligible to borrow FCFA100,000.

(4) Operating Expenses of the Credit System

The demand of potential loan applicants has been projected at 25 percent during the initial three year period (1997 to 1999), 50 percent for the next third year

period (2000 to 2002), and 100 percent in the last third year period (2003 to 2005).

The local fund office in Kayar has presently allocated FCFA 6 million in loans and presently maintains FCFA 11 to 15 million in deposits (300 deposit accounts).

In order to meet the demand for loans, about FCFA 83.6 million will be needed in Saint Louis in 1999; and FCFA 125 million will be needed in 2005. A breakdown of this capital shows that 60 percent will be made up of loans, 30 percent for investments (deposits), and 10 percent for basic management capital.

During the initial three years, this credit system will be managed and operated by two staff members which will increase to three full-time members by 2003. Their total monthly salaries will be FCFA 1.97 million in Saint Louis in 1999, FCFA 2.53 million in Saint Louis in 2002, and FCFA 2.70 million in 2005.

In order to suppress the new additional interest rates as much as possible for fund management operations, it is recommended that the costs incurred for office expenses, purchase of accessories, salaries, the operating costs of the Board of Directors, salaries of temporary employees (training, surveys, etc.) are paid for by the project.

Table III.1.5-1 Projected Capital Amount for the Saint Louis Project (until 2005)

	Unit: Million FCFA/Month						
	1997 - 1999		2000 - 2002		2003 - 2005		
	Number of loans	Loan amount	Number of loans	Loan amount	Number of loans	Loan amount	
(1) Loan Amount							
- Fishing Operations	30	9.0	11%	38	11.3	45	13.5
- Gill Net Fishing	23	11.6	14%	29	14.4	35	17.3
- Purse Seine Fishing	5	2.4	3%	6	2.9	7	3.5
Sub-total	58	23.0	28%	73	28.6	87	34.3
- Wholesalers	7	7.0	8%	9	8.8	11	10.5
- Processors	26	25.8	31%	32	32.2	39	38.6
Total	91.0	55.8	67%	114.0	69.6	137.0	83.4
(2) Total investment amount (deposits)		27.8	33%		34.8		41.2
Loan Investment Amount		83.6	100%		104.4		124.6

Table III.1.5-2 Projected Management Costs of the Saint Louis Project (until 2005)

	Unit: Million FCFA/Month					
	1997 - 1999		2000 - 2002		2003 - 2005	
	Operation cost	Ratio	Operation cost	Ratio	Operation cost	Ratio
Staff salaries	0.36	18%	0.54	21%	0.54	20%
Office expenses	0.75	38%	0.89	35%	0.89	33%
Others	0.17	9%	0.24	9%	0.24	9%
Sub-total	1.28	65%	1.67	66%	1.67	62%
Paid interest, etc.	0.69	35%	0.86	34%	1.04	38%
Total operation expense	1.97	100%	2.53	100%	2.71	100%

1.6 Physical Design

(1) Design Standard and Parameters

Design Standard and Material

Japanese Standard and local standard.

Seismic force = Zero

Design wind force = 60 m/s

Reference Levels = IGN for land elevation, Sea Chart Datum for tidal levels

(M.S.L. 1.00 m = I.G.N. 0.00 m)

Bearing Capacity of soil = approx. 20 ton / sq.m

Reinforced Concrete structural frame.

Direct independent foundation (without piling).

Brick / block walls, with painting

Roof concrete slab or metal roofing material.

Wave Run-Up Elevation

From results of wave calculation, the wave run-up height on the beach for different return periods are as follows:

Wave run-up height by each return period for Saint Louis

Return period (year)	Deep Water Wave Height H_0 (m)	Equivalent Deep Water Wave Height $H_0' \square$ (m)	Rmax(m)
30	5.40	4.50	5.00
10	5.10	4.20	4.30
1	4.40	3.70	3.50

The wave with a return period of 30 years was applied in design for the complex, i.e. equivalent to I.G.N. + 4.00 m at St. Louis.

Soil condition

From the soil investigation survey conducted, it was found that the soil on site is mainly sand with a water table at about 1 m below ground level. The soil is essentially made of moderately compact to very compact sand down to 20 m.

The proximity of the sea has caused the ground water to exhibit high chloride and sulphate contents with a PH value of 7.96. Due to this aggressive ground water, it would be advisable to use special coating on foundation or special concrete to resist the attack.

(2) Land Ownership and Preparation

The land for the complex is owned by the government. Consensus of the various ministries to develop the land will be necessary is will be readily obtained. Before the construction begins, DOPM, CAEP and PSPS activities will need to relocate to temporary offices for the duration of the construction. Demolition of existing buildings will also need to be undertaken by the Senegalese government before construction begins.

The land for the Fish Collection Depots are located on public land and approval for its use will need to be obtained from the government / municipality.

(3) Facilities Zoning Concept

The complex is divided into 2 major zones, i.e. the Market, Administration & Training zone, and the Fishermen Activities Support & Workshop zones. The grouping of these facilities into these 2 major zones is to facilitate activities coordination and rational / efficient use of facilities.

(4) Facilities Design / Capacity

Market hall

The capacity of the Market Hall has been designed to accommodate the fish volume handled in the peak period of an average day's catch pattern divided into 3 periods. The average daily catch volume was calculated by dividing the yearly volume by 300 fishing days.

The elevation of the Market Hall floor has been set at I.G.N.+4.00m in order to meet the 30 year return period wave run-up height.

Apron

The apron is designed to accommodate the temporary loading and unloading operations of material, fuel, fish, etc. and to serve as a preliminary sorting area before the catch is transferred to the Market Hall.

At the toe of the apron, the gabion mattress is provided for erosion control to protect the apron structure.

Truck berth

The number of trucks that can be accommodated in the truck berth area is calculated based on the design volume handled by the market hall. To meet peak demand periods, truck waiting berth area is provided.

Ice plant

The capacity of the ice plant is based on the design volume handled by the market hall. The ice produced is to meet the ice demands for fishing operation at sea, fresh fish transport / marketing, temporary fish storage, and for the test operation of the fish collection depot. Deficit ice supply will be met by ice supply from existing ice plant in the area and from outside the area.

Riverside service facilities / wharf and slipway

These facilities are intended for the actual and practical aspects of modernized workshop activities of boat and gear maintenance and are directly linked to the workshop activities. River bed profile and flow regime will need to be confirmed at detailed design stage to fix the design level and structural design of these facilities.

(5) Equipment Provision

Equipment has been provided for the various sector activities and to meet the rational operation and maintenance of the complex.

(6) Electricity and Water Services

The existing electricity and piped water services on site are adequate to meet the demands of the complex. Piped water supply will be for drinking water use, ice making, shower, and wash basins. To minimise use of the piped water supply, general cleaning of floor, market hall and toilet flushing will be designed to use sea water.

(7) Waste Handling Facilities & Environmental Impact Consideration

Waste water

Independent septic tanks with seepage pit for overflow will be provided to contain the waste discharge from toilets. Periodic emptying of the septic tanks will be necessary by vacuum pump truck. Waste water from washing of the Market Hall will pass through solid waste trap / screen to remove the solid and suspended waste before the waste water is discharged to the sea. The good flushing characteristics of the sea in front of the complex will ensure that the waste will be disperse into the ocean without accumulation or concentration.

Fuel spillage and fire

The fuel service area will incorporate fuel trap to trap accidental fuel spillage and fire extinguishers to fight fires.

Visual impact

Land scaping will be done to minimise the visual impact and to control the sand dune movement as part of the forested belt.

Environment / services management

Rubbish bins will be provided at strategic locations to collect rubbish to ensure sanitary conditions. A collection system will be managed by the autonomous body in collaboration with the municipal rubbish collection service to collect the rubbish on a regular basis. The money collected by the autonomous body for the rubbish collection service could be used to fund various campaigns (sanitary and health awareness, cleaning, rubbish reduction, composting, etc.) and to maintain the rubbish collection services facilities and equipment.

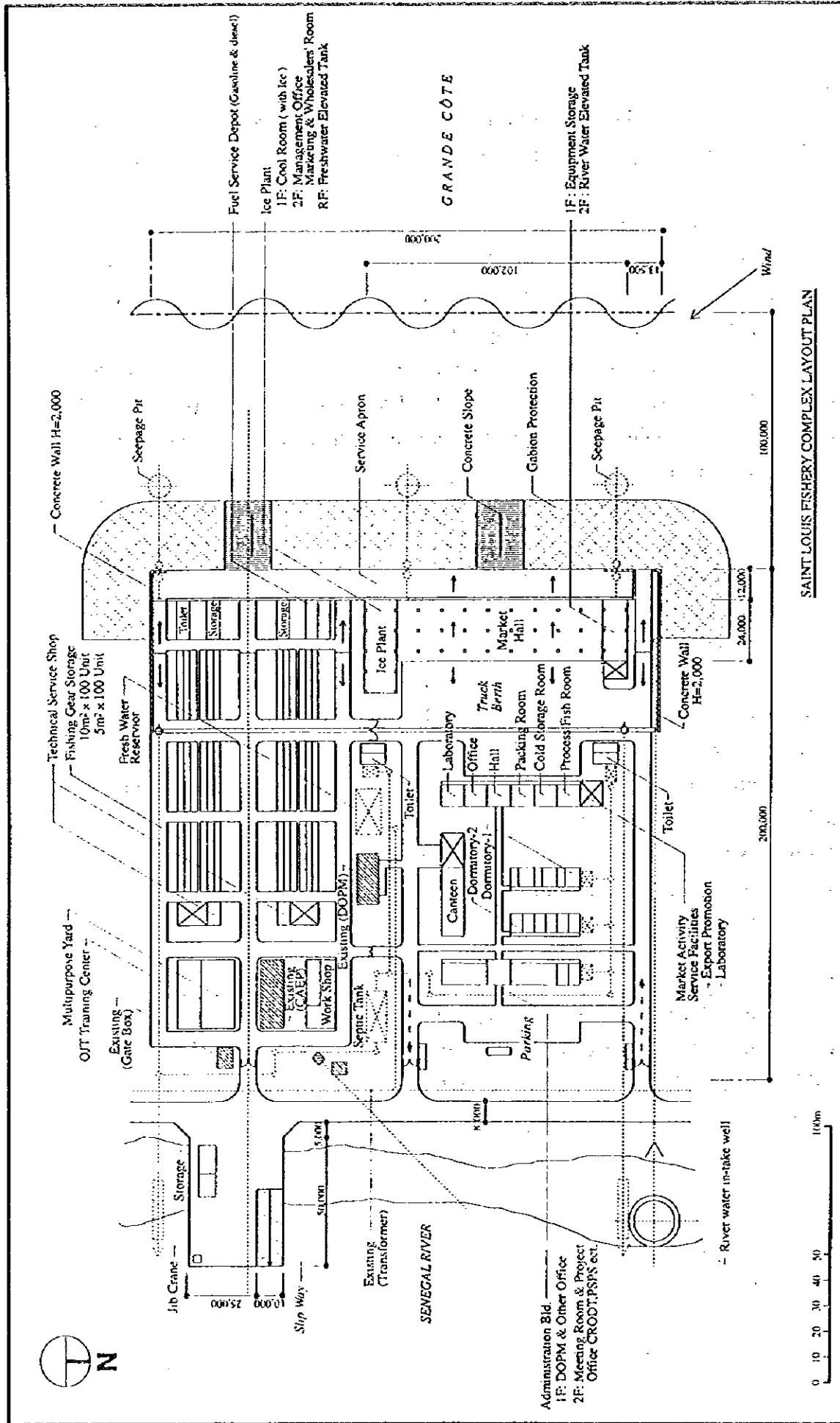
Maintenance of the complex water supply network to check for water leaks, deterioration of piping, pumps, water tanks / tower condition must be undertaken periodically by the autonomous body.

Autonomous body to maintain the sewage system from funds collected from water charge and to encourage community participation in & responsibility for cleaning up the common areas. Awareness campaign on use and maintenance of modern toilets, sanitation problem and related health issues of unhygienic conditions to be undertaken.

Autonomous body to maintain cleanliness of the facilities and to run cleanliness awareness campaign to increase awareness of users and community. Upkeep of site's landscaping trees / vegetative cover, and maintenance of site's drainage by getting rid of sand or rubbish that may be accumulated or blown on to the site, must also be done by the autonomous body.

(8) Activity Flow / Movement

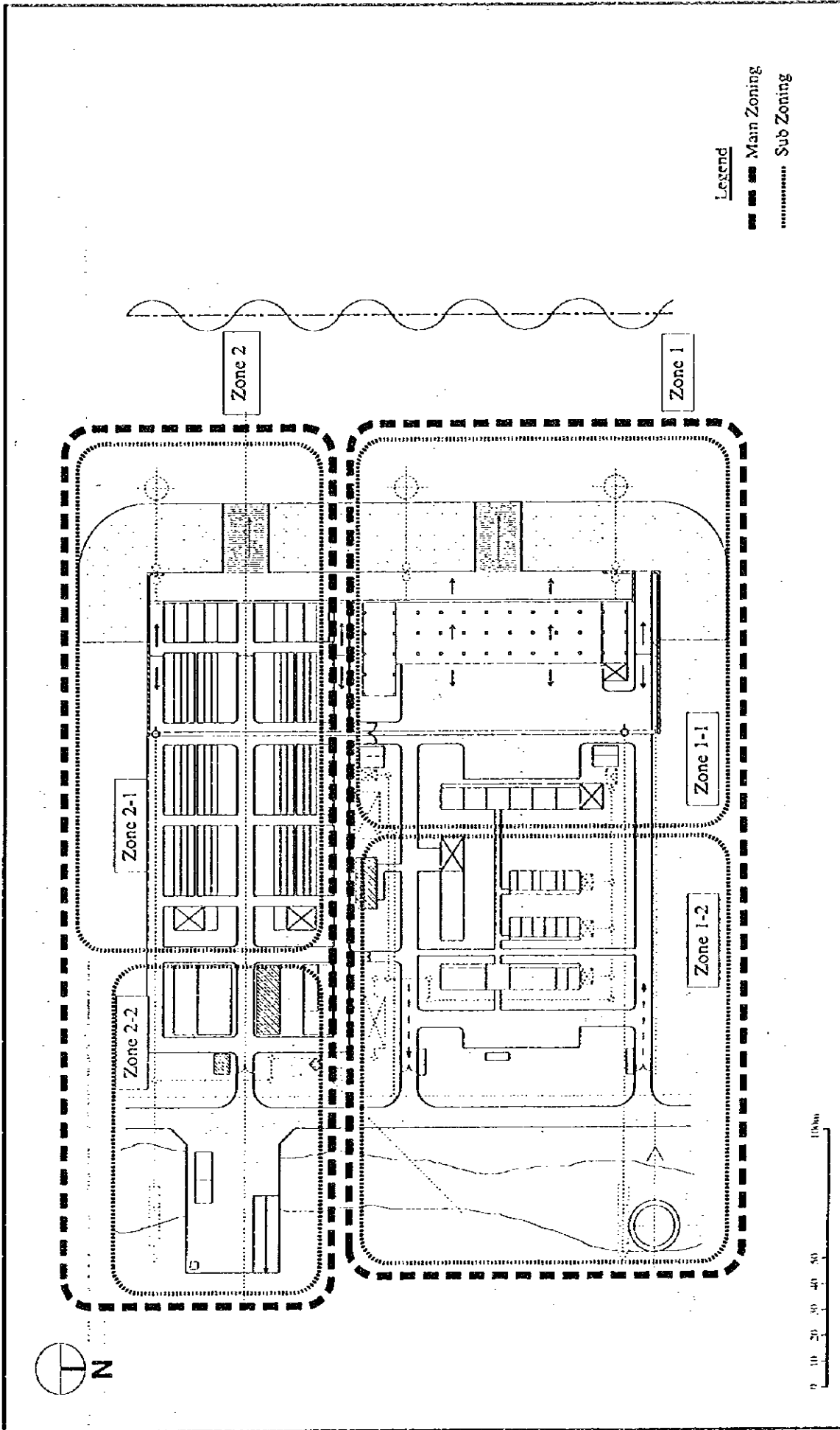
The facilities are designed bearing in mind safety, ease of operation, and the flow / activity pattern of material, people and traffic. To avoid accidents, whenever possible, people and vehicle traffic are separated.



SAINT LOUIS FISHERY COMPLEX LAYOUT PLAN

Fig. III.1.6-1 Layout Plan of Saint Louis Complex (Facilities Plan)

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



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 FOR NORTHERN FISHING AREAS
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Fig. III.1.6-2 Layout Plan of Saint Louis Complex (Zone Plan)

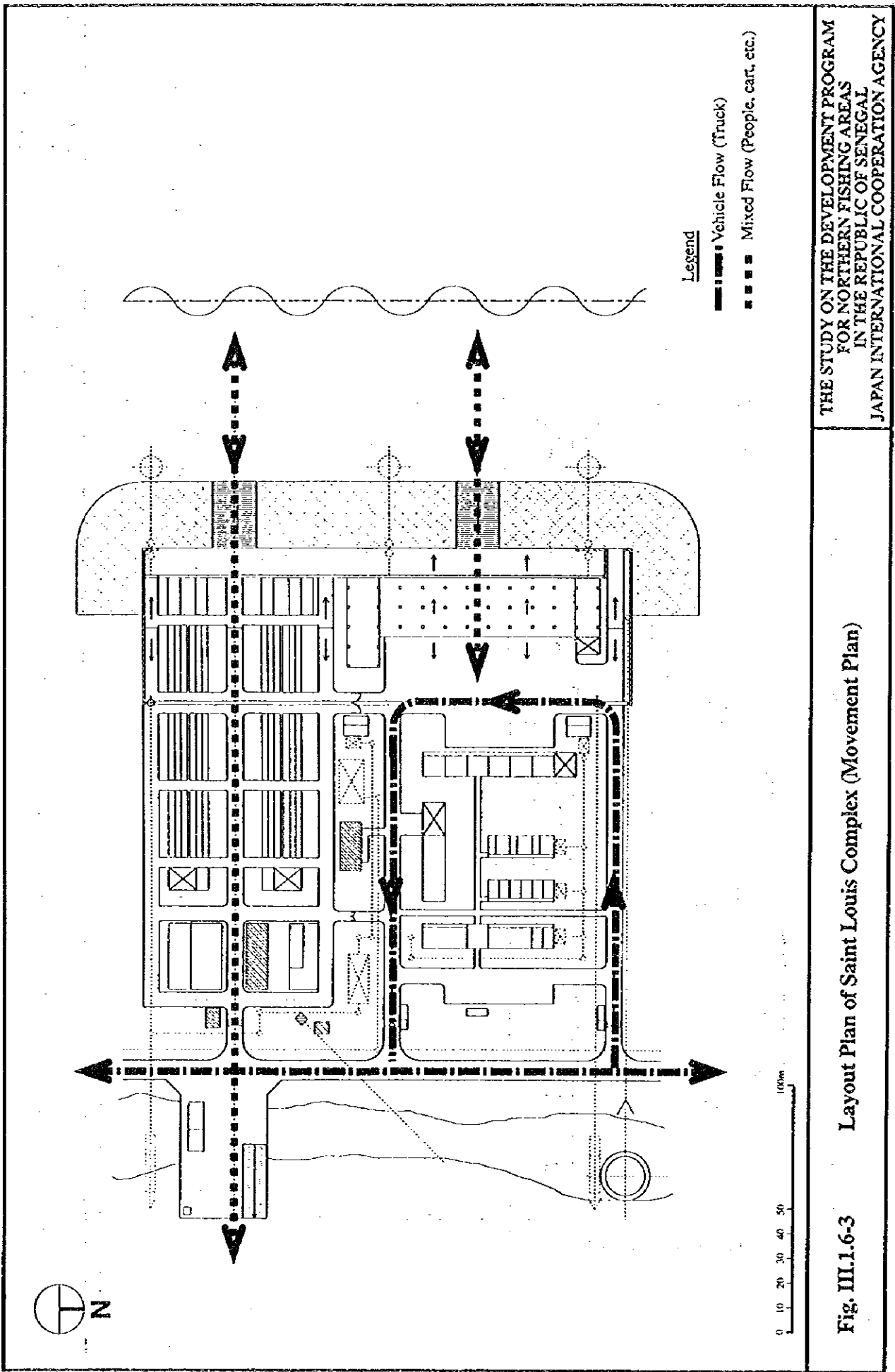
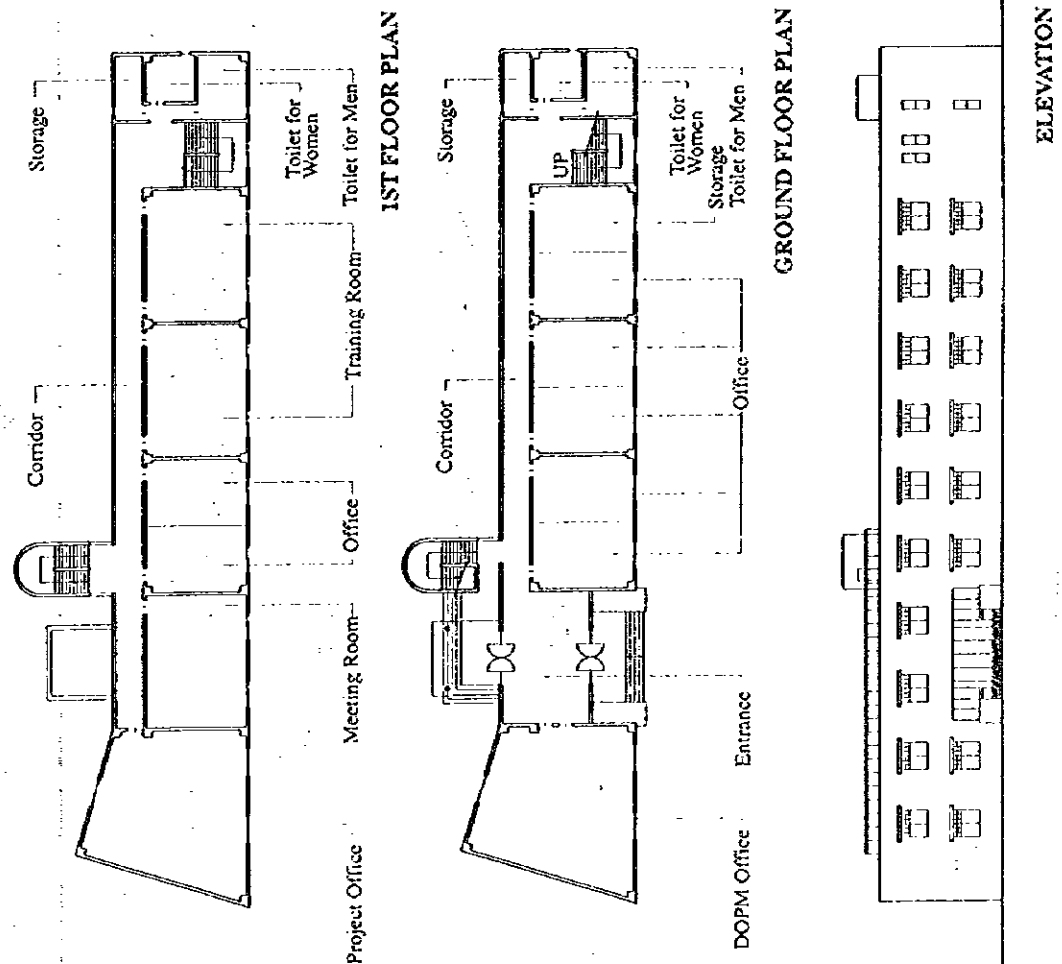


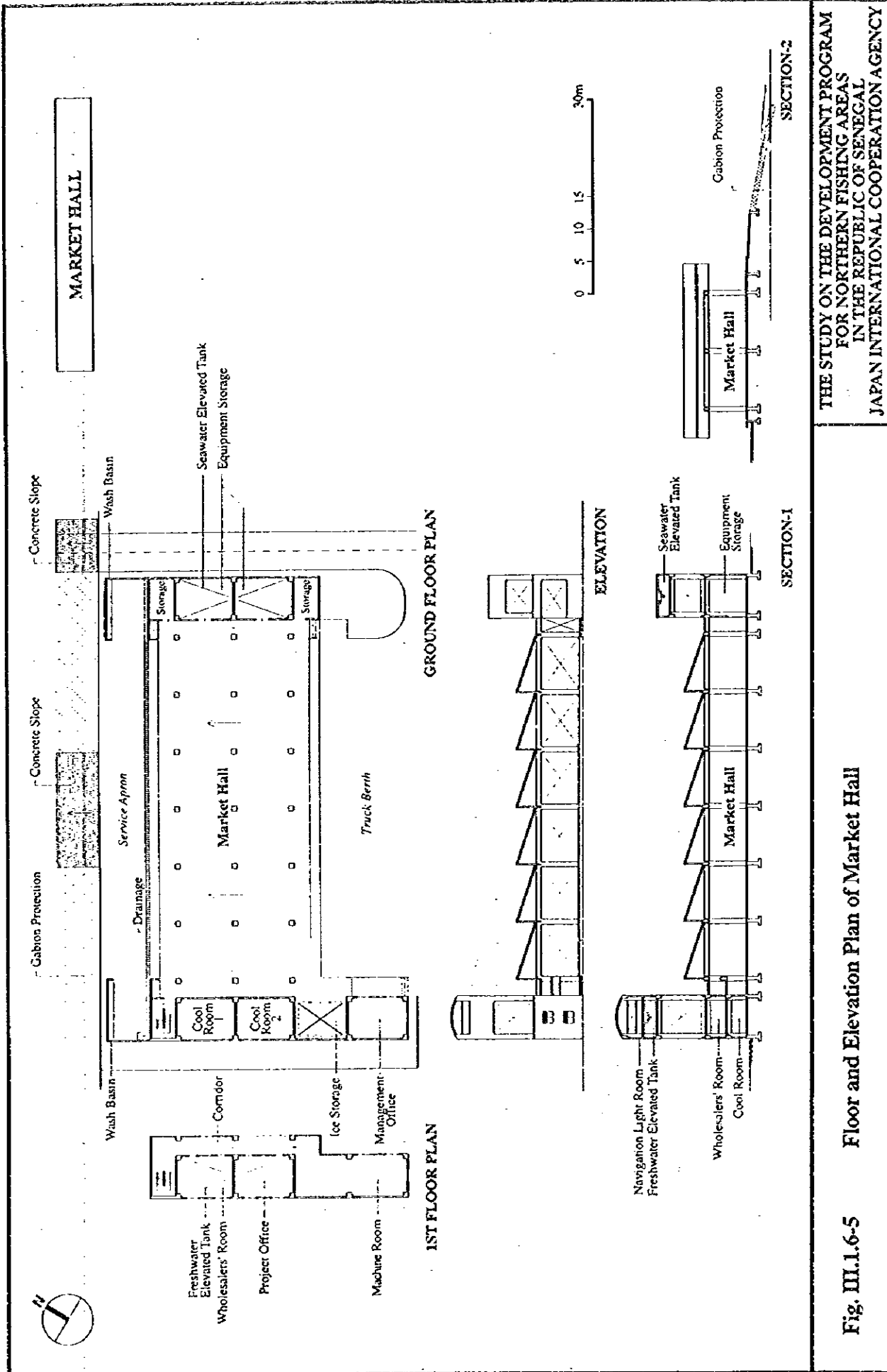
Fig. III.1.6-3 Layout Plan of Saint Louis Complex (Movement Plan)

ADMINISTRATION BUILDING



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IN THE REPUBLIC OF SENEGAL
JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. III.1.6-4 Floor and Elevation Plan of Administration Building



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FOR NORTHERN FISHING AREAS
IN THE REPUBLIC OF SENEGAL
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Fig. III.1.6-5 Floor and Elevation Plan of Market Hall

1.7 Project Cost

(1) Costing Methodology

The local official monthly unit construction prices were obtained from Ministry of Public Works and Transport, Public Works Division (Ministère de l'Équipement et des Transports Terrestres, Direction des Travaux Publics) for types of facilities / structures similar to the project. These prices were analysed and compared with prices obtained from Control Bureau and local architects.

The unit prices compiled from the above analysis were then adjusted taking into account the type of material / finishing, construction method, design philosophy / concept, period of construction, and type of contract / procurement method that are applicable to the project.

(2) Costing Assumptions

- 1) The unit prices are constant prices as of July 1997.
- 2) Yearly price escalation is assumed to be 3 percent.
- 3) Physical contingency is assumed to be 5 percent to cover design contingencies/ changes, facilities / equipment that may become necessary but inadvertently left out of original design, unexpected site conditions, etc.
- 4) The unit prices are all inclusive prices i.e. it is assumed to include the necessary mobilization, construction, workmanship, supply, installations, etc.
- 5) Prices of imported materials and equipment are assumed to be tax exempted and CIF Dakar.
- 6) Land preparation i.e. levelling, demolition of existing buildings, removal of obstructions, relocation of existing houses or businesses, are not included in the unit prices and are the responsibility of the government of Senegal.
- 7) The standard of construction is of the level of foreign assisted projects in Senegal with the appropriate project management structure.
- 8) The construction period for each phase of construction is assumed to be one year from the time of contract signing.
- 9) Consultancy fee is assumed to be 8 percent of project cost.
- 10) Bureau de Contrôle consultancy fee, if necessary, shall be the responsibility of the Senegalese Government.

(3) Calculation Output

- 1) Sub-sector facilities and equipments unit costs were calculated and totalled to get the total sub-sector cost.
- 2) A summary of the sub-sectors' facilities and equipment costs was compiled in a cost summary for the zones.
- 3) The total cost of the project was compiled by adding all sub-sectors total cost.

Table III.1.7-1 Estimated Cost of Facilities and Equipment (Zone 1) (1/6)

Facilities & Equipment		Zone 1 St.Louls	Zone 1 Cost (FCFA)
SPI-1	Navigation lights/sign, safety gear, office		
Facilities	• Search light located at Elevated Water Tank tower	2 unit	4,583,000
	• Navigation lights (Flashing beacon). Solar powered type located at Elevated Water Tank tower	2 unit	6,417,000
	• Safety signal flag & flag pole	2 unit	4,583,000
		30 sq.m	9,167,000
	<i>Sub-total Cost of Sub-Sector Facilities</i>		24,750,000
Equipment	Center Equipment		
	• Security boat, FRP with float	1 unit	9,167,000
	- Outboard Engine with spare parts & reserve unit		
	• Broad-casting equipment	1 unit	4,583,000
	• Life preserver equipment		
	- Life jacket	100 no.	5,500,000
	- Life saving float with rope	10 no.	
	PSPS Reinforcement		
	• Reinstall existing equipment in center	1 unit	2,292,000
	<i>Sub-total Cost of Sub-Sector Equipment</i>		21,542,000
	<i>Total Cost of Sub-Sector</i>		46,292,000
SPI-2	Model boat/gear		
Equipment	• Experimental Training Boat & gear	1 unit	137,500,000
	- FRP boat, Diesel inboard engine		
	- Experimental fishing gear		
	- Transfer boat, FRP		
	• Training Boat with gear	10 unit	110,000,000
	- Senegal type boat (inboard engine type)		
	- Fishing gear		
	- Eco-sounder, GPS, compass		
	• Training Equipment		
	- Fishing gear	100 unit	114,583,000
	- GPS, compass	10 unit	11,458,000
	- Diesel engine	10 unit	68,750,000
	- Radio communication equipment	10 unit	9,167,000
	<i>Total Cost of Sub-Sector</i>		451,458,000
SPI-3	Fishing Gear Storage		
Facilities	• Storage type 1 (each unit = 10 sq.m)	50 unit	137,500,000
		500 sq.m	
	• Storage type 2 (each unit = 5 sq.m)	100 unit	137,500,000
		500 sq.m	
	• Work Area, wash basin, pavement	1,000 sq.m	68,750,000
	<i>Sub-total of area =</i>	2,000 sq.m	
	<i>Total Cost of Sub-Sector</i>		343,750,000
SPI-4	Workshop & Equipment		
Facilities	• Workshop Building	1 unit	
	- Multipurpose yard	200 sq.m	13,750,000
	- Workshop	200 sq.m	55,000,000
	- Storage	50 sq.m	13,750,000
	- Office	50 sq.m	22,917,000
	<i>Sub-total of areas =</i>	500 sq.m	
	• Technical Service Shop	3 unit	27,500,000
	- Workshop & storage		
	• Fuel Service Station	1 unit	45,833,000
	- Diesel & Gasoline		
	<i>Sub-total Cost of Sub-Sector Facilities</i>		178,750,000
Equipment	• Workshop Equipment	1 unit	27,500,000
	- Engine maintenance tool		
	- Boat maintenance tool		
	- General maintenance tool		
	• Test Bench & tank	1 unit	2,292,000
	<i>Sub-total Cost of Sub-Sector Equipment</i>		29,792,000
	<i>Total Cost of Sub-Sector</i>		208,542,000

Table III.1.7-1 Estimated Cost of Facilities and Equipment (Zone 1) (2/6)

Facilities & Equipment		Zone 1 St.Louis	Zone 1 Cost (FCFA)
SP1-5	Ship-building yard		
Facilities	Building Yard with storage	1 unit	
	• Yard	800 sq.m	55,000,000
	• Storage	50 sq.m	13,750,000
	<i>Sub-total Cost of Sub-Sector Facilities</i>		68,750,000
Equipment	• Ship-building Equipment	1 unit	6,875,000
	<i>Sub-total Cost of Sub-Sector Equipment</i>		6,875,000
	<i>Total Cost of Sub-Sector</i>		75,625,000
SP1-6	Service Apron		
Facilities	• Concrete Paved Multipurpose Service space	1 unit	412,500,000
	- Paved area	3,000 sq.m	
	<i>Total Cost of Sub-Sector</i>		412,500,000
SP1-7	Service Facilities for Riverside		
Facilities	• RC jetty & slipway, with hoist	1 unit	183,333,000
	<i>Total Cost of Sub-Sector</i>		183,333,000
SP1-8	Research Post		
Facilities	• Research laboratory	1 unit	55,000,000
	<i>Sub-total Cost of Sub-Sector Facilities</i>		55,000,000
Equipment	• Research equipment	1 unit	18,333,000
	- Laboratory equipment		
	- Oceanographic Equipment		
	• Management & Statistics	1 unit	6,875,000
	- Computer		
	- Motorcycle, 175 cc x 2		
	<i>Sub-total Cost of Sub-Sector Equipment</i>		25,208,000
	<i>Total Cost of Sub-Sector</i>		80,208,000
SP1-9	Sanitation facilities / equipment related to production		
Facilities	• Unit 1 - Fishermen Gear Storage Area	1 unit	110,000,000
	- wash basin, toilet		
	• Unit 2 - Workshop Area	1 unit	36,667,000
	- wash basin, water reservoir, utility area		
	<i>Total Cost of Sub-Sector</i>		146,667,000
SP2-1	Market Hall, Truck Berth, & Office		
Facilities	Market Hall		
	• 1 cycle use of area (Nominal)	35 t/cycle	
	• Area	1,950 sq.m	893,750,000
	Truck Berth		229,167,000
	• Number of berthing truck	16 no.	
	• Number of waiting truck	8 no.	
	Cool Room (cool with ice), 1 ton/10 sq.m		
	• Stock Volume of Fresh Fish	15 ton	
	• Area	150 sq.m	68,750,000
	Office & Other Rooms		
	• Management office & Marketing room, Wholesaler's room	150 sq.m	82,500,000
	• Handling Equipment room	200 sq.m	55,000,000
	• Stairs & others	200 sq.m	55,000,000
	<i>Sub-total of Office & Other Rooms =</i>	<i>550 sq.m</i>	
	<i>Total Area of Market Hall, Office & Other Rooms =</i>	<i>2650 sq.m</i>	
	<i>Sub-total Cost of Sub-Sector Facilities</i>		1,384,167,000
Equipment	Fish Container Box		
	• Fish box, 50 kg/no.	1000 no.	25,208,000
	Handling Equipment		
	• Weight measuring tool, 2 wheel cart, etc.	10 no.	9,167,000
	• Administrative equipment - information board, communication, P/A, telephone, etc., Office furniture	1 unit	13,750,000
	• Maintenance Equipment	1 unit	4,583,000
	• Fish box washing tank and high pressure washer	1 unit	13,750,000
	<i>Sub-total Cost of Sub-Sector Equipment</i>		66,458,000
	<i>Total Cost of Sub-Sector</i>		1,450,625,000

Table III.1.7-1 Estimated Cost of Facilities and Equipment (Zone 1) (3/6)

Facilities & Equipment		Zone 1 St.Louis	Zone 1 Cost (FCFA)
SP2-2 Ice Plant & Cold Storage			
Facilities	• Ice Plant building • Ice making machine	400 sq.m 24 ton/day (8 ton x 3)	183,333,000 275,000,000
	• Ice storage	48 ton	
	<i>Sub-total Cost of Sub-Sector Facilities</i>		458,333,000
Equipment	• Sorting & handling equipment - FRP Pan, 5 nos., 100 l / 50 l - Insulated box, 50 l, 5 nos. - Normal container box, 10 nos. - 2 wheel cart, measuring tools - 2 nos. • Maintenance Equipment - tools, etc.	1 unit	3,438,000
	<i>Sub-total Cost of Sub-Sector Equipment</i>		458,000
	<i>Total Cost of Sub-Sector</i>		3,896,000
			462,229,000
SP2-3 Fish Collection Depot			
Facilities	• Fish collection Depot Building (100 sq.m x 2 units)	2 no. 200 sq.m	91,667,000 91,667,000
	<i>Sub-total Cost of Sub-Sector Facilities</i>		18,333,000
Equipment	• Washbasin, wooden shelf • FRP insulated box for temporary stock handling - 100 kg/no. (fish, ice) • Administrative equipment - handling tool, information board, tel, desk & chairs, measuring tool, etc. • Multipurpose truck (with collecting equipment) - 4 ton truck with spare parts.	2 unit 70 no. 2 unit 2 no.	25,208,000 6,875,000 36,667,000
	<i>Sub-total Cost of Sub-Sector Equipment</i>		87,083,000
	<i>Total Cost of Sub-Sector</i>		178,750,000
SP2-4 Storage for Processed Fish			
Facilities	• Storage	120 sq.m	34,375,000
	<i>Sub-total Cost of Sub-Sector Facilities</i>		34,375,000
Equipment	• Wooden shelf, palette	1 unit	9,167,000
	<i>Sub-total Cost of Sub-Sector Equipment</i>		9,167,000
	<i>Total Cost of Sub-Sector</i>		43,542,000
SP2-5 Sanitation facilities / equipment related to marketing			
Facilities	• Sanitation Unit - 1 - Wash basin, toilets, shower, etc.* same as SPI-9 • Sanitation Unit - 2 - Wastewater screen & semi-treatment system	2 unit 2 unit	220,000,000 137,500,000
	<i>Sub-total Cost of Sub-Sector Facilities</i>		357,500,000
Equipment	• Cleaning & Garbage collection equipment - Cleaning tools - Garbage collection bins, 10 nos - Garbage trailer, 1 no.	1 unit	1,375,000
	<i>Sub-total Cost of Sub-Sector Equipment</i>		1,375,000
	<i>Total Cost of Sub-Sector</i>		358,875,000
SP3-1 Model Artisanal Processing Area			
Equipment	• Processing improvement unit - available for rental & training	50 unit	45,833,000
	<i>Sub-total Cost of Sub-Sector Equipment</i>		45,833,000
	<i>Total Cost of Sub-Sector</i>		45,833,000
SP3-2 Export Promotion Services			
Facilities	• Sorting & Packing area • Management office	280 sq.m	128,333,000
	<i>Sub-total Cost of Sub-Sector Facilities</i>		128,333,000
Equipment	• Sorting & Packaging Equipment - Packing table, packing machine - 2 wheel cart, measuring tools - 2 nos. - Stainless sink, stainless table - Chest freezer, 500 l - 2 nos. • Administrative equipment	1 unit	16,042,000
			4,583,000

Table III.1.7-1 Estimated Cost of Facilities and Equipment (Zone I) (4/6)

Facilities & Equipment		Zone 1 St. Louis	Zone 1 Cost (FCFA)
- Information board, telephone, office furniture.			
<i>Sub-total Cost of Sub-Sector Equipment</i>			20,625,000
<i>Total Cost of Sub-Sector</i>			148,958,000
SP3-3	Quality Control Laboratory & Equipment		
Facilities	• Quality Inspection facilities	80 sq.m	55,000,000
	- Inspection room, test & maintenance room, storage, office		
	• Laboratory Equipment	1 unit	13,750,000
	- Quality test equipment, control & study equipment, filing equipment, office furniture		
<i>Total Cost of Sub-Sector</i>			68,750,000
SP3-4	Sanitation facilities / equipment related to processing		
Equipment	• Garbage collection & cleaning support equipment	1 unit	917,000
	- Garbage collection bins (10 nos), cleaning tools, trailer for garbage bins (2 nos)		
<i>Sub-total Cost of Sub-Sector Equipment</i>			917,000
<i>Total Cost of Sub-Sector</i>			917,000
SP4-1	Facilities / equipment for Retail Market		
Rehabilitation / Extension of the Retail Market			
Facilities	• Rehabilitation of the fish market section (sanitation, table)	1 unit	22,917,000
<i>Sub-total Cost of Sub-Sector Facilities</i>			22,917,000
Equipment	Market activities supporting equipment	1 unit	4,583,000
<i>Sub-total Cost of Sub-Sector Equipment</i>			4,583,000
<i>Total Cost of Sub-Sector</i>			27,500,000
SP4-2	Basic infrastructure/services For Community		
Facilities	Extension of the existing primary school		
	• Construction of class room	2 no.	45,833,000
	• Support of Sport Field (football, basketball)	1 unit	9,167,000
Equipment	Equipment for Primary School & sport support		
	• Black board, desk & chair, locker, etc. for class room	for 2 class room unit	4,583,000
Facilities	Rehabilitation of the existing health post		
	• Rehabilitation of the building & M&E works	1 unit	4,583,000
Equipment	Equipment for health post related		
	• Health post equipment & movable equipment for public health training	1 unit	4,583,000
Facilities	Sanitation Support Facilities	1 unit	
	• Toilet unit, *same as SP1-9		91,667,000
	• Treatment system & garbage collection area		4,583,000
Equipment	• Sanitation Support Equipment	1 unit	917,000
	- Cleaning equipment		
	- Garbage collection equipment (hand cart, garbage collection bins, etc.		
<i>Sub-total Cost of Sub-Sector Facilities</i>			155,833,000
<i>Sub-total Cost of Sub-Sector Equipment</i>			10,083,000
<i>Total Cost of Sub-Sector</i>			165,917,000
	For Complex For St. Louis		
Facilities	• Water connection to the municipal water mains	1 unit	
	• Rehabilitation & construction of the service road	2 km	229,167,000
	- St. Louis, approx. 2 km		
	- Kayar, approx. 2 km (0.5 km + 1.5 km)		
<i>Sub-total Cost of Sub-Sector Facilities</i>			229,167,000
Equipment	• Garbage Collection System support	4 unit	4,583,000
	- Garbage collection area, equipment		
	• Drainage System Support Equipment	4 unit	3,667,000
	- Hume pipe, L = 7 m, excavation tools, etc.		
<i>Sub-total Cost of Sub-Sector Equipment</i>			8,250,000
<i>Total Cost of Sub-Sector</i>			237,417,000

Table III.1.7-1 Estimated Cost of Facilities and Equipment (Zone 1) (5/6)

Facilities & Equipment		Zone 1 St.Louis	Zone 1 Cost (FCFA)
SP5 General Education & Training Facilities & Equipment			
Facilities	OJT Training Center		
	• OJT Training Facility Floor area - office, storage, training room, etc	150 sq.m	68,750,000
	• Demonstration Processing area	150 sq.m	41,250,000
	<i>Sub-total of area = 300 sq.m</i>		
	<i>Sub-total Cost of Sub-Sector Facilities</i>		110,000,000
Equipment	• OJT Training Equipment	1 unit	11,458,000
	- General equipment : OHP, black board, chair, table, video set - OJT Training Equipment : security, boat engine, fishing gear, sanitation, processing, etc.		
	• Demonstration Processing Equipment; processing, handling & packing equipment	1 unit	6,875,000
	<i>Sub-total Cost of Sub-Sector Equipment</i>		18,333,000
Facilities	Dormitory		
	• Operation Staff Dormitory - 1 : (8 x 6 = 48 sq.m)	3 unit	48,125,000
	• Trainee Dormitory - 2 : (8 x 4.5 = 36 sq.m)	5 unit	57,292,000
	• Sanitation Unit (toilet/shower/utility)	1 unit	13,750,000
	<i>Sub-total Cost of Sub-Sector Facilities</i>		119,167,000
Equipment	• Service / Maintenance Equipment	1 unit	917,000
	<i>Sub-total Cost of Sub-Sector Equipment</i>		917,000
	<i>Total Cost of Sub-Sector</i>		248,417,000
SP6 Administration & monitoring equipment			
Facilities	• Administration / Monitoring Facilities	750 sq.m	343,750,000
	- Management office (with storage), GIE groups' office, Credit office, Storage, DOPM / CRODT / PSPS / Others		
	<i>Sub-total Cost of Sub-Sector Facilities</i>		343,750,000
Equipment	• Administrative Equipment	1 unit	13,750,000
	- Statistics & Monitoring equipment: computer, O / A equipment: copy, etc., Office furniture		
	Activities Support Equipment		
	• Pick up truck:4 WD double cab, 1.5 ton	2 no.	16,042,000
	• Truck:3.5 ton		
	• Motor cycle	4 no.	6,417,000
	• Bicycle	4 no.	550,000
	<i>Sub-total Cost of Sub-Sector Equipment</i>		36,758,000
Facilities	• Canteen	250 sq.m	82,500,000
	- Kitchen, storage, hall, utility		
	<i>Sub-total Cost of Sub-Sector Facilities</i>		82,500,000
Equipment	• Canteen Equipment	1 unit	13,750,000
	- Chest freezer, kitchen ware, table / chair, maintenance / cleaning equipment		
	<i>Sub-total Cost of Sub-Sector Equipment</i>		13,750,000
	<i>Total Cost of Sub-Sector</i>		476,758,000
SP7 Miscellaneous Support Facilities & Equipment			
Facilities	• Fresh Water Supply System for the facilities of the Complex	1 unit	229,167,000
	- Water reservoir, elevated water tank, supply system		
	• Well water supply system for the Market Hall & Fishermen's Storage area	1 unit	114,583,000
	- Well, Elevated water tank, supply system		
	• Transformer & Electricity Distribution facilities	1 unit	45,833,000
	• Sanitary & Waste Water Treatment system	1 unit	137,500,000
	• External Work	1 unit	183,333,000
	- Land reclamation, external pavement, ditch, pits, external lighting, landscaping, others		
	<i>Sub-total Cost of Sub-Sector Facilities</i>		710,417,000
Equipment	• Fire-Fighting System	1 unit	6,875,000
	• Lightning protection	1 unit	13,750,000
	• First Aid	1 unit	1,375,000
	<i>Sub-total Cost of Sub-Sector Equipment</i>		22,000,000
	<i>Total Cost of Sub-Sector</i>		732,417,000

Table III.1.7-1 Estimated Cost of Facilities and Equipment (Zone 1) (6/6)

Facilities & Equipment	Zone 1 St.Louis	Zone 1 Cost (FCFA)
Total Cost of All Sector's Facilities		5,710,376,000
Total Cost of All Sector's Equipment		884,903,000
Grand Total Cost of All Sector (Facil + Equipment)		6,595,279,000
Consultancy Fee (8%)		527,622,320
Physical Contingencies (5%)		329,763,950
Price Escalation (3%) for construction to start 1998		197,858,370
Total Cost of Project		7,650,524,000

1.8 Project Evaluation

1.8.1 Economic Evaluation

The objective of the economic analysis is to study and appraise the economic feasibility of the Saint Louis project in the target year (2010) from the view point of national economy. The purpose of this analysis is to investigate economic benefits and costs that will arise from this project. An economic internal rate of return (EIRR) based on a cost-benefit analysis is used to appraise the feasibility of the project by comparing the case with the project and without the project implementation. The following assumptions have been considered for the Saint Louis Project.

	With Project	Without Project
Time cost saving		
1) Landing & marketing	Organized landing at the complex and collection depot	Scattered landings along 3 km beach and disorganized
2) Collection of fish by wholesalers	<ol style="list-style-type: none"> 1) Organized collection of fish under one roof 2) Reduce duration in collection and transfer of fish truck and proper storage facilities available 	<ol style="list-style-type: none"> 1) Scattered collections by collectors and wholesalers 2) Long duration in collection of fish under open sun and transfer and storage without proper facilities
3) Truck trip saving (for high price fish - HPF, based on order of fish export companies in Dakar)	<ol style="list-style-type: none"> 1) Organized collection of fish enable wholesalers to store the fish using the adequate ice and cool storage provided in the project. 3) A truck of 2 to 2.5 tons can get supplied in one day. 	<ol style="list-style-type: none"> 1) Fishermen may not be able to fulfill the ordered quantity ordered y fish traders as there are no adequate storage facilities. 2) A truck of 2 to 2,5 tons cannot get supplied in one day. 3) The truck has to make another trip the next day to get the remainder of the ordered supply.
4) Reduction in quality loss (HPF)	1) With concentrated and organized landing and collection at the complex and the collection depots, and with the adequate facilities and training provided, about 50% of quality loss can be reduced.	<ol style="list-style-type: none"> 1) Landed fish (sorted by species but mixed size) with little ice are transferred to scattered collection points. 2) Collection points are back alleys, road sides, etc. and are usually open and dirty, where the fish are again sorted, iced and packed to transport. 3) Under the above circumstances fish quality is reduced, and the acceptable quantity for export is reduced. About 7% of the quantity taken to Dakar are not accepted for export.
5) Reduction of processed fish loss during storage	1) With the proper storage facilities provided in the project the 5% loss can be saved.	<ol style="list-style-type: none"> 1) As there are no proper storage facilities for processed fish, the product is stored in open spaces and exposed to rain and sand, and vermin, etc. 2) Under the above conditions, the processors lose about 5% of their products prior to marketing.

Investment fund

It is assumed that the project cost is funded by the government.

Physical life of the project

The physical life of the project components is shown in Table III.1.8-3.

Prices and foreign exchange rate

All costs and benefits are based on constant price of 1997. Foreign exchange rates of 550 CFA to a US dollar and Japanese Yen 120 to a US dollar are used.

Income tax

Income tax is assumed to be not levied against revenues.

(1) Project Economic Cost

The investment (financial) costs of the Saint Louis Project and its detail components are shown in Table III.1.8-3. The financial cost of the project is converted to economic cost by applying the economic conversion factor of 0.75 provided by the regional world bank office. Transfer costs within the national economy, such as interest, insurance and tax are excluded from the economic cost. The financial and economic cost are shown in Table III.1.8-1. The operational cost that includes personnel, utility, repair and maintenance and administration cost are shown in Table III.1.8-2.

(2) Economic Benefits

Time cost saving : Savings in opportunity costs due to reduction in number of truck trips

Collection of sufficient quantity of high price fish takes long duration in terms of days. Fish exporting firms in Dakar function on orders from consumption markets in Europe and availability of space in cargo planes. In order to meet a deadline, these firms have regular collectors and wholesalers in the production area to supply a certain quantity of fish by a certain time, and these orders are given to fishermen. Under the existing conditions (or without the project), if the wholesalers are not able to supply the required quantity on the day the truck arrives, the truck will leave with the available quantity and will make another trip the next day. A collection of two to three tons of fish may take one or more days. In other words, the truck sent from Dakar has to travel back with the inadequate quantity, and make another trip the next day for the rest of the fish. If the project is implemented, there will be adequate facilities for organized landings and collection, and storage facilities that will enable the wholesalers to instruct fishermen to go fishing without having to wait for orders

from Dakar and fulfill the immediate order from Dakar. The truck from Dakar would be able to pick up sufficient quantity in one trip, and thus save one truck trip.

The estimated volume of high price fish in the year 2010 is about 8,316 tons. Without the project, it would take about 5,544 trips a year (truck carrying 1.5 tons per trip); with the project, the number of truck trips is about 2,772 (trucks carrying 3 tons per trip). In monetary terms, the savings would be FCFA 221.6 million (one round trip between Dakar and Saint Louis is about 80,000 CFA) in 2010 and it was about FCFA 160.9 million in 1995.

The number of truck trips saved also saves the fuel consumption. A round trip of a truck between Saint Louis and Dakar consumes about 70 to 80 liters of diesel. With the 2,772 trips saved in 2010, an estimated total of 221,600 liters of fuel could be saved. In monetary terms, the fuel savings (at 200 FCFA/liter) would be FCFA 44.320 million in 2010 and FCFA 32.192 million in 1995.

Reduction in quality loss of high price fish

Wholesalers and collectors keep their purchased high price fish in boxes at collection points that are located in open sheds or at home with no proper facilities and wait for the trucks from Dakar and the accumulation of a sufficient quantity. Sometimes the waiting can be two to three days; during this time there is quality loss which is estimated to be about five percent. When the fish is delivered at the fish processing factories in Dakar, another two percent were observed to be unacceptable for export. Therefore, about 7 percent of quality loss in high price fish was noticed without the project. In the case of with the project, there will be a training program for wholesalers on fish handling, and also adequate storage facilities will be available for use by wholesalers; and quality loss is expected to be reduced to about 50 percent.

The estimated volume of high price fish in the year 2010 is about 8,316 tons; of which about 3,742 (50%) are expected to be exported. Without the project, quality loss of about 262 tons are anticipated to be unacceptable for export; and about 131 tons could be saved for export with the project. In monetary terms, it will be about FCFA 196.5 million in 2010 and it was about FCFA 142.5 million in 1995.

Increased fish catch

The volume of fish landed in 1995 was 37,952 tons and it is projected to increase to about 39,238 tons in 2010 with limited fisheries resources in the Senegalese coastal waters and without any modernized fishing. With the introduction of modernized fishing and training, and fishing further from the existing fishing grounds, the fish landing is projected to increase by about 1,862 tons, amounting to a total landing of 41,100 tons in 2010. In view of an increased population and decrease in the per capita consumption, an increase of 1,862 tons could contribute to the fish

consumption supply and source of protein. In monetary terms it is estimated to be about FCFA 752 million.

Reduction in storage loss of processed fish

Approximately about 6,109 tons (16%) of total fish landed in Saint Louis were processed. These processed product are stored in open space without shelters and storage facilities; and thus exposed to rain, sand and vermin till the marketing. Under these conditions, a loss of 5 to 10 percent is anticipated. In 2010, about 8,418 tons are estimated to be processed; without the project, a loss of about 402 tons to 842 tons are anticipated. If the project is implemented, there will be adequate storage facilities for use by the processors, and these losses can be avoided. In monetary terms (at FCFA 85/kg of fish), the savings would be FCFA 35.7 million in 2010 and FCFA 25.93 million in 1995)

Other benefits

The other benefits listed below cannot be quantified, and calculation is not attempted in this study.

- Improved safety in the landing
- Saving of lives through safety facilities
- Timely and better quality repair through workshop and availability of spareparts
- Resource management will maintain sustainable production of fish
- Development of related industries

(3) Results of the Economic Evaluation

The EIRR of the total project shows 7 percent 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 sectors by targeting only the two highest revenue generating sectors, which showed a value of 18 percent for improving fish production and 10 percent for fish marketing and distribution, the profitability of the project will be significantly improved, but it will not be viable as a public or privately financed project.

Although the economic internal rate of return 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 assistance.

1.8.2 Financial Evaluation

The objective of this evaluation is to study and appraise the financial feasibility of the Saint Louis project in the target year (2010). The profitability of the projects is analyzed using the financial rate of return (FIRR). The FIRR is a discount rate that makes net present value of cash flow (revenue - costs) during the project life equal to be zero. The following conditions are assumed for the calculation.

Investment fund

It is assumed that the project cost is funded by the government.

Physical life of the project

The physical life of the project components is shown in Table III.1.8-3.

Prices and foreign exchange rate

All costs and benefits are based on constant price of 1997. Foreign exchange rates of 550 CFA to a US dollar and Japanese Yen 120 to a US dollar are used.

(1) Project Financial Cost

Investment cost

The investment costs of the Saint Louis Project and its detail components are shown in Table III.1.8-3.

Operation cost

The annual operation costs are assumed as follows and the detail are shown in Table III.1.8-2. The annual personnel cost are estimated based on the organization proposed for the both the projects. Personnel cost and the number of staff members are shown in Table III.1.8-5. The utility cost covers mainly for electricity and water, and most of the utility cost is accrued in the operation of market hall, ice making and cool storage of the sector 2. The annual repair and maintenance costs are assumed from 1 percent to 5 percent depending on the facilities and equipment of the investment cost. The administration cost is assumed to be 20 percent of the personnel cost.

The annual depreciation costs of the facilities and equipment (Table III.1.8-3) are calculated by the straight line method on the depreciation lives. Generally the depreciation lives of 20 years for buildings and structures, and from 5 to 10 years for equipment.

(2) Revenue of the Project

The revenue generated in the project is shown in Table III.1.8-5; some of the revenues are estimated based on the present users charges in Joal Fisheries Center and Dakar Central Fish Market, and for those where there no available case of charges, the users charge is based on rental use. The rental use is calculated based on the depreciation and maintenance cost of the facilities and equipment. The revenue will arise from the following items. The total revenue accrued in the first year is about FCFA 615 million; of which FCFA 336 million (55%) is from sector 2 and FCFA 251 million (41%) is from sector 1.

- 1) Annual registration fee of wholesalers using the complex
- 2) Daily user charges for wholesalers
- 3) Entrance charge for fish trucks
- 4) Sales and crushing of ice
- 5) Rental of cool storage
- 6) Rental of processed fish storage
- 7) Rental of fish box
- 8) Rental of wholesaler rooms
- 9) Rental of fishing gear storage
- 10) Rental of boatyard and workshop

(3) Results of the Financial Evaluation

The income statement and the cash flow of the total Saint Louis Project and its revenue earning sectors are shown in Tables III.1.8-6 and III.1.8-7. In both cases the operational expense can be recovered before depreciation. The income after depreciation borders on the red throughout the project life when all the components are considered. However, in case of revenue earning components, the income after depreciation is in the black from the 7th year.

The FIRR indicated a minus 15 percent when all sectors are considered and a minus 8 percent also for the three main revenue earning sectors. Even when 20 percent of the investment cost was scaled down, the FIRR was a minus. However, if it is scaled down 80 percent assuming the project is financed under grant aid, the FIRR is 9 percent for the project and 20 percent for the combined three revenue earning sectors. Under these circumstances, the scope of the facilities and equipment has to be taken into consideration if the scope of the project is reduced.

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.

A financial analysis of the ice plant (Table III.1.8-8), which is one of the major sources of revenue, shows a profit of FCFA 38 million after depreciation in the first year.

1.8.3 Other Benefits

Other benefits that are anticipated as indirect benefits or intangible benefits that are not accounted for in the economic or financial analysis are summarized below:

(1) Relocation to Hydrobase

The development of the complex will have an indirect impact on the existing living environment of Guet Ndar as the complex will encourage the migration of people to the new village at Hydrobase thus reducing the congestion at Guet Ndar. This will have an impact on an improved living environment leading to better health and living conditions.

(2) Reduced Risk of Epidemic and Diseases

The activities of the complex's sorting, storage, marketing, processing and distribution in a more sanitary and clean environment will improve the quality and cleanliness of the fisheries product which will subsequently:

- Reduce the cost of health care of the workers and consumers
- Reduce the risk of epidemic and the spread of diseases due to dirty / unhygienic environment and fisheries product
- Reduce the time lost due to sick workers and consumers
- Produce more a hygienic product and increase value added processed fisheries products

(3) Increase in Tourism Income

The potential for tourism in the area will increase as a consequence of improved sanitation and environment. With the elimination of the bad odor, flies and unsightly / unsanitary conditions in the fishing community, tourism activities can be promoted and this could lead to more hotels being built and related job opportunities increase.

(4) Spin-off Economic Activities

Increased economic activities in the area due to the complex and new village development will encourage spin-off activities such as restaurants, transport services, hotels, sundry stores, etc. These spin-off activities will create more job opportunities and improve job security for the inhabitants.

(5) Increased Enrollment Rate of Primary School Students

An improved of awareness community members on the importance of primary education and expansion of the primary school will contribute to an increase in the primary school enrollment rate in the fishing communities.

Table III.1.8-1 Financial and Economic Cost of Saint Louis Project

		Unit : 1000 FCFA	
	Facilities & Equipment	Financial Cost	Economic Cost
SP1-1	Navigation lights/sign, safety gear, office	46,292	34,719
SP1-2	Model boat/gear	451,458	338,594
SP1-3	Fishing Gear Storage	343,750	257,813
SP1-4	Workshop & Equipment	208,542	156,407
SP1-5	Ship-building yard	75,625	56,719
SP1-6	Service Apron	412,500	309,375
SP1-7	Service Facilities for Riverside	183,333	137,500
SP1-8	Research Post	80,208	60,156
SP1-9	Sanitation facilities / equipment related to production	146,667	110,000
SP2-1	Market Hall, Truck Berth, & Office	1,450,625	1,087,969
SP2-2	Ice Plant & Cold Storage	462,229	346,672
SP2-3	Fish Collection Depot	178,750	134,063
SP2-4	Storage for Processed Fish	43,542	32,657
SP2-5	Sanitation facilities / equipment related to marketing	358,875	269,156
SP3-1	Model Artisanal Processing Area	45,833	34,375
SP3-2	Export Promotion Services	148,958	111,719
SP3-3	Quality Control Laboratory & Equipment	68,750	51,563
SP3-4	Sanitation facilities / equipment related to processing	917	688
SP4-1	Facilities / equipment for Retail Market	27,500	20,625
SP4-2	Basic infrastructure/services		
	For Community	165,917	124,438
	For Complex	237,417	178,063
SP5	General Education & Training Facilities & Equipment	248,417	186,313
SP6	Administration & monitoring equipment	476,758	357,569
SP7	Miscellaneous Support Facilities & Equipment	732,417	549,313
	Cost of Project	6,595,280	4,946,460
	Consultancy Fee (8%)	527,622	395,717
	Physical Contingencies (5%)	329,764	247,323
	Price Escalation (3%) for construction to start 1998	197,858	148,394
	Re-Mobilization cost (5%) for 2 phase construction	-	-
	Total Cost of Project (FCFA)	7,650,525	5,737,894

Remarks 1) Constant price of 1997
 2) Conversion factor of 0.75 is used for economic cost.

Table III.1.8-2 Annual Operation Cost of Saint Louis Project

	Unit 1000 FCFA		
	Saint Louis		Total
	1999	2000	
Maintenance			
Sector 1	6,142	24,182	30,323
Sector 2	26,389	3,529	29,918
Sector 3	688	3,323	4,010
Sector 4	2,704	2,419	5,123
Sector 5	-	3,256	3,256
Sector 6	4,540	1,238	5,778
Miscell. facilities & equipment	7,764	-	7,764
Sub-total	48,226	37,947	86,173
Salary			
Director (General Manager)	-	4,200	4,200
Sector -1 (Division 1) Fish Res & Prod	-	10,200	10,200
Sector -2 (Division 2) Fish Marketing	-	13,800	13,800
Sector -3 (Division 3) Fish Proc&Quality	-	10,200	10,200
Sectors 4,5,&6 (Division 4) Admin?Finan.	-	17,760	17,760
Sub-total	-	56,160	56,160
Administrative/Managment cost (20%)	-	11,232	11,232
Utility			
Electricity	-	59,197	59,197
Water	-	25,000	25,000
Sub-total	-	84,197	84,197
Depreciation			
Sector 1	24,567	82,818	107,384
Sector 2	94,898	9,472	104,370
Sector 3	2,750	11,840	14,590
Sector 4	9,717	8,128	17,844
Sector 5	-	10,450	10,450
Sector 6	21,102	4,675	25,777
Miscell. facilities & equipment	32,817	-	32,817
Sub-total	185,850	127,383	313,233
TOTAL	234,076	316,919	550,995

Remarks : Administrative and managment cost estimate at 20 percent of salary.

Table III.1.8-3 Project Cost and Physical Life by Components of Saint Louis Project

Facilities & Equipment		Life	Saint Louis Zone 1 Total cost	1999		2000		1999 (Phase 1a)		2000 (Phase 1b)	
				Phase 1a Investment Cost	Phase 1b	Phase 1a	Phase 1b	Depreciation	Maintenance	Depreciation	Maintenance
SECTOR - 1											
SP1-1 Navigation lights/sign, safety gear, office											
Facilities		25	24,750,000	-	-	24,750,000	-	-	-	990,000	247,500
Equipment		10	21,541,667	-	-	21,541,667	-	-	-	2,154,167	646,250
Total Cost of Sub-Sector			46,291,667	-	-	46,291,667	-	-	-	3,144,167	893,750
SP1-2 Model boat gear											
Equipment		10	451,458,333	-	-	451,458,333	-	-	-	45,145,833	13,543,750
SP1-3 Fishing Gear Storage											
Facilities		25	343,750,000	-	-	343,750,000	-	-	-	13,750,000	3,437,500
SP1-4 Workshop & Equipment											
Facilities		25	178,750,000	-	-	178,750,000	-	-	-	7,150,000	1,787,500
Equipment		15	29,791,667	-	-	29,791,667	-	-	-	1,986,111	1,439,583
Total Cost of Sub-Sector			208,541,667	-	-	208,541,667	-	-	-	9,136,111	3,227,083
SP1-5 Boat-building yard											
Facilities		25	68,750,000	-	-	68,750,000	-	-	-	2,750,000	687,500
Equipment		15	6,875,000	-	-	6,875,000	-	-	-	458,333	343,750
Total Cost of Sub-Sector			75,625,000	-	-	75,625,000	-	-	-	3,208,333	1,031,250
SP1-6 Service Apron											
Facilities		25	412,500,000	412,500,000	-	-	16,500,000	4,125,000	-	-	-
SP1-7 Service Facilities for Riverside											
Facilities		25	183,333,333	-	-	183,333,333	-	-	-	7,333,333	1,833,333
SP1-8 Research Post											
Facilities		25	55,000,000	55,000,000	-	-	2,200,000	550,000	-	-	-
Equipment		5	25,268,333	-	-	5,500,000	-	-	-	1,100,000	165,000
Total Cost of Sub-Sector			80,268,333	55,000,000	-	-	2,200,000	550,000	-	1,100,000	165,000
SP1-9 Sanitation facilities/equip.											
Facilities		25	146,666,667	146,666,667	-	-	5,866,667	1,466,667	-	-	-
Total Cost of Sub-Sector			146,666,667	146,666,667	-	-	5,866,667	1,466,667	-	-	-
TOTAL OF SECTOR - 1											
Facilities			1,413,500,000	614,166,667	799,333,333	24,566,667	6,141,667	31,973,333	7,993,333		
Equipment			534,875,000	-	515,166,667	-	-	50,844,444	16,188,333		
Total			1,948,375,000	614,166,667	1,314,500,000	24,566,667	6,141,667	82,817,778	24,181,667		
SECTOR - 2											
SP2-1 Market Hall, Tack Berth, & Office											
Facilities		25	1,384,166,667	1,384,166,667	-	-	55,366,667	13,841,667	-	-	-
Equipment		15	66,458,333	66,458,333	-	-	4,430,556	3,322,917	-	-	-
Total Cost of Sub-Sector			1,450,625,000	1,450,625,000	-	-	59,797,222	17,164,583	-	-	-
SP2-2 Ice Plant & Cold Storage											
Facilities		25	458,333,333	458,333,333	-	-	18,333,333	4,583,333	-	-	-
Equipment		10	3,895,833	3,895,833	-	-	389,583	194,792	-	-	-
Total Cost of Sub-Sector			462,229,167	462,229,167	-	-	18,722,917	4,778,125	-	-	-
SP2-3 Fish Collection Depot											
Facilities		25	91,666,667	-	91,666,667	-	-	-	-	3,666,667	916,667
Equipment		15	87,683,333	-	87,683,333	-	-	-	-	5,865,556	2,612,500
Total Cost of Sub-Sector			178,750,000	-	178,750,000	-	-	-	-	9,472,222	3,529,167
SP2-4 Storage for Processed Fish											
Facilities		25	34,375,000	34,375,000	-	-	1,375,000	343,750	-	-	-
Equipment		15	9,166,667	9,166,667	-	-	611,111	458,333	-	-	-
Total Cost of Sub-Sector			43,541,667	43,541,667	-	-	1,986,111	802,083	-	-	-
SP2-5 Sanitation facilities /equipment											
Facilities		25	357,500,000	357,500,000	-	-	14,300,000	3,575,000	-	-	-
Equipment		15	1,375,000	1,375,000	-	-	91,667	68,750	-	-	-
Total Cost of Sub-Sector			358,875,000	358,875,000	-	-	14,391,667	3,643,750	-	-	-
TOTAL OF SECTOR - 2											
Facilities			2,326,041,667	2,234,375,000	91,666,667	89,375,000	22,343,750	3,666,667	916,667		
Equipment			167,979,167	80,895,833	87,083,333	5,522,917	4,044,292	5,865,556	2,612,500		
Total			2,494,020,833	2,315,270,833	178,750,000	94,897,917	26,388,042	9,472,222	3,529,167		
SECTOR - 3											
SP3-1 Model Artisanal Processing Area											
Facilities		25	-	-	-	-	-	-	-	-	-
Equipment		10	45,833,333	-	45,833,333	-	-	-	-	4,583,333	1,375,000
Total Cost of Sub-Sector			45,833,333	-	45,833,333	-	-	-	-	4,583,333	1,375,000
SP3-2 Export Promotion Services											
Facilities		25	128,333,333	-	128,333,333	-	-	-	-	5,133,333	1,283,333
Equipment		10	20,625,000	-	20,625,000	-	-	-	-	2,062,500	618,750
Total Cost of Sub-Sector			148,958,333	-	148,958,333	-	-	-	-	7,195,833	1,902,083
SP3-3 Quality Control Laboratory & Equipment											
Facilities		25	68,750,000	68,750,000	-	-	2,750,000	687,500	-	-	-
SP3-4 Sanitation facilities /equipment related to processing											
Facilities		25	-	-	-	-	-	-	-	-	-
Equipment		15	916,667	-	916,667	-	-	-	-	61,111	45,833
Total Cost of Sub-Sector			916,667	-	916,667	-	-	-	-	61,111	45,833
TOTAL OF SECTOR - 3											
Facilities			197,083,333	68,750,000	128,333,333	2,750,000	687,500	5,133,333	1,283,333		
Equipment			67,375,000	-	67,375,000	-	-	6,706,944	2,039,583		
Total			264,458,333	68,750,000	195,708,333	2,750,000	687,500	11,840,278	3,322,917		

Table III.1.8-3 Project Cost and Physical Life by Components of Saint Louis Project

				Unit: FCFA					
Facilities & Equipment		Life	Saint Louis Zone 1 Total cost	1999 Phase 1 a Investment Cost	2000 Phase 1 b Investment Cost	1999 (Phase 1a)		2000 (Phase 1b)	
						Depreciation	Maintenance	Depreciation	Maintenance
SECTOR - 4, 5, & 6									
SP4-1 Facilities/Equipment for Retail Market									
Facilities		25	22,916,667	-	22,916,667	-	-	916,667	229,167
Equipment		15	4,583,333	-	4,583,333	-	-	305,556	137,500
Total Cost of Sub-Sector			27,500,000	-	27,500,000	-	-	1,222,222	366,667
SP4-2 Basic Infrastructure Services For Community									
Facilities		25	155,833,333	-	155,833,333	-	-	6,233,333	1,558,333
Equipment		15	10,083,333	-	10,083,333	-	-	672,222	504,167
Total Cost of Sub-Sector			165,916,667	-	165,916,667	-	-	6,905,556	2,062,500
For Complex									
Facilities		25	229,166,667	229,166,667	-	9,166,667	2,291,667	-	-
Equipment		15	8,250,000	8,250,000	-	550,000	412,500	-	-
Total Cost of Sub-Sector			237,416,667	237,416,667	-	9,716,667	2,704,167	-	-
TOTAL OF SECTOR 4			430,833,333	237,416,667	193,416,667	9,716,667	2,704,167	8,127,778	2,429,167
SECTOR 5 General Education & Training Facilities & Equipment									
OJT Training Center									
Facilities		25	110,000,000	-	110,000,000	-	-	4,400,000	1,100,000
• OJT Training Equipment									
Equipment		15	18,333,333	-	18,333,333	-	-	1,222,222	916,667
Dormitory									
Facilities		25	119,166,667	-	119,166,667	-	-	4,766,667	1,191,667
Equipment		15	916,667	-	916,667	-	-	61,111	45,833
TOTAL OF SECTOR 5			348,416,667	-	248,416,667	-	-	10,450,000	3,254,167
SECTOR 6 Administration & monitoring equipment									
• Administration / Monitoring Facilities									
Facilities		25	343,750,000	343,750,000	-	13,750,000	3,437,500	-	-
• Administrative Equipment									
Equipment		5	36,758,333	36,758,333	-	7,351,667	1,102,750	-	-
• Canteen									
Facilities		25	82,500,000	-	82,500,000	-	-	3,300,000	825,000
• Canteen Equipment									
Equipment		10	13,750,000	-	13,750,000	-	-	1,375,000	412,500
TOTAL OF SECTOR 6			476,758,333	380,508,333	96,250,000	21,101,667	4,540,250	4,675,000	1,237,500
SECTOR 7 Miscell Support Facilities & Equip									
Facilities		25	710,416,667	710,416,667	-	28,416,667	7,104,167	-	-
Equipment		5	22,000,000	22,000,000	-	4,400,000	660,000	-	-
TOTAL OF SECTOR 7			732,416,667	732,416,667	-	32,816,667	7,764,167	-	-
TOTAL OF SECTOR - 4, 5, 6									
Facilities			1,773,750,000	1,283,333,333	490,416,667	51,333,333	12,833,333	19,616,667	4,904,167
Equipment			114,675,000	67,008,333	47,666,667	12,301,667	2,175,250	3,636,111	2,016,667
Total			1,888,425,000	1,350,341,667	538,083,333	63,635,000	15,008,583	23,252,778	6,920,833
TOTAL OF PROJECT COST									
FACILITIES			5,710,375,000	4,200,625,000	1,509,750,000	168,025,000	42,006,250	60,390,000	15,097,500
EQUIPMENT			884,904,167	147,904,167	712,291,667	17,824,583	6,220,042	66,593,056	22,857,083
TOTAL COST IN FCFA			6,595,279,167	4,348,529,167	2,222,041,667	185,849,583	48,226,292	127,333,056	37,954,583
Consultancy cost (3%)			527,632,333	347,862,333	178,163,333	-	-	-	-
Physical contingency (5%)			329,763,958	217,426,458	111,352,083	-	-	-	-
Price escalation (3%)			197,858,375	130,455,875	66,811,250	-	-	-	-
Re-mobilization cost (5%) for Phase 1b			111,352,083	-	111,352,083	-	-	-	-
TOTAL COST IN FCFA			7,761,875,912	5,044,293,833	2,694,720,417	-	-	-	-

Assumptions:

1. Constant price as of July 1997.
2. Foreign Exchange Rate: 120 Yen to 1US\$ to FCFA 550.
3. Price escalation rate of the project cost assumed at 3% per year.
4. Physical contingency is assumed at 5% of total construction cost.
5. Consultancy fee is assumed at 8% of total construction cost.

Table III.1.8-4 Number of Personnel and Annual Personnel Cost of Saint Louis Project

				Unit: FCFA	
				Saint Louis Project	
		Monthly Salary	Agency	No.	Annual Salary
Director (General Manager)		350,000	DOPM	1	4,200,000
Sector -1 (Division 1) Fish Resources & Production					
1	Chief	250,000	DOPM	1	3,000,000
2	Technician Fish resources management	150,000	CRODT	1	1,800,000
3	Technician Security control	150,000	PSPS	1	1,800,000
4	Technician Fishing modernization	150,000	CAEP	1	1,800,000
5	Technician Fish landing activities	150,000	CAEP	1	1,800,000
Sub-total				5	10,200,000
Sector -2 (Division 2) Fish Marketing					
1	Chief	250,000	DOPM	1	3,000,000
2	Technicians Fish marketing	150,000	DOPM	3	5,400,000
3	Technicians Ice plant & cold storage	150,000	DOPM	2	3,600,000
4	Technician Fish marketing support	150,000	DOPM	1	1,800,000
Sub-total				7	13,800,000
Sector -3 (Division 3) Fish Process & Quality Control					
1	Chief	250,000	DOPM	1	3,000,000
2	Technician Export promotion	150,000	DOPM	1	1,800,000
3	Technician Internal quality inspection	150,000	DOPM	1	1,800,000
4	Technician Quality control laboratory	150,000	DOPM	1	1,800,000
5	Technician Model artisanal processing support	150,000	CAEP	1	1,800,000
Sub-total				5	10,200,000
Sectors 4,5,&6 (Division 4) Admin. & Finances					
1	Chief	250,000	DOPM	1	3,000,000
2	Employed Accountant	130,000	Contract	2	3,120,000
3	Employed Clerk	100,000	Contract	3	3,600,000
4	Employed Living environment	80,000	Contract	2	1,920,000
5	Technician Education & training	150,000	DOPM	1	1,800,000
6	Employed Credit support	130,000	Contract	1	1,560,000
7	Technician FMJS	150,000	DOPM	1	1,800,000
8	Employed Sanitary & environ. control	80,000	Contract	1	960,000
Sub-total				12	17,760,000
Total				30	56,160,000

Table III.1.8-5 Revenue Accrued of Saint Louis Project

		Unit : FCFA			
		Saint Louis		Saint Louis	
Unit Fee (CFAF)	Quantity	Saint Louis		Saint Louis	
		1995	2010	1995	2010
SECTOR 1					
SP1-2 Fishing modernization				63,650,000	190,950,000
SP1-3 Fishing gear storage					
Type - 1	100/unit/day	50	50	1,825,000	1,825,000
Type - 2	80/unit/day	100	100	2,920,000	2,920,000
SP1-4 Workshop & equipment				12,443,750	12,443,750
SP1-5 Boat building yard				4,235,000	4,235,000
	Sub-total			85,073,750	212,373,750
SECTOR 2					
SP2-1 Market hall, truck berth				40,572,500	48,657,500
1) Wholesalers					
- Registration (annual)	5000/year	70	97	350,000	485,000
- Daily users	500/day/person	57	80	8,550,000	12,000,000
2) Wholesaler room		15	15	7,672,500	7,672,500
3) Fish box	50/box/day	1000	1000	15,000,000	15,000,000
4) Truck berth					
Trucks	1500/day/truck	20	30	9,000,000	13,500,000
SP2-2 Ice Plant & Cold Storage				163,056,000	230,184,000
Fresh fish storage	10/kg/day	10 tons/day	15 tons/day	30,000,000	45,000,000
Block ice sales	600/block (25kg)	18 tons	25 tons	129,600,000	180,000,000
Plate ics sales	1000/tray (40kg)				
Ice crushing	20/block	12 tons	18 tons	3,456,000	5,184,000
	Sub-total			203,628,500	278,841,500
SECTOR 3					
SP3-1 Model Artisanal Process				594,000	594,000
Storage for processed fish				2,780,000	2,780,000
SP6					
Canteen				5,912,500	5,912,500
	Sub-total			9,286,500	9,286,500
Total				297,988,750	500,501,750

Remarks:

Only ice used for marketing is crushed; about 70% of 25 tons in Saint Louis in 1995.

Table III. I.8-6 Income Statement and Cash Flow of Saint Louis Project

	0	1	2	3	4	5	6	7	8	9	10	11	12
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Unit: 1000 FCFA													
I. Income Statement													
A. Revenue	297,988	311,269	325,361	340,324	356,224	373,131	391,123	410,282	430,698	452,468	475,698	500,502	500,502
1) Sector 1	85,073	92,451	100,468	109,181	118,650	128,940	140,122	152,274	165,479	179,830	195,426	212,374	212,374
2) Sector 2	203,629	209,532	215,606	221,856	228,288	234,906	241,715	248,723	255,933	263,352	270,986	278,842	278,842
3) Sector 3	3,374	3,374	3,374	3,374	3,374	3,374	3,374	3,374	3,374	3,374	3,374	3,374	3,374
4) Sector 4	5,912	5,912	5,912	5,912	5,912	5,912	5,912	5,912	5,912	5,912	5,912	5,912	5,912
B. Expenditure	385,665	548,061	548,061	548,061	548,061	548,061	548,061	548,061	548,061	548,061	548,061	548,061	548,061
1) Electricity	59,197	59,197	59,197	59,197	59,197	59,197	59,197	59,197	59,197	59,197	59,197	59,197	59,197
2) Water	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
3) Salary	56,160	56,160	56,160	56,160	56,160	56,160	56,160	56,160	56,160	56,160	56,160	56,160	56,160
4) Administrative	11,232	11,232	11,232	11,232	11,232	11,232	11,232	11,232	11,232	11,232	11,232	11,232	11,232
5) Maintenance	48,226	86,173	86,173	86,173	86,173	86,173	86,173	86,173	86,173	86,173	86,173	86,173	86,173
6) Depreciation	185,850	310,299	310,299	310,299	310,299	310,299	310,299	310,299	310,299	310,299	310,299	310,299	310,299
C. Income before Depreciation	98,173	73,507	87,599	102,562	118,462	135,370	153,361	172,520	192,936	214,707	237,936	262,740	262,740
D. Income after Depreciation	(87,677)	(236,792)	(222,700)	(207,737)	(191,837)	(174,929)	(156,938)	(137,779)	(117,363)	(95,592)	(72,363)	(47,559)	(47,559)
II. Cash Flow													
A. Source of Fund	7,650,525	98,173	73,507	87,599	102,562	118,462	135,370	153,361	172,520	192,936	214,707	237,936	262,740
1) Equity	7,650,525	0	0	0	0	0	0	0	0	0	0	0	0
2) Depreciation	185,850	310,299	310,299	310,299	310,299	310,299	310,299	310,299	310,299	310,299	310,299	310,299	310,299
3) Net Income	(87,677)	(236,792)	(222,700)	(207,737)	(191,837)	(174,929)	(156,938)	(137,779)	(117,363)	(95,592)	(72,363)	(47,559)	(47,559)
B. Uses of Fund	7,650,525	-	-	-	-	-	58,758	-	-	-	-	-	58,758
1) Construction	7,650,525	0	0	0	0	0	58,758	0	0	0	0	0	58,758
2) Reinvestment	0	0	0	0	0	0	0	0	0	0	0	0	0
C. Net cash flow	98,173	73,507	87,599	102,562	118,462	135,361	153,361	172,520	192,936	214,707	237,936	262,740	262,740

Table III.1.3-7 Income Statement and Cash Flow of Saint Louis Project (Revenue Earning Components)

	0	1	2	3	4	5	6	7	8	9	10	11	12
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Unit: 1000 FCFA													
I. Income Statement													
A. Revenue	292,076	319,449	334,412	350,312	367,219	385,211	404,370	424,786	446,556	469,786	494,590		
1) Sector 1	85,073	100,468	109,181	118,650	128,940	140,122	152,274	165,479	179,830	195,426	212,374		
2) Sector 2	203,629	215,606	221,856	228,288	234,906	241,715	248,723	255,933	263,352	270,986	278,842		
3) Sector 3	3,374	3,374	3,374	3,374	3,374	3,374	3,374	3,374	3,374	3,374	3,374		
B. Expenditure	285,709	420,873	420,873	420,873	420,873	420,873	420,873	420,873	420,873	420,873	420,873	420,873	420,873
1) Electricity	59,197	59,197	59,197	59,197	59,197	59,197	59,197	59,197	59,197	59,197	59,197	59,197	59,197
2) Water	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000
3) Salary	38,400	38,400	38,400	38,400	38,400	38,400	38,400	38,400	38,400	38,400	38,400	38,400	38,400
4) Administrative	7,680	7,680	7,680	7,680	7,680	7,680	7,680	7,680	7,680	7,680	7,680	7,680	7,680
5) Maintenance	33,218	64,251	64,251	64,251	64,251	64,251	64,251	64,251	64,251	64,251	64,251	64,251	64,251
6) Depreciation	122,215	226,345	226,345	226,345	226,345	226,345	226,345	226,345	226,345	226,345	226,345	226,345	226,345
C. Income before Dep.	128,581	110,828	124,920	139,883	155,783	172,691	190,683	209,842	230,258	252,028	275,258	300,062	
D. Income after Dep.	6,367	(115,516)	(101,425)	(86,461)	(70,561)	(53,654)	(35,662)	(16,503)	3,913	25,683	48,913	73,717	
II. Cash Flow													
A. Source of Fund	4,706,853	128,581	110,828	124,920	139,883	155,783	172,691	190,683	209,842	230,258	252,028	275,258	300,062
1) Equity	0	0	0	0	0	0	0	0	0	0	0	0	0
2) Depreciation	122,215	226,345	226,345	226,345	226,345	226,345	226,345	226,345	226,345	226,345	226,345	226,345	226,345
3) Net income	6,367	(115,516)	(101,425)	(86,461)	(70,561)	(53,654)	(35,662)	(16,503)	3,913	25,683	48,913	73,717	25,208
B. Uses of Fund	4,706,853	0	0	0	0	0	0	0	0	0	0	0	0
1) Construction	0	0	0	0	0	0	0	0	0	0	0	0	0
2) Reinvestment	0	0	0	0	0	0	0	0	0	0	0	0	0
C. Net cash flow	128,581	110,828	124,920	139,883	155,783	172,691	190,683	209,842	230,258	252,028	275,258	300,062	274,854

Table III.1.8-8 Revenue and Expenditure of Ice Plant in Saint Louis Project

Items	Unit: FCFA
Revenue	129,600,000
Expenditure	
Utility	
- Electricity	52,031,000
- Water	7,120,000
Salary	
- DOPM staff	3,600,000
- Workers	4,800,000
Administrative	720,000
Maintenance	4,785,000
Depreciation	18,700,000
Sub-total of expenditure	91,756,000
Profit before depreciation	56,544,000
Profit after depreciation	37,844,000

Remarks : Revenue is mainly from the sales of ice.

1.9 Environmental Impact Assessment

(1) Objectives of Environmental Impact Assessment (EIA)

The objectives of the EIA were:

- 1) Identification and prediction of potential impacts of project components on the physical and living environment (social, economic and environmental aspects).
- 2) Assessment of project impacts (short term, long term, direct, indirect, local, strategic, adverse, beneficial impacts).
- 3) Recommendation to avoid, mitigate, lessen or eliminate impacts.

(2) Environmental Impact Assessment Process

- 1) Appointment of local consultant for environmental survey work to collect baseline data and information with regards to the impact on the physical and socio-economic environment.

- 2) Execution of detailed surveys, data collection

- Carry out trial questionnaire survey
- Revise questionnaire forms after trial survey
- Brief enumerators and helpers for carrying out questionnaire survey
- Field survey , data collection

- 3) Analysis of survey / questionnaire data

- Compilation, analysis of questionnaire survey
- Reports, drawings, survey results from local consultant
- Review and analyze local consultant's output

- 4) Identification / confirmation of potential impacts

- During construction, O & M, and future and related activities phase
- On physical, ecological, aesthetic, and social aspects

- 5) Assessment of impacts

The lack of historical long term data for the project sites meant that the baseline data for the prediction of impact could only be gleaned from the spot surveys conducted by the local consultant and field survey data collected during Phase 1 and 2. Qualitative judgment by the experts were used to assess the impacts and whenever data was available, quantification of impact was conducted.

- 6) Preparation of EIA report

The complete EIA report is in the Annex. Only the tabulated summary of the EIA and recommendations are in this section

Table III.1.9-1 Environmental Impact Assessment - Saint Louis (1/6)

Activity	Potential Impact	Classification	Evaluation	Countermeasures/ Comments
SITE PREPARATION / CONSTRUCTION				
Site clearing / tree cutting	- Stripping of existing vegetation and some trees	S, D, Lc, A	Impact not significant as there are only some low bushes on the site. Only trees that are in the way of construction will be cut down.	Replanting of trees and other landscaping work after construction completion will be carried out.
Excavation (Cut and Fill)	- Removal of some soil - Importing of soil to use as fill	S, D, Lc, A	Impact not significant. According to the soil investigation, the soil type is mainly sand. Soil removed could be used for fill therefore there will not be much unwanted soil that will need to be disposed off site.	Unwanted or suitable excavated soil should be disposed off in proper place.
Demolition	- Demolition of some old existing buildings	S, D, Lc, B, I	The impact will be significant & beneficial as the buildings are old and not maintained in good condition.	New buildings will be built in their place which will have higher function and efficiency.
Relocation	- Existing DOPM, PSPS and CAEP activities will be relocated to another site during the construction	S, D, Lc, A, R	Impact will be significant but temporary only for the duration of the construction.	Temporary offices for DOPM, PSPS and CAEP function must be found before construction starts.
Facilities construction	- Construction activities on site will create noise, dust, and increase construction traffic on road.	S, D, Lc, A, R	Impact will be significant but temporary only for the duration of the construction.	Construction activities should be restricted to working hours and constructional plant traffic should be cautioned to travel at low speed especially passing through populated areas.

Legend:

S = Short Term impact
L = Long Term impact
Lc = Local impact
St = Strategic impact

Note on Classification:

Impact that is Significant, will be further classified into Reversible or Irreversible impacts.

D = Direct impact
A = Adverse impact
I = Indirect impact
B = Beneficial impact

R = Reversible
I = Irreversible

Table III.1.9-1 Environmental Impact Assessment - Saint Louis (2/6)

Activity	Potential Impacts	Classification	Evaluation	Countermeasures/ Comments
Temporary services (water, electricity)	- Construction activities will make use of water & electricity supply on the site	S, D, Lc, A	Impact will not be significant and temporary only for the duration of the construction. There is sufficient pipe water & electricity supply to the site and construction needs will not strain the supply condition.	
Construction labour force	- labour force from outside St. Louis will create demand for housing, services (transport, restaurant, etc.)	S, D, Lc, B & A	Impact will not be significant as most of the labourers are available from St. Louis. The impact will be temporary only for the duration of the construction. The beneficial benefits will be from the injection of cash into the local community from increase in economic activities of the labourers (such as house rental, meals at local restaurants, use of transport). Adverse impact is not expected to be significant as the number of outside workers will be small.	Encourage the contractor to hire local labourers from the community or St. Louis.
Landscaping	- landscaping of the site will seek to improve the scenery and reduce the vision impact of the structures.	L, D, Lc, B, R	Impact will be significant as the existing site is devoid of vegetation except for some scattered trees and low bushes.	Encourage the planting of hardy trees and plants to cope with the harsh environment (dry climate, sandy soil, salt air).
OPERATION / MAINTENANCE STAGE				
Sector 1 - Production / Resource				
Fish resource management & monitoring	- management of the resource will ensure the long term sustainability of the fisheries industry.	L, D, St, B, R	Impact will be significant in the long term as future sustainability will be in doubt if resource management & monitoring is not implemented.	Long term monitoring and accurate data collection is essential for resource management.

Legend:

S = Short Term impact
L = Long Term impact
St = Strategic impact

Note on Classification:

Impact that is Significant, will be further classified into Reversible or Irreversible impacts.

D = Direct impact
A = Adverse impact

I = Indirect impact
B = Beneficial impact
R = Reversible
I = Irreversible

Table III.1.9-1 Environmental Impact Assessment - Saint Louis (3/6)

Activity	Potential Impacts	Classification	Evaluation	Countermeasures/ Comments
Improve security / safety at sea, launching and landing.	- will reduce the loss of lives and fishing boats/gears.	S, D, Lc, B, I	Impact will be significant and effect immediate. The benefit will be substantial due to lives and fishing boat/gear saved.	
Transfer landing activities of purse seine boats to new project site	- will reduce the landing activities and congestion at the existing site at Guet Ndar. - concentrated landing causing congestion and waste concentration. - longer distance for fisher-men to travel to and from their homes to new project site.	L, D, Lc, B, R L, D, Lc, A L, D, Lc, A, R	- Impact will be significant & beneficial due to an improvement in sanitation both on the beach and on land at the existing site at Guet Ndar. - Impact not significant as new project site has sufficient space to accommodate the landing of purse seine boats. - Impact is significant due to additional 2.5 km travel distance.	- The freeing of the existing space at Guet Ndar could be used for other economic or community activities. - Sanitary control at the new project site to be implemented. - Project will provide multi-purpose truck that may be used by the fishermen free of charge.
Fish cleaning, sorting, packing activities	- Pollution of ground water and environment from fish waste and discharge from activities	L, D, Lc, A, R	Impact will be significant if the waste discharge is not properly handled and treated.	Project design will incorporate waste separation and proper discharge of waste water.
Preparation activities on land for fishing	- Contamination of the environment from fuel supply activities	L, D, Lc, A, R	Impact will be significant if the fuel supply yard is not designed to handle fuel spillage.	Project design will incorporate fuel trap and separators to minimise spillage discharge.
Repair / maintenance activities	- Waste from net, boat, gear repairs. - Contamination of environment from waste oil / fuel discharge from repair activities.	L, D, Lc, A, R	Impact will be significant if the waste disposal is not managed and appropriate facilities to handle the waste discharge.	Waste disposal management, control, and facilities will be implemented in the project.

Legend:

S = Short Term impact
L = Long Term impact
Lc = Local impact
St = Strategic impact

Note on Classification:

Impact that is Significant, will be further classified into Reversible or Irreversible impacts.

D = Direct impact
A = Adverse impact

I = Indirect impact
B = Beneficial impact

R = Reversible
I = Irreversible

Table III.1.9-1 Environmental Impact Assessment - Saint Louis (4/6)

Activity	Potential Impacts	Classification	Evaluation	Countermeasures/ Comments
Boat building activities	- Waste from boat building activities could contaminate the boat building yard.	L, D, Lc, A, R	Impact will be significant if the waste disposal is not managed to handle the waste material.	Waste disposal management & control will be implemented in the project.
Fishing modernization activities	- Modern fishing gear and techniques will impact on the fishermen's income and way of fishing. - Impact on fishing activities could be on more efficient and cost effective fishing which in turn will impact on fisheries resources.	L, D, S, B, R	Impact will be significant and will be strategic as the modern fishing technique and gear will be promoted not only in St.Louis area but also throughout the nation. Impact on fisheries resources will be significant if fishing activities are not done in line with resource management & monitoring activities.	Equity of access to participate in these activities must be assured by user groups. Resource management & monitoring must be implemented in line with fishing modernization.
Fish Collection Depot activities	- Fish collection of high value fish at the depot will impact on the efficient collection / handling leading to time savings and quality improvement. - Ice supply to fishermen will impact on improved fish quality.	L, D, Lc, B, R	Impact will be significant if the use of the depot is popular.	Use of the depot should be encouraged to get the most benefits from it. Regulatory mechanism may assist in promoting the use of the depot.
Privatised activities - repair workshops - fuel supply - rubbish collection - cleaning services	- The privatised activities will encourage competition, greater opportunities and spin-off activities.	L, D, Lc, B	Impact will not be significant as there are existing privatised activities at the site.	Project will encourage these privatised activities to promote sustainable and equitable services.

Legend:

S = Short Term impact
L = Long Term impact
Lc = Local impact
St = Strategic impact

Note on Classification:

Impact that is Significant, will be further classified into Reversible or Irreversible impacts.

D = Direct impact
A = Adverse impact

R = Reversible
I = Irreversible

I = Indirect impact

B = Beneficial impact

Table III.1.9-1 Environmental Impact Assessment - Saint Louis (5/6)

Activity	Potential Impacts	Classification	Evaluation	Countermeasures/ Comments
Sector 2 - Marketing / Distribution				
Fish market activities				
- fish sorting	- These activities will increase waste water generated.	L, D, Le, A, R	Impact will be significant as these activities will be concentrated within the complex.	Project will provide adequate water supply and waste handling/disposal facilities.
- cleaning / washing	- These activities will mean an increased people and vehicle movement, impacting on noise and exhaust emission.	L, D, Le, A, R	Impact will be significant within the complex due to the concentration of people and traffic to conduct these activities. Impact of exhaust emission is not expected to be significant due to the open nature of the complex design and no inhabitants living within the complex.	Project design will cater to the volume of people and traffic. Adequate truck berth & parking will be provided to handle the vehicle traffic.
Ice plant / cold storage				
- Water consumption	- These operation impact on the water supply and generate waste water.	L, D, Le, A,	Impact will not be significant as the existing water supply in St. Louis is more than adequate to meet the new water demand of the complex.	Waste water generated will be adequately handled by the project's waste handling/disposal facilities.
- Ice supply and storage	- These will impact on increased fish quality and maintaining freshness.	L, D, St, B, R	Impact will be significant as existing ice supply cannot meet local demand and storage facilities are not adequate.	Equity of access to be ensured by user group and autonomous body.
Fuel supply activities	- Impact from accidental fuel spillage leading to contamination of soil and ground water. - Possible fire hazard.	S, D, Le, A, R	Impact will be significant as existing site does not have fuel supply activities and is not contaminated. Impact will be significant as damage from fire will be drastic and may affect the whole operation of the complex.	Project will provide adequate fuel handling/disposal facilities to cope with any accidental spillage. Fuel depot will be located away from complex to minimise fire hazard. Project will incorporate fire safety & fighting equipment.

Legend:

- S = Short Term impact
- L = Long Term impact
- Le = Local impact
- St = Strategic impact

Note on Classification:

Impact that is Significant, will be further classified into Reversible or Irreversible impacts.

- D = Direct impact
- A = Adverse impact
- I = Indirect impact
- B = Beneficial impact

- R = Reversible
- I = Irreversible

Table III.1.9-1 Environmental Impact Assessment - Saint Louis (6/6)

Activity	Potential Impacts	Classification	Evaluation	Countermeasures/ Comments
Sector 3 - Artisanal Processing				
Quality improvement / inspection / control activities	- Product quality and sanitation will be controlled and improved impacting on the health of the consumers.	L, D, St, B, R	Impact will be significant and health impact on consumers will not only be local but strategic as the products are exported to neighbouring countries.	Equity of access to be assured by the autonomous body.
Sector 4 - Community Development				
Improve literacy & health/sanitary awareness	- Knowledge empowerment will impact on behavioural changes that may lead to improved quality of life.	L, I, St, B, R	Impact will be indirect and significant for the improvement of the life of the community.	Equity of access to be assured by the user group.
Community infrastructure / facilities improvement	- These will provide the community with better services to improve their quality of life.	L, I, St, B, R	Impact will be indirect and significant for the improvement of the life of the community.	Equity of access to be assured by the user group.
Sector 5 - Education / Training				
Training of fishermen & processors	- Knowledge empowerment will impact on behavioural changes that may lead to improved quality of life.	L, I, St, B, R	Impact will be indirect and significant for the improvement of the life of the beneficiaries and community	Equity of access to be assured by the user group.
- fishing techniques, safety, resource management				
- out of school education				
- processing techniques				
- quality & sanitation				
Training of DOPM, CRODT, CAEP, PSPS	- Training will improve the knowledge and facilitate sustainable fisheries activities and of the complex operation.	L, D, St, B, R	Impact will be significant as training of the upper level beneficiaries will be necessary for the continued operation of the complex.	Equity of access to be assured by the autonomous body.

Legend:

S = Short Term impact

Lc = Local impact

Note on Classification:

Impact that is Significant, will be further classified into Reversible or Irreversible impacts.

L = Long Term impact

St = Strategic impact

D = Direct impact

A = Adverse impact

I = Indirect impact

B = Beneficial impact

R = Reversible

I = Irreversible

