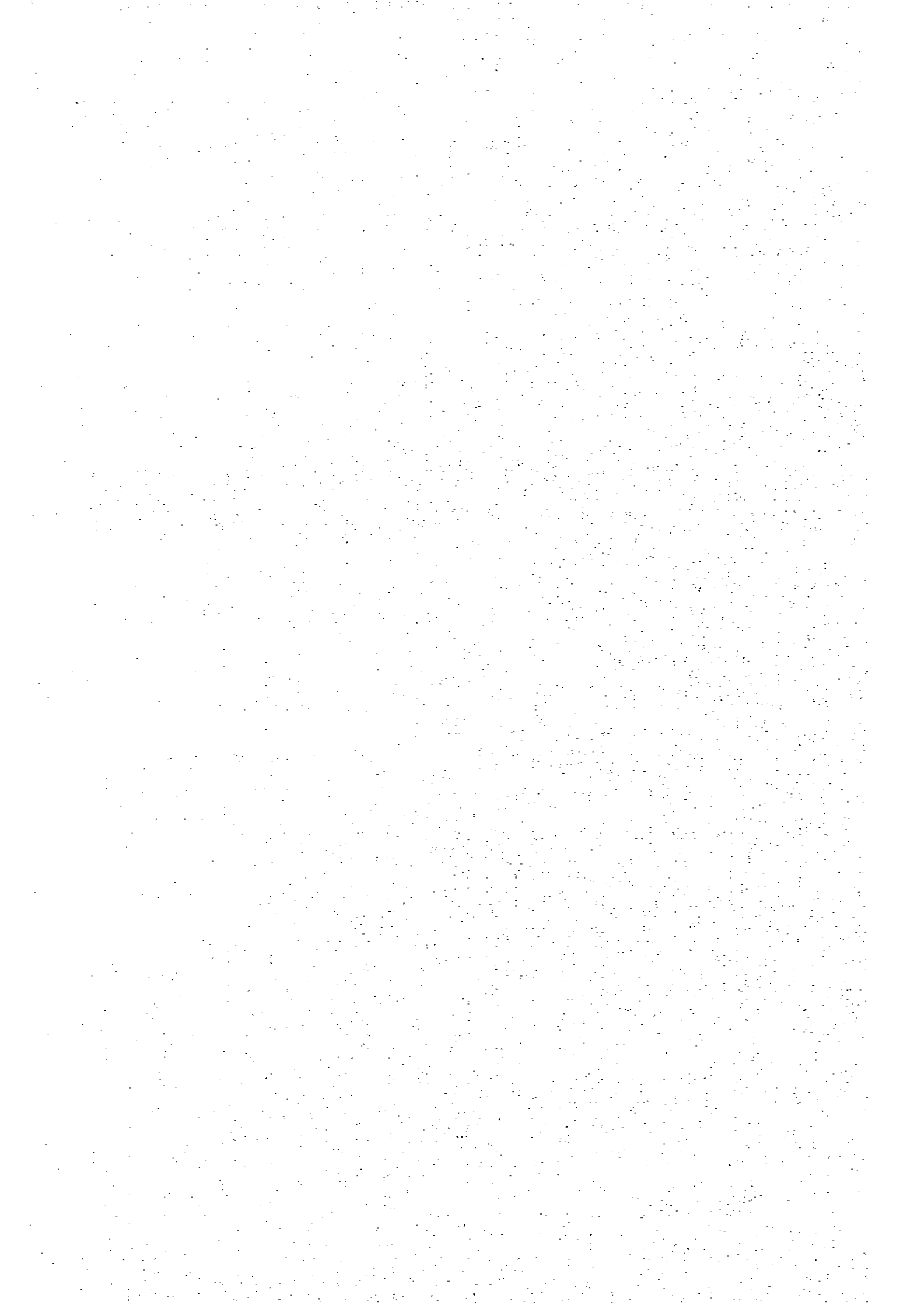


Chapter I
EXISTING CONDITIONS

1. EXISTING CONDITIONS OF ARTISANAL FISHERIES



1. EXISTING CONDITIONS OF THE ARTISANAL FISHERIES

1.1 Fisheries Policy

A draft of the Fisheries Development Policy has been submitted and awaits approval of the Parliament, which consists of a diagnostic, development policy and short, medium and long term plans (Politique de Developpement de la Pêche Maritime, DOPM). The development options listed in the plan are summarized as follows.

(1) Improvement Measures in Fisheries

The improvement measures should take into account the enforcement of fisheries laws and regulations relating to fishing license, redefinition of fishing zones through different type of fishery, regulation of mesh size, harvestable size, etc.

(2) Re-enforcement of Monitoring, Control and Surveillance

Re-enforcement of monitoring, control and surveillance should take into the account monitoring of resources, coastal management, and it should include two aspects; a better knowledge of the resources and its state of exploitation and reinforcing the means of control and supervision of fishing activities.

(3) Development of Fisheries Activities

The development of fisheries activities relates to:

- Restructuring, modernization and/or renovation of fishing fleet
- Improving the conditions of landing facilities at the fishery centers, and constructing infrastructure such as landing space, ice making facilities, processing area, roads, etc.
- Improving the conditions of production, fish processing and marketing
- Valorization of fisheries products (value added)

(4) Institutional Measures

Institutional measures related to financing, training and professional organization are as follows.

1) Financing

- Facilitate conditions necessary for financing by local banks or lines of credit negotiated with sponsors
- Better conditions in the access and policy of credit
- Favorable conditions in lending and repayment

- 2) Training
 - Training policies which are reinforced and oriented towards the needs of the users
- 3) Professional organizations must increase their role
 - Reinforce strategies and intervention through training
 - Commercial support by promoting and supplying information on markets
 - Organizational support in establishing strategic programs

(5) Fisheries Sector in the Perspective Triennales 1997/1999

The Government has started implementing the Ninth Development Plan (1996-2001) since January of 1997. However, in view of the pending implementation of the Ninth Development Plan in 1996, the government had a Working Plan or Document "Perspective Triennales 1997/1999), in which the Fisheries Sector Policy for the conservation of the fisheries resources is emphasized mainly for industrial fishery, and the measures to be taken accordingly are to:

- Freeze investments temporarily in the network of armaments (fishing gears) of coastal fishing
- Establish first a fishing authorization (rights) for certain categories of boats
- Regulate the access to the resources
- Elaborate a plan for the fisheries management
- Ban fishing in couple of trawlers
- Delimitate fishing zones to end the conflicting climate between different types of fishing
- Reinforce the regulation of meshes (nets)
- Stimulate participatory or collaborative research

1.2 Fishery Resources and Production

1.2.1 Fishery Resources

The potential of coastal pelagic fishery resources in Senegal waters was estimated based on the fisheries resources surveys conducted on a joint operation of six Western African Countries (Sub-Regional Committee for Fisheries - CSRP a committee for coastal pelagic resources). The potential of the off-shore pelagic, coastal demersal and deep-sea demersal resources in their respective EEZs was surveyed by each country. Research on Senegal was planned by CRODT/ISRA. For tuna, Senegal made programs with ICCAT.

The estimates of exploitable potential of fishery resources (offshore pelagic, coastal demersal and deep-sea demersal), and the level of exploitation based on the above surveys, are shown in Table I.1.2-1.

An analysis of the DOPM's statistical data of 1995 (Table I.1.2-2) shows a total fish production of 382,919 tons harvested by both the industrial and artisanal fisheries; a further breakdown or classification by fisheries shows that 254,444 tons were coastal pelagics (of which 78 percent or 198,811 tons were sardinelles and 22 percent or 20,446 tons other coastal pelagics), 92,594 tons were demersal, and 35,881 tons were deep-sea pelagics.

According to CRODT's estimates of resource potential, the estimate for coastal pelagics is between 173,000 to 248,000 tons, which means that the 254,444 tons of coastal pelagic fish harvested in 1995 have exceeded the potential estimate. The harvested quantity was about 92,000 tons of coastal demersal and the estimated potential is 125,000 - 130,000 tons. There is still some allowance of 20,000 - 30,000 tons of coastal demersal that could be harvested.

According to a report by ISRA/CRODT in 1995, the estimate of the coastal pelagic resource potential is preliminary because it is difficult to make an estimate using the current classical acoustic methods, and also the levels are strongly influenced by (oceanographic conditions) which cause variations in the evaluation.

(1) Characteristics of Senegalese Fisheries Resources

The maritime zone of Senegal characterized by great biological diversity, and its resources in the Exclusive Economic Zone (EEZ) can be described into four groups.

- Coastal pelagic resources
- Coastal demersal resources
- Deep-sea pelagic resources
- Deep-sea demersal resources

Coastal pelagic resources

The coastal pelagic resources account for more than 70% of the landed fish realized from Senegalese EEZ. The main species are round sardinella (*Sardinella aurita*), flat sardinella (*S. maderensis*), chinchards (*Deccapterus rhonchus*, *Trachurus trecae* and *T. trachurus*) and mackerel (*Scomber japonicus*). The resources are exploited both by artisanal and industrial fisheries.

The 254,444 tons of coastal pelagic fish harvested in 1995 have exceeded the potential estimate by CRODT between 173,000 to 248,000 tons. There are some difficulty to estimate their biomass, because, among other factors, the abundance of small pelagics is much more dependent on hydro-climatological factors, such as current, temperature, etc. than on fishing effort whose influence cannot be ruled out entirely. These species perform seasonal migrations between Mauritania (north) and Bissago Isles (south) and their landing is linked to the landed quantities realized in the different countries sharing these resources. And the biomass mentioned above concern only a zone between 10 and 200m in depth, and thus an important part of stock, located between the coast and 10m exploited by artisanal fishing, has not be evaluated.

Coastal demersal resources

The demersal resources of the Senegalese continental shelf, present between 0 and 200m deep include crustaceans (white shrimp, crab, etc.) and shellfish (octopus, calmar, etc.) and fishes (goat fish, soles, dorades, captains, etc.). They are exploited by several artisanal fishing gears (handlines, gill nets, longlines, traps, etc.) or industrial fishing gears (trawlers). The octopus (*Octopus vulgaris*) saw a great expansion in 1986; it can be explained by a combination of environmental factors and decreased predation of young species. The resource is exploited by artisanal fishery, trawlers based in Dakar and foreign trawlers.

The production potential of the coastal demersal resources is estimated about 125,000 to 130,000 tons. Expeditions of research trawlers clearly indicate an important decrease in the overall abundance of demersal species on the continental shelves, with a decrease of more than 50% between 1986 and 1991. This decrease is more marked in the deep zone of 10-60m in the entire fishing area. A preliminary diagnosis of the present situation by CRODT indicates there is an over-exploitation of some species such as arius, thiof, dorade/pageot and sole, while cuttlefish, octopus, brotula etc. still allow further exploitation (CRODT, 1995).

Deep-sea pelagic resources

The deep-sea pelagic resources are represented mainly by tuna stocks that are

distributed in the whole Inter-tropical Atlantic between the coasts of Africa and the America. The three main species are albacore, listao, and patudo. They are captured by industrial boats even though artisanal ones manifest an increasing interest in these species. One factor to be taken into account is that these species are migratory. Senegal is situated on the migratory path of tuna. The national production is seasonal and the "local potential" is difficult to estimate, and is influenced by the global state of resources in the whole distribution zone. The exploitable potential according to CRODT is about 25,000 to 30,000 tons.

Deep-sea demersal resources

Deep-sea demersal resources are present at an ocean depth of 150 m to 1000 m and include shrimps which are mainly the "gambas" (*Parapenaeus longirostris*) and the "alistado" (*Aristeus varidens*), fish (hake, shark) and pink lobster.

The exploitable potential of all species included is estimated at 20,000 tons, of which 3,500 to 5,000 tons are deep shrimps and red crabs, 6,000 to 8,000 tons are hakes, 500 to 700 tons are angler-fish. The other commercial species are essentially sharks, (*Centrophorus spp.*) and pink lobsters.

(2) Resources Management

Fishing legislation

The essential means of management such as boat registration and fishing license are not sufficient in Senegal. Artisanal fishing boats and fishermen have been registered at regional offices of DOPM as registration is necessary to purchase tax-exempted fuel and fishing equipment. However, migrant fishermen purchasing fuel at different landing sites may get registered more than once. There is a need for data bases of registration to obtain reliable estimates of fishing efforts. Regulations on access to fisheries resources through various licenses apply only to industrial fishing. Artisanal fishery still has free access without any regulation of fishing effort. Classical fisheries management tools, such as minimum mesh size, restricting entry, closed seasons and areas, minimum fish size, quota allocation, for artisanal fishery are not strictly implemented. Taking into account the present coastal resources conditions, measures to regulate fishing pressure must be imposed in order to achieve rational management of coastal resources. For the artisanal fishery, the preferred management option is to improve the data base and general information on fishing effort, number of boat, and fishermen, to introduce some gear controls, and to promote community-based rational management. In order to make the fishermen aware of resources conservation and management, support and assistance to them, in the form of training and research, should be conducted at the field level.

Management institutions

The key public institutions responsible for managing the fisheries resources are CRODT, DOPM and PSPS. Their activities are functionally divided: (a) CRODT is responsible for undertaking stock assessment and biological studies, monitoring oceanographic phenomena, and conducting research and development in fishing gear; (b) DOPM is responsible for coordinating statistics collection, extension and planning, and for issuing fishing license; and (c) PSPS is in charge of monitoring and control of fishing activities.

1.2.2 Fish Production

(1) Fishing Sector

Senegal has two types of fisheries sector, the artisanal fishery and the industrial fishery which is comprised of sardinelle, trawl and tuna fisheries. The fish production of these two fisheries from 1991 to 1995 is shown in Table I.1.2-3, which shows increasing and decreasing trends. In 1991 the production was 338,766 tons and it increased to 366,556 tons in 1992, decreased to 346,409 in 1993, increased to 364,842 tons in 1994 and fell to 358,054 tons in 1995. This tendency is attributed to the seasonal and migratory character of fish as well as to the oceanographic conditions in the Senegalese waters.

The fish production by artisanal fisheries was 249,724 tons in 1991 and it increased to 265,744 tons in 1995. The artisanal fishery sector contributes more than 70 percent of the total fish production; in 1995 it contributed 265,744 tons (74%) of the total production of 358,054 tons. The industrial fishing sector contributed 92,310 tons (26%), of which 5,376 tons (6%) was from sardine vessels, 51,317 tons (56%) from trawlers and the rest 35,617 tons (39%) from tuna boats.

(2) Artisanal Fish Production by Fish Group

The artisanal fish landings were grouped according to value and exportability, into the sardinelle group, exportable fish group whose price was generally more than 500-1,000 FCFA, and other fish group or locally consumed fish whose ranged from 100 FCFA to less than 1,000 FCFA as shown in Table I.1.2-4. Of the total landings of 265,744 tons in 1995, 65 percent (172,078 tons) were sardinelles, 10 percent (27,786 tons) were exportable or high value fish and the remaining 25 percent (65,881 tons) were other fish group. The fish landings according to species and region is shown in Table I.1.2-5. Of the 172,078 tons of sardinelle landed in 1995, about 77 percent (132,857 tons) were landed in Thies region, about 13 percent (22,840 tons) in St. Louis region, about 9 percent (16,251 tons) in Dakar region, and the remaining one percent was in other regions. The species *Sardinella rondes* makes

up about 62 percent or 107,367 tons of the total sardine landings, and the remaining were *Sardinella plates* (64,711 tons).

In the exportable group of fish, again Thies region led with 10,137 tons (37%) of the total landings of 27,786 tons, followed by St. Louis region with 6,035 tons (22%), Dakar region with 4,733 tons (17%), Ziguinchor 3,922 tons (14%), Fatick 2,495 tons (9%) and the remaining one percent from other regions. A similar trend was also seen for the 65,857 tons of the other fish group.

The seasonal fish production by region in 1995 is shown in Table I.1.2-6. As seen from the monthly landing in Senegal, fishing season extends from November to June with average production of 24,462 tons, while the production of lean season is 17,510 tons. The larger differential in production between peak and lowest month is observed in Saint Louis and Kayar. The peak production of these two areas are 3.7 and 7.6 times as much as the production in the lowest month, respectively. The peak and lowest months are slightly different by regions due to the migration of sardinella. In Thies region, the peak landings was around May and June, while in the Saint Louis the peak was around March and April in 1995.

(3) Fishermen and Fishing Boats

The latest official estimated number of fishermen (1995) was 51,734. The fishermen population appears to be stable or slightly increased during 1990 - 1995. Saint Louis had the highest number of 15,000 fishermen though its production was 37,952 tons of fish, while Thies region, the largest production area with 177,436 tons had 13,705 fishermen. Dakar had 10,000 fishermen and other regions with 12,617 fishermen (Table I.1.2-7).

The artisanal fishery is based on a total of 10,239 traditional boats "Senegalese-type pirogues", of various sizes; of which 90 percent of them are motorized, typically with 15 - 40HP out-board engine in 1995 (Table I.1.2-7). The number of boats have remained stable over the last 6 years. However, fishing effort seems to increase in terms of motorization. The number of fishing boats with engines have increased from 6,522 in 1990 to 8,716 in 1995, whereas boats without engines declined from 3,889 in 1990 to 1,523 in 1995.

The main types of fishing techniques for artisanal fishermen are purse seine for small pelagics. This fishery is carried out by large-sized boats of 15-20m with up to 25 crew and is responsible for the bulk of the seasonal sardinella catch. Other smaller boats use a variety of gear including gillnets for both demersal and larger fish (shark, croaker) and lines for high-price demersal fish in areas close to the edge of the continental shelf.

(4) Impact of Devaluation on Artisanal Fishery

The devaluation of the Franc CFA on January 11, 1994 has had relatively little impact on the artisanal fisheries in Senegal. A summary of the analysis of the fishing inputs and fish price before and after devaluation is shown in Table I.1.2-8. The prices of imported outboard engines had increased by 100 percent to 200 percent; and the fishing nets increased by 100 percent. The price of locally produced fishery products has however only increased slightly. The price of boats have increased by 29 to 35 percent; fuel from 172 FCFA to 265 FCFA (54% increase) and ice blocks from 450 FCFA to 600 FCFA (33% increase).

(5) Modernization of Fishing Technology

Various types of fishing gears and engines have been applied to modernize artisanal fisheries in recent years. CAEP and CRODT have reviewed the possibility of extending the newly introduced technologies in artisanal fishery development in Senegal. These technologies have not been fully adopted by fishermen due to the following major reasons.

- High investment cost of boats and engines;
- Illiteracy and low technical capability of fishermen;
- Slow technology transfer from the central to fishermen at regional level;
- Poor accessibility to credit;
- Low group participation among fishermen in extension activities;
- Less incentive due to low fish price in the domestic market; and
- Difficulties of sustainable operation and maintenance system.

Training on technical and financial management aspects to resolve the above constraints should be conducted with the direct participation of fishermen prior to introducing new technology; and consideration should also be taken of the on-going activities.

Motorization and introduction of diesel engine

The government of Senegal has promoted motorization of artisanal fishing boats. This motorization policy includes tax exemption of out-board engine and its fuel since 1965. As the institution responsible for motorization, "Center of Assistance for the motorization of Pirogues" (CAMP) was established in 1972. CAMP contributed to motorization on a commercial basis through import and sale of gasoline motors to fishermen with technical assistance. As a result, motorization showed a significant progress between 1990 and 1995. Now, 8,716 boats, accounting for about 90% of total artisanal fishing boats, have been motorized. With successful promotion of motorization, sales of gasoline engine has been fully privatized at

present. CAEP has been organized in 1994 as a successor to CAMP, but mainly focused on research and development of new technology.

Gasoline out-board engines have contributed to the increase of fish production and expansion of fishing grounds. However, fishermen are recently compelled to go fishing further from their bases, due to decrease in coastal resources. Likewise the increasing demands for high-price demersal species have forced the fishermen to go offshore using boats more than 15 m for several days. As fuel consumption increased, the introduction of diesel engines, which has greater economic benefits compare to gasoline out-board engines, became gradually popular. In 1994, about 100 units of diesel out-board engines (27HP) were donated to Senegal by the government of Japan under the "Senegal Coastal Fisheries Development" project. These engines have been applied for modernization of artisanal fisheries by CAEP. The project showed economical fuel consumption of diesel out-board engines and was viable from a financial viewpoint. Although the introduced diesel engines have been successful as a pilot project, it has met some problems as summarized in Table I.1.2-10 as well as indicated below:

a. Social aspect

Fishermen's illiteracy rate is extremely high. Therefore, some fishermen could not grasp the technology which was taught by CAEP. It is important to organize fishermen and to bring down illiteracy for sustainable technology transfer.

b. Financial aspect

i. Revolving fund as a source of credit for fishermen to acquire diesel engine had been introduced. This credit system had been introduced for gasoline engines by CAMP and subsequently applied to diesel engine. However it did not work fully because of engine troubles and weak financial management.

ii There is no formal and applicable credit system for purchasing these engines.

c. Technical aspect

The government of Japan and engine suppliers have implemented technical training to CAEP staff and the project staff in "Missirah Fishery Center". Even though their technical level for engine maintenance has been improved, institutional support for technology transfer by CAEP to fishermen has not been well organized.

d. Commercial aspect

The system of spare parts supply has not been fully developed for commercialization of diesel engine in private sector because of trial operation of diesel

engines as a pilot project while the commercial activities of gasoline engines has been privatized after long-term trial by CAMP. Sustainable effort will be indispensable by CAEP and private sector for commercialization

For the solution of these problems, it is required to promote close linkage with CAEP and the other projects such as Missirah center and PAPEC for fishing modernization. CAEP is expected to play a role as national center for development of pilot project of diesel engine. CAEP's activities will focus on the development and experimental function for the extension of diesel engine and on providing technical support to the other projects. Practical extension activities to fishermen will be implemented under the cooperation of the other projects as follows (Fig. I.1.2-1 and Fig. I.1.2-2).

i. Pilot project development

- With the cooperation of foreign expert, CAEP's financial management capacity and stock control of spare parts should be strengthened, for full operation of revolving fund system for the engine which have been sold to fishermen.
- Lease system based on the recovery capability of fishermen is recommended for sustainable operation of the engines which CAEP owns, and effective education/training of fishermen at the time of introduction of the engines. Target fishermen will be selected to eliminate/remove social constraints such as illiteracy for technical transfer at pilot scale level. There are three options to implement the lease system.

Option 1: Direct contract method with fishermen by CAEP.

Option 2: Contract method with fishermen through the new activities supervised by foreign expert in CAEP.

Option 3: Contract method with fishermen through the other project, Missirah Project, PAPEC and/or the new projects proposed by the Study.

ii Development of commercial activities

- Diesel engine trading will be decentralized from CAEP to private sector in the long term like the existing trading system of gasoline engine.
- Private sector will establish stable supply system of spare parts.
- Fishermen's associations will be organized for sustainable development of new system for diesel engine trading.

Fishing boats

Projects for the improvement of the traditional crafts have been conducted by several firms at their own initiatives to address shortcomings such as:

- Traditional boats have limits such as bad water-proofing, instability and costly maintenance linked with construction materials and short life;
- A positive correlation between deforestation and building of wooden boats;
- The necessity to replace the gasoline out-board motors with the diesel motors due to decrease in the import of fuel.

These boat building firms came up with prototypes such as:

- Plastic boats by SOSACHIM (1986)
- Nauticus boat (1988)
- ATEPAS boat (1991)
- Hauchard and Associates Boats

These prototypes have advantages compared to the traditional boats in terms of high stability, rigidity, buoyancy and resistance, easy and less maintenance cost, etc. However, the main obstacle is the high purchase cost that has prevented the extension of these prototypes. The current mode of financing of traditional fishery would not allow the acquisition of these boats.

Fish boxes

Due to scarcity of coastal demersal fish, fishermen are obliged to use insulated boxes and spend more time in sea. The introduction of "pirogues lignes glacières" in demersal fishing allowed fishermen to increase fishing time and their catch. Initially ice holds did not have thermal insulation. But CAMP with the assistance of FAO and ATEPAS have increased waterproofness of the ice hold and this improvement has been adopted in the Senegalese artisanal fishery.

Fishing gears

a. Octopus pots

Octopus pots of industrial models used in Japan, Spain and Morocco were introduced and tried with ATEPAS project. After successful experimentation, they were popularized in Messia Project, PAMEZ and GIE Federation. The Japanese pots are good but expensive.

b. Trammel net

Trammel, which is known for its effectiveness, was introduced from

overseas; first used in Pointe Saréne. It is now being used in the North Coast. Soles are caught particularly and many fishermen wanted to change their nets to trammel. The disadvantage is that trammel gets caught in the sea bottom and have a tendency to degrade faster than the other nets.

1.2.3 Safety Control

During 1992-97 (until first trimester - the first four months), a total of 241 fishing operation accidents have been reported in Senegal. Most of the accidents (188 cases) are classified as damage to fishing gear mainly caused by industrial vessels (Table I.1.2-11).

During 1993-97, 21 serious accidents such as boat capsized, wreck and death of 52 deaths of fishermen have been recorded in Saint Louis; 71 percent of the accidents occurred at the wave breaking zone near the shore (Table I.1.2-12). These accidents are mainly caused by lack of training and experience, and by landing without considering dangerous wave situation. Moreover, they reject use of the security box with life jacket and lifeboat.

For reduction of the accidents, the PAMEZ and ATEPAS projects introduced improved boats equipped with navigation compass, signal mirror, radar reflector, fire extinguisher, lifejacket on a trial basis. These equipment for safety control will be used effectively only after training. In addition to the technical matters, accessibility should be improved

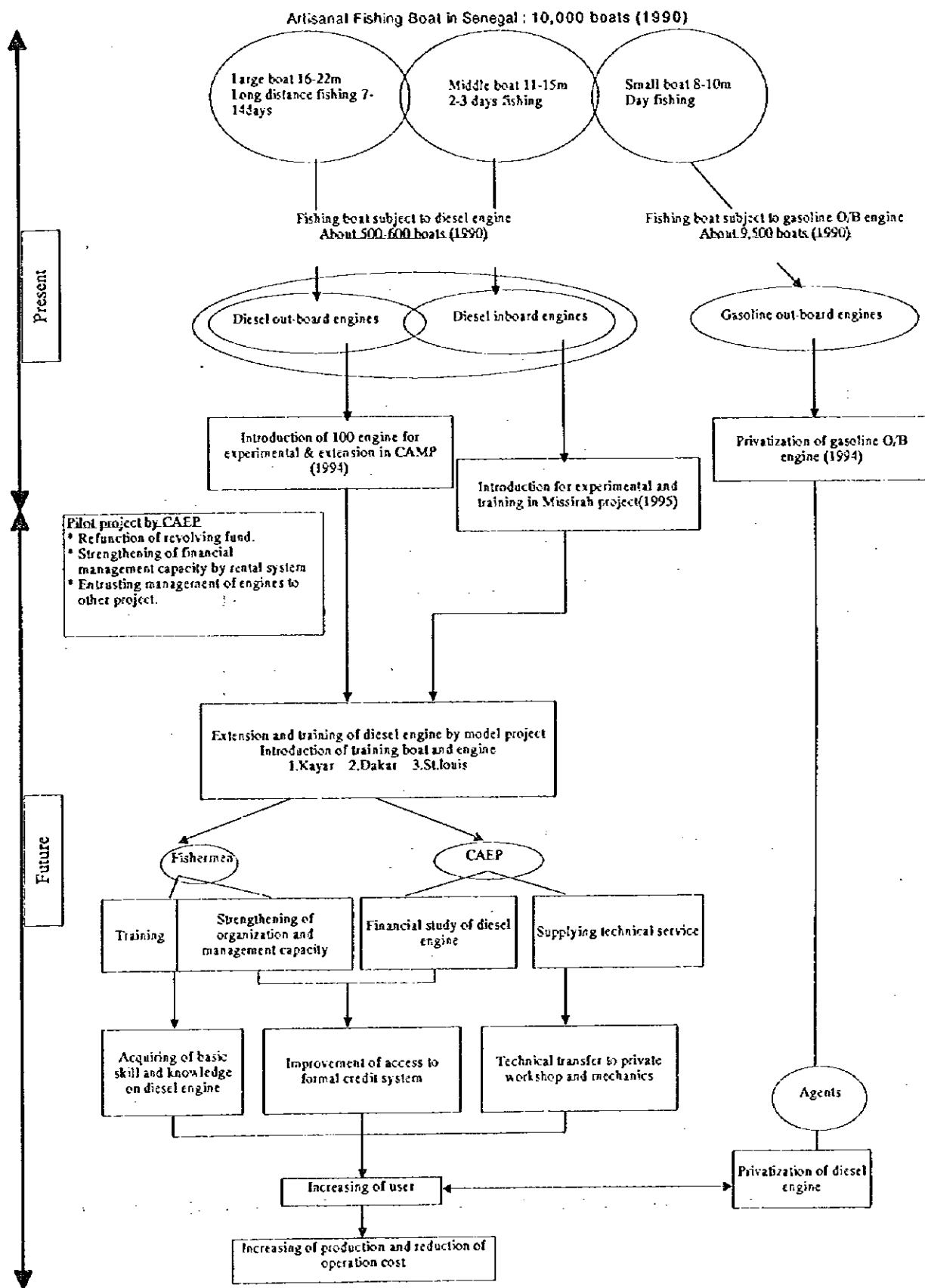


Fig. I.1.2-1 Extension Process of Diesel Engine

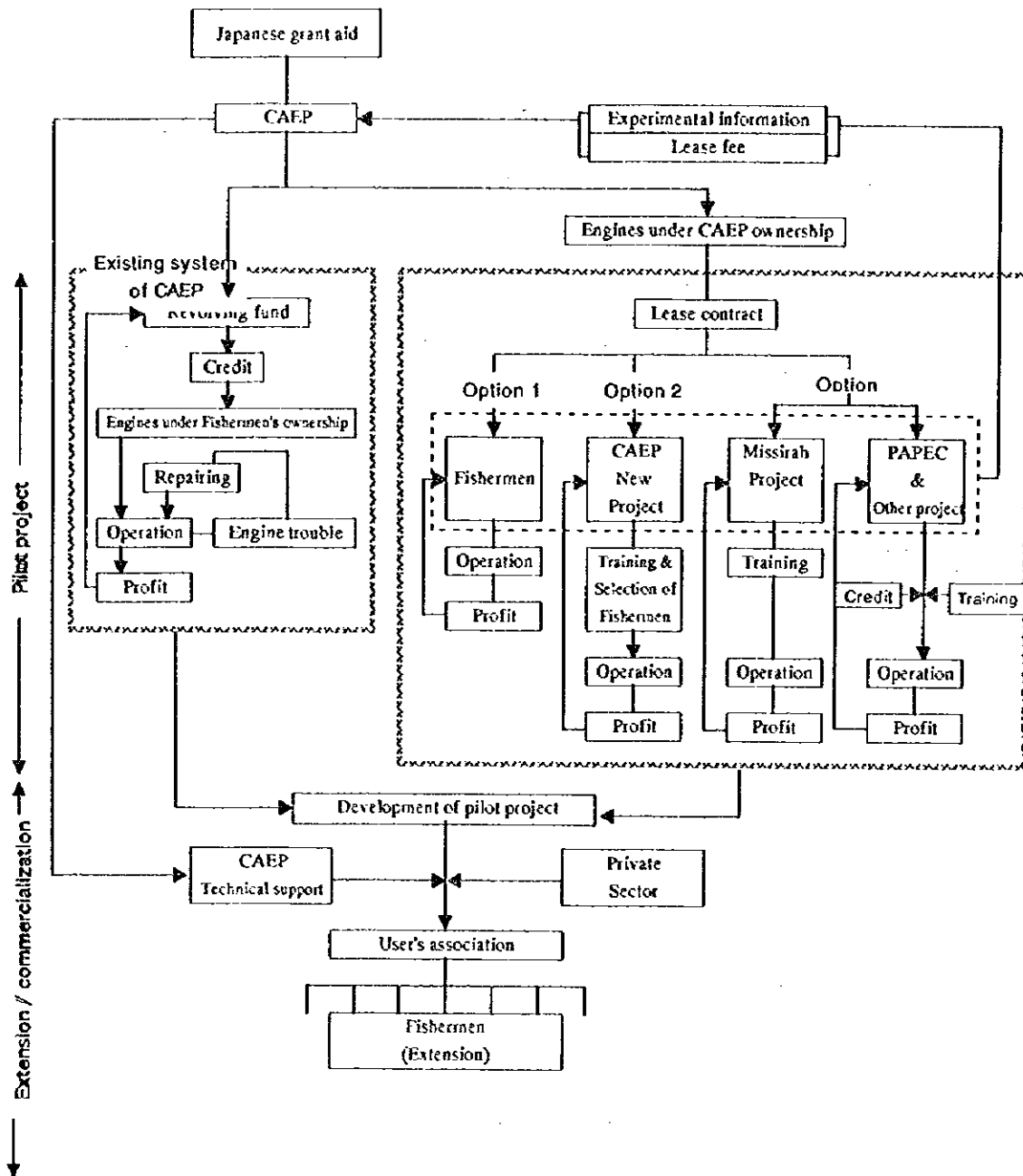


Fig. I.1.2-2 Extension Process of Diesel Engine for Fishing Modernization (Pilot Project)

Table I.1.2-1 Estimates of Exploitable Potential of Fishery Resources and Level of Exploitation

Type of Resources	Exploitable potential	Exploitation level
Coastal pelagic resources	173,000 to 248,000 tons/year	- 200,000 to 240,000 tons/year - most important resources in the landed quantity (75% of the total catch) - essential production of artisanal fishery - stable in Grande Côte except in Petite Côte)
Coastal demersal resources	125,000 to 130,000 tons/year	- 100,000 tons/year - based on abundance indices of certain constant species - over exploitation of certain species
Deep-sea pelagic resources	25,000 to 30,000 tons/year	- 18,000 tons/year - stocks divided with other countries
Deep-sea demersal resources	20,000 tons/year	- 10,000 tons/year oriented towards deep-sea shrimps and crabs

Source:

- 1) Politique de développement de la pêche maritime, DOPM, 1995
- 2) Comité Régional de Planification Stratégique de la Recherche Agricole, ISRA/CRODT, Aug., 1995

Table I.1.2-2 Marine Fish Production from Senegalese Waters in 1995

Type of fisheries	Unit: Tons			
	Industrial	Artisanal	Total (1995)	Estimated potential by CRODT
Coastal pelagics	46,162	208,282	254,444	173,000-248,000
Coastal demersal	35,132	57,462	92,594	125,000-130,000
Deep-sea pelagic	35,881		35,881	25,000-30,000
	117,175	265,744	382,919	

Source: Résultats Généraux de la Pêche Maritime Sénégalaise, DOPM, 1995

Table I.1.2-3 Marine Fish Production of Senegal (1991-1995)

	1991	1992	1993	1994	1995	Unit: Tons	
						Share	Share
1. Artisanal Fishery							
1) Dakar	21,133	24,856	14,448	25,289	27,763	10%	
2) Thiès	182,720	211,000	197,469	193,616	177,436	67%	
3) Saint-Louis	24,026	29,998	34,820	38,690	37,952	14%	
4) Ziguinchor	9,494	8,072	8,534	12,383	12,982	5%	
5) Fatick	9,761	9,437	8,608	9,258	6,955	3%	
6) Kaolack	1,376	1,226	1,171	1,226	912	0%	
7) Louga	1,192	1,193	1,901	2,338	1,744	1%	
Other	22	18					
Sub-total	249,724	285,798	266,951	282,799	265,744	100%	74%
2. Industrial Fishery							
1) Sardine	7,797	5,649	3,311	3,506	5,376	6%	
2) Trawl	50,894	46,797	38,945	40,635	51,317	56%	
3) Tuna	30,351	28,312	37,203	37,902	35,617	39%	
Sub-total	89,042	80,758	79,459	82,043	92,310	100%	26%
Total	338,766	366,556	346,409	364,842	358,054		100%

Remarks: Other refers to landings by pêche cordière which is gradually disappearing.

Source: Resultats Generaux de la Pêche Maritime Senegalaise, DOPM, 1995

Table I.1.2-4 Summary of Artisanal Fish Landings by Major Group and by Region (1995)

Species	Unit: Tons							
	Dakar	Thies	St. Louis	Fatick	Ziguin.	Louga	Kaolack	Total
1 Sardinelle group	16,251	132,857	22,840	9	79	41	0	172,078
2 Exportable group	4,733	10,137	6,035	2,495	3,922	318	145	27,786
3 Other fish group	6,779	34,442	9,077	4,450	8,980	1,385	767	65,881
Total	27,763	177,436	37,952	6,955	12,982	1,744	912	265,744

Source: Resultats Generaux de la Pêche Maritime Senegalaise, DOPM, 1995

Table I.1.2-5 Artisanal Fish Landings by Species and by Region (1995) (1/2)

		Unit: Tons							
Commercial name	Scientific Name	Dakar	Thies	St. Louis	Fatick	Ziguin.	Louga	Kaolack	Total
Sardinelle Group									
1 Sardinella ronde	Sardinella ronde	13,919	75,406	17,928	4	79	31	0	107,367
2 Sardinella plate	Sardinella maderensis	2,332	57,451	4,912	5	0	10	0	64,711
Sub-total		16,251	132,857	22,840	9	79	41	0	172,078
Exportable Group									
1 Carpe rouge	Lutjanus spp.	210	74	34	2	44	0	4	367
2 Thiof	Epinephelus spp.	491	750	691	6	0	12	0	1,951
3 Mérou de Méditerranée	Epinephelus guaza	91	77	199	4	0	0	0	370
4 Mérou de Gorée	Epinephelus goreensis	235	515	197	4	0	0	0	951
5 Mérou gris	Epinephelus caninus	63	15	51	0	0	0	0	129
6 Mérou rouge	Cephalopholis taeniiops	114	57	42	0	0	0	0	214
7 Capitaine	Polydactylus quadrifilis	6	2	92	41	152	4	0	293
8 Dorade grise	Plectrohynchus mediterranea	288	168	320	40	41	1	0	856
9 Courbine	Argyrosoma regius	82	148	208	46	14	34	0	532
10 Dentex	Dentex spp.	417	427	228	0	18	0	0	1,091
11 Pageot	Sparus caeruleostictus	445	887	314	0	0	0	0	1,646
12 Pageot	Pagellus bellottii	1,252	1,783	1,642	0	0	2	0	4,678
13 Otholite	Pseudotolithus spp.	1	295	226	315	1,045	108	2	1,994
14 Sole	Cynoglossus spp.	149	803	1,392	421	1,600	154	0	4,519
15 Rascasse	Ponticus felionus	120	30	19	0	1	0	0	170
16 Crevette	Penaeus sp.	0	226	159	563	887	0	138	1,974
17 Langouste	Palinurus spp.	8	21	64	2	7	2	0	103
18 Seiches	Sepia officinalis	274	1,269	78	973	112	2	0	2,707
19 Pouppe	Octopus	485	2,589	82	78	0	0	0	3,233
Sub-total		4,733	10,137	6,035	2,495	3,922	318	145	27,786

Table I.1.2-5 Artisanal Fish Landings by Species and by Region (1995) (2/2)

Commercial Name	Scientific Name	Dakar	Thies	St. Louis	Fatick	Ziguin.	Louga	Kaolack	Total
Other fish group									
1 Ethmalose	Ethmalosa fimbriata	0	10,915	874	1,146	2,606	1	143	15,686
2 Anchois	Anchois guineensis	71	2	0	0	0	0	0	73
3 Faux perroquet	Lagocephalus	25	203	179	45	0	0	0	452
4 Brochet	Sphyraena spp.	162	317	119	182	328	1	1	1,110
5 Mulet	Mugil spp.	328	134	247	699	413	3	122	1,947
6 Carpe blanche	Pomadasys spp.	276	1,194	152	78	128	129	1	1,957
7 Pelon	Brachydeuterus auritus	2	1,159	86	5	0	4	0	1,255
8 Chinchard jaune	Decapurus rhonchus	702	1,067	129	2	0	13	0	1,913
9 Chinchard noir	Trachurus traecae	441	540	0	0	0	0	0	981
10 Liche	Liche amie	30	232	409	3	6	15	0	695
11 Grande carangue	Caranx carangus	155	1,420	25	215	533	1	0	2,350
12 Trachinote	Trachinotus spp.	0	5	0	0	59	0	0	64
13 Vomer de Gorée	Scyris alexandrana	93	39	22	4	0	0	0	158
14 Bogue	Bops boops	5	11	75	0	0	0	0	91
15 Drepane	Drepana africana	9	13	74	7	143	0	0	247
16 Maquereau Espagnol	Scomber japonicus	589	1,133	13	9	0	4	0	1,748
17 Maquereau bonite	Scomber tritor	111	739	291	78	24	0	0	1,241
18 Thonine	Eutynnus alleteratus	382	725	26	0	0	0	0	1,133
19 Bonite a dos raye	Sarda sarda	252	84	9	0	0	0	0	345
20 Ceinture	Trichurus	60	193	92	0	0	0	0	345
21 Carangue	Caranx chrysos	150	1,816	76	89	0	0	0	2,132
22 Espadon	Xiphias gladius	110	94	0	0	0	0	0	204
23 Machoiron	Arius spp.	72	448	734	434	1,691	407	0	3,785
24 Murene	Lycodentis spp.	25	230	567	0	0	0	0	821
25 Plexiglass	Gateoides decadactylus	17	193	149	14	4	64	0	441
26 Brotule	Brotula barbata	128	0	10	0	0	0	0	138
27 Tassergal	Pomatomus saltator	51	0	408	0	0	2	0	461
28 Tilapie	Tilapia guineensis	0	5	1,085	412	353	25	495	2,376
29 Scyria d'Alexandrie	Scyris alexandrana	0	53	47	0	0	0	0	100
30 Requin	Charcharinas spp.	105	795	1,285	87	1,142	280	0	3,694
31 Thon	Tunas	52	0	0	0	0	0	0	52
32 Raie	Rhinobatos spp.	23	743	836	408	780	300	0	3,089
33 Coque	Annadara spp.	0	0	55	91	32	0	0	178
34 Murex	Murex	35	689	0	8	17	0	0	748
35 Huitre	Grassostrea gasar	0	35	0	30	158	0	0	223
36 Cymbium	Cybbium spp.	115	7,031	45	134	126	1	0	7,453
37 Crabs	Crabs	0	1	0	0	19	20	0	40
38 Gasterpodes	Gastropods	24	0	0	0	0	0	0	24
39 Badeche	Mycteroperca rubra	254	74	44	0	0	0	0	371
40 Turbot	Psettodes bekheri	13	36	2	54	0	0	0	105
41 Ombrine	Umbrina canariensis	11	0	78	5	0	9	0	102
42 Rouget	Pseudofaeneus prayensis	12	59	11	0	0	1	0	83
43 Other fishes	Other fishes	1,861	1,942	665	212	418	103	0	5,201
44 Other Crus//Moll.	Other crust. & molluscs	27	72	165	0	0	0	4	267
Sub-total		6,779	34,442	9,077	4,450	8,980	1,385	767	65,881
Total		27,763	177,436	37,952	6,955	12,982	1,744	912	265,744

Source: Resultats Generaux de la Pêche Maritime Senegalaise, DOPM, 1995

Table I.1.2-6 Artisanal Fish Landing by Month and Region (1995)

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Total
Unit: Tons													
Thies													
Fish	13,651	11,779	17,989	12,407	20,265	19,375	10,669	9,928	11,681	11,230	14,032	12,499	165,504
Crust/Mollusc	1,149	814	996	558	1,181	1,014	1,484	1,073	1,040	706	986	931	11,933
	14,799	12,593	18,985	12,965	21,446	20,389	12,152	11,001	12,721	11,936	15,018	13,430	177,436
Saint Louis													
Fish	2,943	4,423	5,025	4,994	3,176	3,261	2,149	1,344	2,174	2,186	3,453	2,186	37,312
Crust/Mollusc	197	25	70	22	34	30	28	21	59	96	49	10	640
	3,140	4,448	5,095	5,016	3,210	3,291	2,177	1,365	2,233	2,282	3,502	2,196	37,952
Dakar													
Fish	2,806	2,957	1,718	1,718	2,286	2,287	2,241	1,449	1,418	1,270	3,330	3,316	26,795
Crust/Mollusc	137	120	159	90	50	72	57	49	83	55	48	50	968
	2,943	3,077	1,877	1,808	2,336	2,359	2,298	1,497	1,501	1,324	3,378	3,366	27,763
Ziguinchor													
Fish	825	1,174	1,368	975	982	970	939	871	1,028	955	829	707	11,623
Crust/Mollusc	103	115	108	139	78	102	91	96	81	189	162	96	1,359
	928	1,289	1,475	1,114	1,060	1,072	1,030	967	1,109	1,144	991	803	12,982
Fatick													
Fish	180	516	552	866	428	463	364	332	281	338	447	308	5,076
Crust/Mollusc	124	187	187	34	53	59	148	148	310	311	182	137	1,879
	303	703	739	900	481	523	512	481	591	649	630	445	6,955
Louga													
Fish	69	65	101	182	171	298	147	204	288	151	29	17	1,719
Crust/Mollusc	-	0	16	4	2	2	0	1	0	-	0	-	25
	69	65	117	185	173	299	147	204	288	151	29	17	1,744
Kaolack													
Fish	75	135	129	85	61	51	56	61	31	24	26	34	770
Crust/Mollusc	7	1	1	-	-	1	-	-	60	52	16	4	143
	82	137	130	85	61	52	56	61	91	76	42	39	912
SENEGAL													
Fish	20,548	21,050	26,881	21,227	27,368	26,705	16,563	14,189	16,901	16,152	22,146	19,067	248,797
Crust/Mollusc	1,715	1,261	1,536	847	1,399	1,281	1,807	1,587	1,633	1,408	1,444	1,228	16,947
TOTAL	22,263	22,311	28,417	22,074	28,767	27,986	18,371	15,576	18,534	17,560	23,590	20,295	265,744

Source: Resultats Generaux de la Pêche Maritime Senegalaise, DOPM, 1995

Table I.1.2-7 Fishermen and Fishing Boats in Study Area (1990-1995)

Item	1990	1991	1992	1993	1994	1995
Fishermen						
Saint Louis	13,000	13,500	14,000	14,200	14,200	15,000
Louga	224	224	236	244	316	312
Thies	13,328	13,594	13,780	13,780	13,780	13,705
Dakar	8,110	8,110	7,440	7,660	8,820	10,100
Other regions	13,460	13,486	13,552	13,030	15,463	12,617
	48,122	48,914	49,008	48,914	52,579	51,734
Pirogue with engine						
Saint Louis	1,530	1,600	1,760	1,831	1,820	2,660
Louga	22	22	23	18	27	64
Thies	2,079	2,090	2,168	2,376	2,168	2,230
Dakar	1,262	1,428	1,363	1,339	1,424	1,143
Other regions	1,629	1,839	1,736	1,415	1,217	2,619
	6,522	6,979	7,050	6,979	6,656	8,716
Pirogue without engine						
Saint Louis	100	90	60	70	150	140
Louga	7	7	2	4	17	25
Thies	138	135	128	123	128	128
Dakar	234	268	205	218	188	172
Other regions	3410	3420	3157	3505	2590	1,058
	3,889	3,920	3,552	3,920	3,073	1,523

Source: Resultats Generaux de la Pêche Maritime Senegalaise, DOPM

Table I.1.2-8 Fishing Materials Prices Before and After FCFA Devaluation

	Unit: FCAF		
	Before	After	Percent Change
Pirogues			
(6-10 m)	1,000,000	1,350,000	35%
(12-14 m)	1,400,000	1,800,000	29%
Outboard engines			
40 HP	627,190	1,633,885	160%
25 HP	456,475	1,379,445	202%
15 HP	380,000	920,000	142%
8 HP	291,000	823,280	183%
Diesel motor			
27 HP	2,400,000	4,600,000	92%
Fishing Nets (100 yards)	52,000	105,000	102%
Ice blocks (25-kg block)	450	600	33%
Fuel (liter)	172	265	54%

Source: IDAF Newsletter September 1994

Table I.1.2-9 Comparison of Operation Cost of Gasoline and Diesel Outboard Engines in 1996

	Gasoline Engine	Diesel Engine
1. Assumptions		
Fishing method	Hand & Long Line	Hand & Long Line
Fishing ground	Guinea Bissau/Conakry	Guinea Bissau/Conakry
Number of days/trip	10 days	10 days
Number of trips/year	18 trips	18 trips
2. Engine and Fuel		
Type of engine	2-stroke Gasoline/40PS	4-stroke Diesel/27PS
Physical year	One year	Two years
Cost of engine	2,272,727 FCFA	4,318,181 FCFA
Fuel cost/liter	265 FCFA	160 FCFA
Fuel consumption/trip	1,300 liters	700 liters
Fuel cost/trip	344,500 FCFA	112,000 FCFA
3. Operation cost/year		
Fuel cost/year	6,201,000 FCFA	2,016,000 FCFA
Lubrication oil	0 FCFA	171,818 FCFA
Maintenance & consumable	681,818 FCFA	2,241,955 FCFA
Depreciation	2,272,727 FCFA	2,159,091 FCFA
Total Operation Cost without depreciation	6,882,818 1	4,429,773 0.64
Total Operation Cost with depreciation	9,155,545 1	6,588,863 0.72

Remarks 1) Number of trips a year = 2 trips/month x 9 months.

2) Fuel cost is tax exempted.

3) Cost of engine based on list price in Japan

4) Maintenance & consumable include replacement parts.

Source: Field Survey on the status of the diesel outboard engines in December 1996

Table I.1.2-10 Management Conditions of the Project and Users of Modernized Fishing by Diesel Engines

	Government Sector			Private Sector	
	CAEP	Missirah	PAPEC	Fishermen	Supplier of spareparts
1. Social Aspect					
- Illiteracy	Not effective	No program	No program	No program	No program
- Fishermen organization	Not effective	Organized	No program	GIE, CNPS: not functioning well	No program
2. Financial Aspects					
- High engine cost	Provided under grant aid; sales price is subsidized	Provided under grant aid; Rental system	Credit is available through CNCAS	Not available	Not available
- Access to credit	Revolving fund, no interest	Rental system	High interest and short period	Amount of mutual fund is not sufficient	Not available
3. Technical Aspects					
- Technology transfer	No effective program	Managed under technical expert	No training program	No training program	Training program by manufacturer
- Operation and management sustainability	Maintenance service is available at workshop, but lacks in spareparts and stock control	Regular maintenance by project	Monitor of repayment	Nil	Nil
4. Marketing Aspects					
	Nil	Nil	Nil	Nil	Nil

Table I.1.2-11 Number of Accidents in Artisanal Fisheries in Senegal (1992-1997)

Year	Total	Gears*	Collision	Capsize	Wrecks	Lost in value (FCFA)
1992	29	25	4	0	1	18,776,970
1993	54	45	8	1	8	23,433,200
1994	44	27	5	12	46	26,672,323
1995	48	36	3	9	33	26,847,375
1996	66	55	3	8	21	57,770,495
1997**	10	9	0	1		
Total	251	197	23	31	109	153,500,363

Remarks * refers to destruction of fishing gear.

** refers to data of first three months.

Source : PSPS Office, Dakar

Table I.1.2-12 Annual Record of Accidents in Artisanal Fisheries in Saint Louis (1993-1997)

Zone	1993	1994	1995	1996	1997	Total	Share
Number of accidents							
- Breakwater	1	4	1	3	6	15	71%
- River mouth				1	1	2	10%
- Open sea		3	1			4	19%
Total	1	7	2	4	7	21	100%
Number of deaths							
- Breakwater	4	21	2	3	7	37	71%
- River mouth				6	4	10	19%
- Open sea		4	1			5	10%
Total	4	25	3	9	11	52	100%

Source : PSPS Branch of Saint Louis Office

1.3 Fish Marketing and Distribution

1.3.1 Domestic Supply and Demand

The supply and demand of fish products for the whole country in 1995 is shown in Table I.1.3-1. The total demand of fresh and processed fish was 358,866 tons, of which 225,966 tons (63%) were consumed domestically and the remaining 132,900 tons (37%) were exported. Of the 225,966 tons consumed domestically, 78,437 tons (35%) were consumed in Dakar region and the rest of the 147,529 tons (65%) were consumed in other regions. The total supply of 358,866 tons was contributed mainly from fish landed by artisanal and industrial fishing vessels, 265,744 tons by artisanal and 92,311 tons by industrial, and only a small quantity of 811 tons was imported from Mauritania, which was mainly mullet. Of the 265,744 tons of artisanal fish production, 223,374 tons (84%) were used for domestic consumption and the remaining 31,230 tons (16%) were exported. Of the 92,311 tons of industrial fish production, 90,530 tons (98%) were exported and a negligible amount of 1,781 tons (2%) was consumed domestically.

The per capita consumption of fish was estimated at about 40kg for Dakar, 23kg for other regions, and 27kg for the whole country based on the population in 1995 and the total fish supply that includes mainly fish landed from artisanal fishery, without any quantity loss.

The origin and destination of fresh and processed fish in 1995 for the whole country are shown in Table I.1.3-2. The total supply of fish was 358,866 tons, of which 265,744 tons (74%) were from artisanal fishing, and the remaining 26 percent or 93,122 tons were from industrial fishing (92,311 tons) and imports (811 tons). Of the total 265,744 tons from artisanal fishing, the share of Thies region was 177,436 tons (67%), Saint Louis 37,952 tons (14%) and Dakar 27,763 tons (10%), and the remaining 14,399 tons (9%) were from Ziguinchor, Fatick and Kaolack.

Some 225,966 tons (63%) of the total supply of 358,866 tons were consumed domestically with 162,051 tons in fresh form and 63,915 tons in processed form; and the remaining 132,900 tons (37%) were exported with 9,915 tons in fresh form, 11,140 tons in frozen form and 21,315 in processed form from artisanal fishery, and 90,530 tons in processed form from industrial fishery).

Approximately 78,437 tons (22%) of fish were sent to Dakar, a major destination, of which 75,845 tons were from artisanal fishing, 1,781 tons from industrial fishing and a small amount of 811 tons imported from Mauritania.

Kaolack, a major fish transit point, received 36,403 tons (22,669 tons of fresh fish and 13,734 tons of processed fish), of which about 90 percent (33,002

tons) were from Thies region and about 469 tons from Saint Louis. The quantities of fish destined to the interior regions of Diourbel, Tamba and Kolda were 24,918 tons, 10,198 tons and 6,298 tons, respectively.

The type of fish marketed to Kaolack and the interior areas are mainly low priced coastal pelagics. For example, a detailed survey in 1986 by CRODT indicated about 70-90 percent of the fish transported to the interior of Saint Louis region were small coastal pelagics.

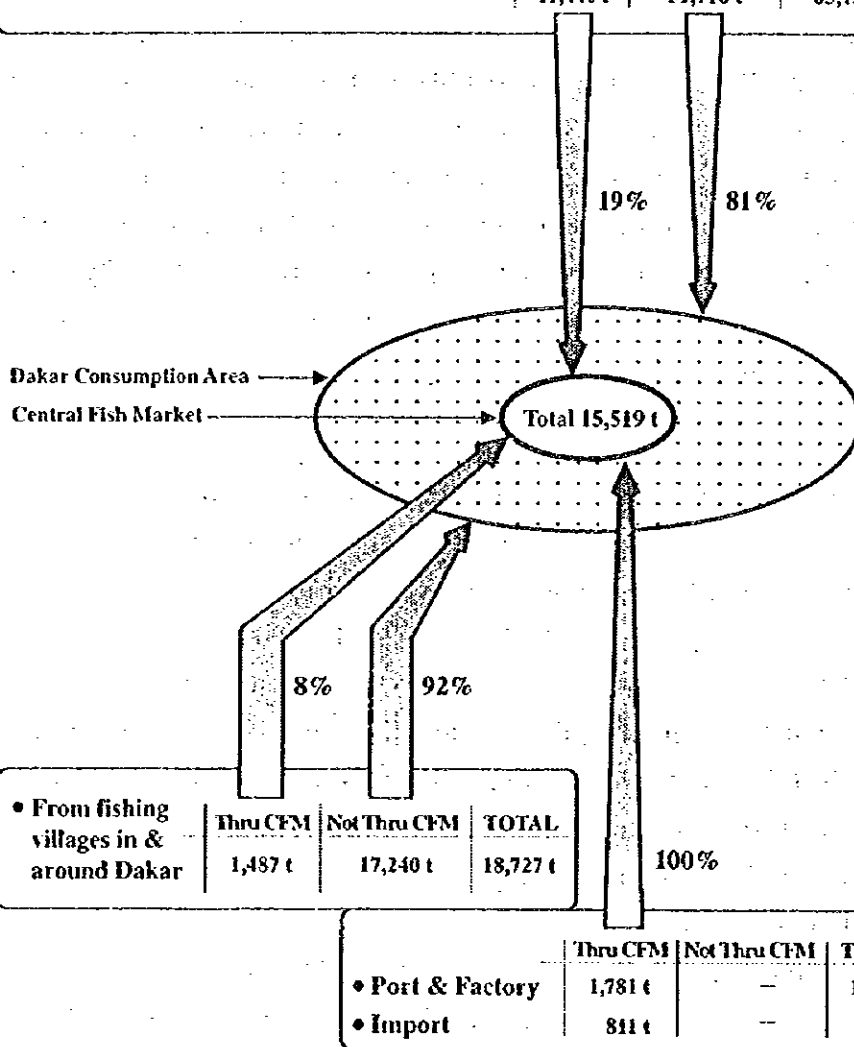
The total supply of fish to Dakar was about 84,475 tons in 1995 which included about 9,915 tons of fish in fresh form and 11,140 tons in frozen form via Dakar (Table I.1.3-2). Of the total supply of 84,475 tons, about 15,519 tons (18%) passed through the Central Fish Market (CFM) and the remaining 68,956 tons (82%) by-passed the market (Table I.1.3-3 and Fig. I.1.3-1). The quantity of fish from Saint Louis to Dakar was 10,375 tons, of which 2,991 tons (29%) passed through the CFM. The supply of fresh fish from Kayar was 5,672 tons; of which 2,647 tons (47%) passed through CFM (Table I.1.3-3). An analysis of the daily records of CFM from January to November of 1996 showed that about 18,044 tons fish passed through CFM; of which about 9,479 tons (53%) were sardines (Table I.1.3-4).

1.3.2 Export

Exported fish products of Senegal (1991-1995) are shown in Table I.1.3-5; and on an average, about 58 percent (60,265 tons) consist of frozen fishes, about 10 percent (9,914 tons) in fresh and 30 percent (33,286 tons) in processed form. The total export shows a drop from 118,850 tons in 1991 to 83,823 tons in 1993 and an increase to 103,466 tons in 1995. The same trend is seen in frozen fish products, which was 80,563 tons in 1991, declined to 44,912 tons in 1993 and increased to 54,087 tons in 1994 and 60,265 tons in 1995. This increase can be attributed to the devaluation of CFAF. In contrast, the export of fresh fish products is decreasing and this could be attributed to the quality standards required for fresh fish in the international market.

The destination of exported fish products in 1995 is shown in Table I.1.3-6. Of the total export of 103,465 tons, 60,265 tons (58%) were frozen, 9,914 tons (10%) were fresh fish, 20,471 tons (20%) were canned, 4,787 tons (5%) were artisanal processed fish and the remaining 8,082 tons (7%) were in meal form. About 61,687 tons (60%) of the export were for Europe, which was mainly frozen and canned fish; the next destination was Africa with 35,635 tons (34%), and export to Asia was 5,949 tons (6%), and a very small quantity of 194 tons were exported to America.

• From other areas			
Area	Thru CFM	Not Thru CFM	TOTAL
■ Thies	7,535 t	36,930 t	44,465 t
■ St. Louis	2,991 t	7,386 t	10,375 t
■ Louga	145 t	169 t	314 t
■ Ziguinchor	506 t	4,449 t	4,955 t
■ Fatick	263 t	2,646 t	2,909 t
■ Kaolack	—	138 t	138 t
TOTAL	11,440 t	51,716 t	63,156 t



Source : Field Survey of Phase 1 (The Study on the Development Program for Northern Fishing Areas in Senegal), 1996

Fig. I.1.3-1 Total Fresh Fish Supply Volume to Dakar Central Fish Market in 1995

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

Table I.1.3-1 Supply and Demand of Fish Products in Senegal (1995)

Unit: Tons

	SUPPLY		DEMAND				Total	
	Production	Import	Sub-total	Domestic Consumption		Export		
				Dakar Region	Other Region			Sub-total
Fresh Fish	180,514	811	181,325	61,639	98,631	160,270	21,055	181,325
Artisanal	180,514	811	181,325	61,639	98,631	160,270	21,055	181,325
Processed Fish	177,541	-	177,541	16,798	48,898	65,696	111,845	177,541
Artisanal	85,230	-	85,230	15,017	48,898	63,915	21,315	85,230
Industrial	92,311	-	92,311	1,781	-	1,781	90,530	92,311
Total	358,055	811	358,866	78,437	147,529	225,966	132,900	358,866
Share	99.8%	0.2%	100.0%	22%	41%	63%	37%	100%

Remarks:

- 1) Processed fish expressed in whole weight (wet weight).
- 2) About 1,781 tons originated from industrial fishing (in frozen form) to Dakar Central Fish Market.
- 3) Import of 811 tons was from Mauritania.
- 4) Assumption 811 tons (import) and 1,781 tons (industrial fishing) were consumed in Dakar Region.

Source:

- 1) Resultats Generaux de la Pêche Maritime Senegalaise, DOPM, 1995
- 2) Daily records of Dakar Central Fish Market, CFM 1995

Table I.I.3-2 Origin and Destination of Fresh Fish and Processed Fish by Region (1995)

Unit: Tons

ORIGIN	DESTINATION													TOTAL
	DOMESTIC CONSUMPTION						EXPORT							
	Thies	St. Louis	Louga	Dakar	Ziguinchor	Fatick	Kaolack	Diourbel	Tamba	Kolda	Sub-Total	Fresh Form	Frozen Form	
Thiès	14,817	1,182	2,800	36,050	1,724	4,318	19,854	13,823	5,370	1,800	101,738	4,065	4,350	110,153
Process	6,597	4,944	1,805	8,887	348	2,414	13,148	5,468	3,108	3,875	50,594	16,688		67,282
Saint Louis	1,926	12,658	2,752	7,665	8	-	469	2,952	704	-	29,134	1,820	890	31,844
Process	185	1,596	1,360	244	-	-	542	194	-	-	4,121	1,987		6,108
Louga	-	-	80	49	-	-	-	-	-	-	129	80	185	394
Process	11	53	100	1,148	-	-	38	-	-	-	1,350	-		1,350
Dakar	1,951	171	382	14,492	203	58	1,094	1,648	538	230	20,767	3,365	870	25,002
Process	319	8	146	1,407	17	4	68	314	110	-	2,392	368		2,760
Ziguinchor	125	1	-	1,465	2,000	-	25	-	98	250	3,964	420	3,070	7,454
Process	40	15	20	2,725	578	1	74	113	55	141	3,759	1,770		5,529
Fatick	716	-	-	969	1	675	520	1	0	-	2,882	165	1,775	4,822
Process	90	1	1	608	-	514	378	18	20	1	1,631	502		2,133
Kaolack	-	-	-	138	-	-	707	-	-	-	845	-		845
Process	-	-	-	-	-	-	67	-	-	-	67	-		67
Sub-total (A)	19,536	14,011	6,013	60,828	3,936	5,051	22,669	18,425	6,711	2,281	159,459	9,915	11,140	180,514
Process	7,242	6,617	3,432	15,017	943	2,932	13,734	6,494	3,487	4,017	63,915	21,315		85,230
Share	10%	8%	4%	29%	2%	3%	14%	9%	4%	2%	84%	12%	4%	100%
Industrial Fishing	-	-	-	1,781	-	-	-	-	-	-	1,781	-	90,530	92,311
Import (Mauritania)	-	-	-	811	-	-	-	-	-	-	811	-		811
Sub-total (B)	19,536	14,011	6,013	63,420	3,936	5,051	22,669	18,425	6,711	2,281	162,051	9,915	11,140	187,325
Process	7,242	6,617	3,432	15,017	943	2,932	13,734	6,494	3,487	4,017	63,915	21,315	90,530	177,541
TOTAL (A+B)	26,778	20,628	9,445	78,437	4,879	7,983	36,403	24,918	10,198	6,298	225,966	31,230	101,670	358,866
Share	7%	6%	3%	22%	1%	2%	10%	7%	3%	2%	63%	9%	28%	100%

Remarks:

- 1) Process fish products are expressed in whole weight (wet weight).
- 2) Approximately 30 percent of the Senegalese export (fresh and frozen) form originated from artisanal fishery; based on this export of frozen fish form is estimated at 11,140 tons and fresh fish form at 1,820 tons.
- 3) Includes crustaceans and molluscs.

Source:

- 1) Resultats Generaux de la Pêche Maritime Senegalaise, DOPM, 1995
- 2) Daily Records of Dakar Central Fish Market, CFM 1995

Table I.1.3-3 Total Inflow Volume of Fish to Dakar Region via CFM by Origin

Origin	Inflow of Fresh Fish (1995)		Unit: Tons
	Via CFM	By-Pass CFM	Total supply to Dakar Region
Domestic			
1) Thies *)	7,535	36,930	44,465
2) Saint Louis	2,991	7,384	10,375
3) Louga	145	169	314
4) Ziguinchor	506	4,449	4,955
5) Fatick	263	2,646	2,909
6) Kaolack	-	138	138
7) Dakar	1,487	17,240	18,727
9) Port/Factory	1,781	-	1,781
Import	811	-	811
Total	15,519	68,956	84,475
Share	18%	82%	100%

Remarks :

- 1) CFM refers to Dakar Central Fish Market.
- 2) Total supply to Dakar Region includes the export volume of fish in fresh form (9,915 tons) and in frozen form (11,140 tons).
- 3) * includes the supply of 5,672 tons; of which 2,647 tons (47%) passed via CFM.

Source :

- 1) Compiled from Daily Records of Dakar CFM (Jan. - Dec. 1995).
- 2) Total supply to Dakar Region compiled from DOPM Statistics, 1995.

Table I.1.3-4 Inflow Volume of Fresh Fish (sardinelles and other fish) to Central Fish Market by Origin (Jan. - Nov. 1996)

	Inflow of fresh fish (Jan.-Nov. 1996) to CFM		Unit: Tons
	Sardines	Other Fish	Total
Domestic			
1) Thies	5766	3387	9,153
2) Saint Louis	1587	897	2,484
3) Louga	2	50	52
4) Ziguinchor	2	466	468
5) Fatick	11	315	326
6) Kaolack	0	0	-
7) Dakar	1,782	434	2,216
8) Others	-	16	16
9) Port/Factory	329	1,703	2,032
Import	-	1,297	1,297
Total	9,479	8,565	18,044
Share	53%	47%	100%

Remarks : CFM refers to Dakar Central Fish Market.

Source : Compiled from Daily Records of Dakar CFM (Jan. - Nov., 1996).

Table I.1.3-5 Export of Fish Products of Senegal (1991-1995)

Type of Products	Unit: Tons				
	1991	1992	1993	1994	1995
1. Frozen	80,563	52,470	44,912	54,087	60,265
- Fish	49,872	36,454	25,091	34,654	35,144
- Crustacea	4,929	3,645	4,480	4,570	5,622
- Mollusca	25,763	12,371	11,224	14,863	13,185
- Pre-processed	-	-	4,117	-	6,314
2. Fresh	12,768	12,600	10,967	9,546	9,914
- Fish	12,360	11,916	8,899	9,400	8,183
- Crustacea	253	280	403	62	55
- Mollusca	155	403	964	84	86
- Pre-processed	-	-	701	-	1,590
3. Artisanal processed fish	2,236	2,543	2,852	7,651	4,788
4. Canned fish	19,372	15,043	22,270	18,385	20,471
5. Meal & Oil	3,910	3,455	2,822	4,004	8,028

Source: Resultats Generaux de la Pêche Maritime Senegalaise, DOPM, 1995

Table I.1.3-6 Destination of Exported Fish Products (1995)

Destination	Unit: Tons					Total
	Frozen	Fresh	Processed Products			
			Artisanal	Oil/meals	Canned	
Africa	22,273	23	4,617	7,908	835	35,635
1) Cote d'Ivoire	12,355	-	623	120	-	13,098
2) Gabon	4,293	-	1	-	-	4,294
3) Cammeron	2,982	-	14	660	-	3,656
4) Nigeria	1,032	-	0	380	-	1,412
5) Congo	234	-	2,855	-	-	3,089
6) Ghana	895	-	318	6,346	-	7,559
7) Algeria	-	-	-	21	21	42
8) Egypt	-	-	-	-	255	255
9) Morocco	-	-	-	-	245	245
10) Tunisia	-	-	-	-	308	308
12) Others	482	-	806	381	6	1,675
Europe	32,336	9,572	40	120	19,619	61,687
1) Spain	9,695	382	24	120	39	10,260
2) France	7,931	3,486	14	-	15,713	27,144
3) Italy	9,229	2,885	0.50	-	1,458	13,573
4) Belgium	1,782	47	-	-	1,321	3,150
5) Greece	1,218	1,689	-	-	41	2,948
6) Others	2,481	1,083	2	-	1,047	4,613
America	55	122	17	-	-	194
1) USA	-	109	4	-	-	113
2) Canada	55	13	13	-	-	81
Asia	5,601	218	113	-	17	5,949
1) Japan	3,069	-	-	-	-	3,069
2) China	2,251	-	107	-	-	2,358
3) South Korea	95	-	-	-	-	95
4) Israel	-	-	-	-	17	17
5) Others	186	218	6	-	-	410
Total	60,265	9,914	4,787	8,028	20,471	103,465

Remarks : Artisanal processed fish, canned fish and meal & oil are expressed in net weight (i.e., not converted to whole fish equivalent).

Source: Resultats Generaux de la Pêche Maritime Senegalaise, DOPM, 1995

1.4 Artisanal Fish Processing

In 1995, the artisanal fishery sector landed 265,744 tons of fish in Senegal; out of which 85,230 tons (32%) were used for the artisanal fish processing. The artisanal fish processing has been led by individual fish processors, most of whom are small and/or micro-scale female processors. Their products are dried fish produced through various traditional processing methods; some are exported to the neighboring West African countries. The DOPM control office is also responsible for checking the quality of artisanal fish processing products exported to these countries using their own standards.

The Study, aiming at improvement in the artisanal fisheries in the study area, focuses on the artisanal fish processing activities. Some of modernization requirements related to sanitation and hygiene control included in the European Union (EU) standard can be applied with appropriate modification for planning the improvement in the artisanal fish processing sector.

(1) Outline of Artisanal Fish Processing

Artisanal processing plays an important role in Senegal because of the following major benefits.

- Utilization of the fresh fish surplus due to lack of preservation facilities during the peak season
- Supplying food with protein to the people living in the interior areas with little accessibility to fresh fish
- Important source of foreign currency through export
- Provides income generating opportunities for community members in fishing villages, especially for women, which contributes to women's empowerment.

In 1995, 85,230 tons of artisanal processed fish were produced in Senegal; of which 15,017 tons (18%) were consumed in Dakar, 48,898 tons (57%) in other regions and 21,315 tons (25%) were exported. The processors sell their products to wholesalers, who market these products to the local and inland population as well as for export to nearby African countries including Congo, Ghana, Guinea, etc. In 1995, 4,788 tons (net weight) of artisanal processed fish were exported (see the table I.1.3-5), out of which 4,617 tons (96%) were destined for the African countries. Congo had imported the largest volume of 2,855 tons, which was 60 percent of the entire volume of artisanal processed fish exported from Senegal.

Artisanal fish processing has produced various types of products with different fish species and processing methods. The products of artisanal fish

processing have local names such as *guedj*, *tambadiang*, *ketiakh*, *saly* etc.

In order to make *guedj* products, large and medium-size raw fish are used as materials. First, the materials are fermented in big cement bowls or oil drums, then scaled, head-cut, gutted, cleaned, cut open, and dried in the sun on drying tables made of wood and nets placed on the beach for two to four days.

Small fish are used for *tambadiang*. Fish are scaled but not gutted; and brined for around twenty-four hours, and then dried in the sun for five to six days. Very fresh fish are not necessarily used for making *guedj* and *tambadiang* because of the fermentation process; and fresh fish of second quality are usually used. *Guedj* and *tambadiang* are products produced mainly for local and inland consumption.

Sardines are used for *ketiakh*. Materials are boiled and fumed for two to three hours, peeled, head-cut, boned, and then dried for a maximum of seven days. It is desirable to use very fresh sardines for producing *ketiakh*, which are consumed locally in interior areas, and exported to neighboring West African countries.

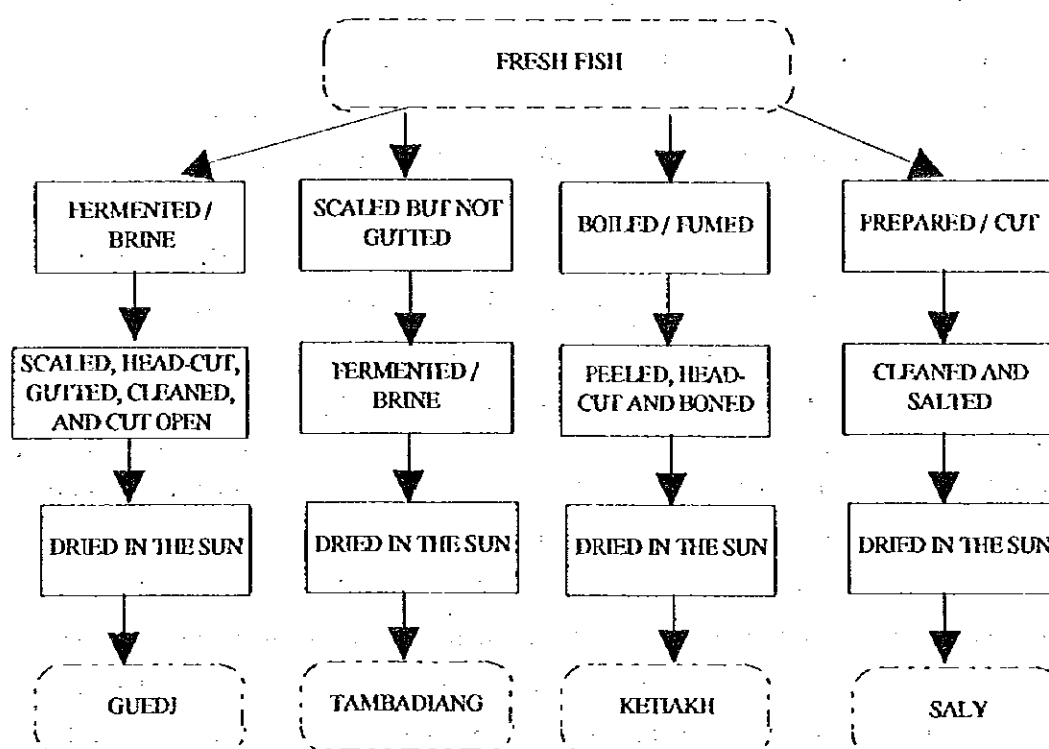
Saly are high priced products that are mainly exported. Large size white meat fish are used for *saly*. The materials are prepared, cut, cleaned with sea water, and salted for four days, and washed and salted again, and dried in the sun for seven days. Very fresh materials are required for producing *saly* that are suitable for export. Most of the processors of *saly* can afford to buy very fresh high priced materials through competition with wholesalers.

Table I.1.4-1 outlines the types of products, materials, and processing process, and Fig. I.1.4-1 summarizes the production process of major artisanal processed products.

(2) Technical Research at Institut de Technologie Alimentaire (ITA)

The ITA has been active in various fields related to the food industry including artisanal fisheries. As part of their activities, they have carried out some research in improving the quality of artisanal fish products, i.e. analysis of food nutrition, bacteriological examination, heavy metal examination, analysis on vitamins and poisonous substance etc. In addition, ITA has been experimentally producing fish sausages, surimi, smoked fish etc. at its test plant.

The artisanal fish processing sector is very close linked to the local communities. Therefore, it is difficult to control their activities directly from the centre. Human resources development and working environmental improvement projects need to be conducted at each processing site by incorporating ITA technical assistance into these project activities.



Source: Le role des femmes dans la commercialisation du poisson dans la region du cap-vert, Seynabou Camara, 1983)

Fig. I.1.4-1 Work Flow of Artisanal Fish Processing Activities

Table I.1.4-1 Types of Products, Materials and Process of Artisanal Fish Production

Name of products	Raw materials	Main processing process	Remarks
Guedj	any kind of fish	fermented-salted-dried	second quality fish usually used
Tambadiang	small-size fish	brined-salted-dried	second quality fish usually used
Ketiakh	sardinelles ethmaloses	smoked-salted-dried	fresh materials required consumed in Dakar and inland areas some exported
Saly	large-size fish capitaine, tuna, catfish, sharks, rays, etc.	salted-dried	fresh materials required mostly exported.
Métora	shark, ray, sardinelle, ethmaloses, machoiron	salted-dried	fresh materials required consumed in Dakar and inland areas
Yeel	top shell	fermented-dried	

1.5 Credit System for Fisheries Sector

(1) Credit Lines Through CNCAS Supported by Donors

Caisse National de Crédit Agricole de Sénégal (CNCAS) was created in May 1983 as an agricultural development bank. CNCAS began lending for artisanal fisheries even before lines of credit were made available for lending to the sector by various donors. After starting to lend to the sector in 1988, CNCAS's Saint Louis branch alone had made 150 million FCFA (US\$300,000) in loans by 1989.

Under the Pro-Pêche project¹ of CIDA, the Saint Louis office made FCFA 600 million (US\$1.2 million) in loans, with major recovery problems analyzed in the "2.6.1 Credit system available in the Study Area" in this report. According to information provided by the Artisanal Fisheries Unit of CNCAS, FCFA 1.4 billion (US\$2.8 million) have been loaned as of 30 September 1996 by CNCAS under Pro-Pêche line of credit. Under agreement with CIDA, remaining funds in the line of credit which guaranteed 70 percent of loan capital will be returned by CNCAS to CIDA after guarantees are covered. Part of the funds from the Pro-Pêche line of credit went to repatriates from Mauritania and most of these loans were never paid.

The Caisse Francaise de Developpement (CFD), which has been one of the biggest donors for the fisheries sector together with CIDA and provided funding in the past for the PAMEZ project (Maritime Artisanal Fisheries in the Ziguinchor Region), also provided a loan fund for Senegalese then living in France to allow them to reestablish themselves in Senegal. Very little of these funds of FCFA 274 million (US\$550,000) loaned under this program were repaid.

PAPEC² credit funds, supported by AfDB, were returned as a grant by Government to CNCAS Loans amounting to FCFA 1.3 billion (US\$2.6 million) have been made from a total of almost FCFA 2.0 billion (US\$4.0 million) provided to CNCAS. Loan repayment problems have also been significant but less so than in the case of the Pro-Pêche project line of credit.

¹ Pro-Pêche Project: Canada has been a major supporter of the artisanal fisheries sector in the past, most recently through its funding of the Pro-Pêche project which has had a major role on the development of the sector in the northern area of the country. Although the Pro-Pêche project has finished, the project did have a significant impact on northern communities. The project had two major components: ATEPAS which focused on technological improvements and Servi-Pêche supporting credit and the development of a fisheries credit capacity within CNCAS.

² PAPEC: The African Development Fund (ADF), which is the soft loan facility of the African Development Bank (ADB), provided the funding necessary for the PAPEC project which supports artisanal fisheries development on the Petit Côte, south of Dakar. After a slow start, the project has had a major impact on artisanal fisheries in the region, principally through investment in infrastructure and provision of a line of credit through CNCAS. The operation of the credit line appears to have been somewhat more successful than on the Grand Cote although many of the same problems were observed.

Until recently all artisanal fisheries projects having a lines of credit operated them through CNCAS. Recently Casamance Artisanal Fisheries Project (PROPAC)³, which is the EU successor to the PAMEZ project, will establish its own project managed credit fund. This step of setting up a credit fund managed by a project is highly unusual where a bank exists which has managed artisanal fisheries line of credit in the past. The decision for the project to manage the credit system appears to be indicative of the degree of donor dissatisfaction with CNCAS overall operation and in particular with the way in which it has managed artisanal fisheries credit in the past.

The principal problems in the operation of the credit component by CNCAS are the following.

Related to organization and human resources

- Over-centralization of loan approval process; especially failure to provide local officers with decentralized authority to authorize small working capital or equipment loans
- Lack of expertise in fisheries on the part of CNCAS officers and failure to credit a department within CNCAS specialized in fisheries credit
- Lack of loan recovery effort by CNCAS and "contamination" of other borrowers due to lack of CNCAS follow-up on defaulters
- Failure of CNCAS to assign additional staff as the portfolio grew

Related to services for users

- Unnecessary complex loan application procedures and long delays in processing applications
- Lack of sufficient prior training of borrowers before loans are given out

Related to donors projects

- Failure of the donors to put more stringent obligations on CNCAS as a condition of obtaining the line of credit

(2) Groupements d'Interêt Économique (GIE) and CNCAS Loan Application

After the failure of the system of very large cooperatives where members had

³ PROPAC: EU through its fishing agreements with Senegal although providing mostly budgetary support, do provide some funding for fisheries. The EU's main direct support to fisheries is the Casamance Artisanal Fisheries Project (PROPAC), which is the successor to the PAMEZ project. Its goal is to empower groups and federations and similar organizations to allow them to take control of their activity. The credit fund will be project-operated and carry an interest rate of 9.5%. Loan size is from FCFA 500,000 (US\$1,000) to FCFA 60 million (US\$120 thousand); thus size is too low to be much interest to industry. The project also has helped set up marketing centers for buying equipment with a guarantee fund to allow fishermen to shop around and then go to suppliers to buy where prices are cheapest. Credit is open to all activities in project area communities, not just fishing.

no sense of solidarity, a new system was established called GIEs, which aims at supporting various activities in all of the economic sectors. GIEs can be formed two or more physical or moral persons simply by filing with the Registry of Commerce and they do not need to have any capitals. GIEs are given advantages including tax exemption and access to CNCAS credit lines.

The process of forming is relatively simple and the cost of registry depends on the region. They are required to have two staff members responsible for management and accounting. FENAGIE is a national federation of GIEs in the fishery sector with 42 local unions all over the country; however it does not have a fixed office and its objectives and functions have not been well developed.

(3) Non-governmental Organization (NGO) Projects

There are a large number of small projects including credit services funded by various NGOs and operating in fisheries communities. The degree of coordination and coherence of objectives and procedures is low. Some of the systems focus on community organization and have an eventual goal to assist their client in establishing or joining savings and loan institutions. However, a number of the programs by adopting a welfare-oriented approach rather than a business-oriented from the start, make it difficult for the clients they serve to later make the transition to real world conditions they are likely to face with institutions which have to depend on interest income to cover the costs of their operations.

Collaboration between the NGOs which are working directly in fishing communities and the Ministry of Fisheries is hampered by the fact that NGOs cannot communicate officially with the Government except through the Ministry of Women and the Family which is responsible for transmitting correspondence from NGOs to appropriate line Ministries. Followings are the outline of two major NGOs working with fishing communities:

Association pour un dynamique de Progrès Economique et Social

Association pour un dynamique de Progrès Economique et Social (ADPES), a NGO which works with women's organizations on the Grande Côte from Saint Louis to Dakar and also as far as south the Cap-Vert peninsula. This NGO derives most of its support from a variety of European NGOs. It uses credit as an incentive to help women's group organize, with the eventual goal of helping them either to form or to join mutuelles in their communities. They charge women's groups 10 percent interest on loans used for fish processing and to a limited extent for small-scale fish trading; in case of absolutely on-time repayment, the entire 10percent interest is rebated to the group. In 1995-96, they financed 10 local unions comprising

118 women's GIEs for a total of FCFA 22 million US\$44 thousand); repayment was 100 percent. They also financed additional women's groups associated with CNPS and other groups in Thiaroye and Mbaou.

Centre de Recherches pour le Développement des Technologies intermédiaires de Pêche

Centre de Recherches pour le Développement des Technologies intermédiaires de Pêche (CREDETIP) was set up by statute as an NGO in 1985 exclusively in support of fisheries, at a time when all support from the Government and NGOs was focused on the agricultural sector. CREDETIP provides technical assistance to the independent fishermen's organization, Collective National des Pêcheurs de Sénégal (CNPS) and to the mutual funds which CNPS has organized. CREDETIP has obtained considerable external finance, principally from European sources, and the mutual fund system it supports is more heavily dependent than other systems on external funding and charges lower interest rate than competing systems.

(4) Mutual Fund Systems in Local Community

The restrictions on monetary growth and tightening of the availability of credit within the national financial sector during the 1980s and early 1990s encouraged the populace to turn savings and mutuelles (credit institution). For the most part this expansion occurred spontaneously, without adequate training or technical assistance for staff or members, and lacking an appropriate legal framework. During the period July 1990 and July 1992, old structures were consolidated and the groundwork laid to establish new ones. At that time the current structure was established and the Ministry of Finance was given the responsibility over all mutuelles. Between 1992 and 1995, 67 mutuelles were granted the approval of the Ministry of Finance.

Law No.95-03 provides the framework under which mutualist institutions will be operating from now on; previously all credit operations were supposed to be governed by the banking law which was inappropriate to the need of small mutualist institutions. Under the terms of the new law, an additional 30 mutuelles have been registered, bringing the total to 97 approved by the Ministry of Finance.

There are a total of 346 institutions now operating in the collection of savings and the making of loans; a large number do not currently qualify for the Ministry approval and are destined to disappear.

Supervision of the movement is carried out by the National Coordination Committee (CNC) composed of the Prime Minister's office, the various Ministries and the donors including Italy, German, USAID, World Bank, UNDP which promote or have promoted mutuelles in the past. Any funds being provided to mutuelles by donors have to be authorized by the CNC.

The dominant force in the mutual fund sector are the mutuelles affiliated to Crédit Mutuel Sénégalaise (CMS), followed by those supported by PAMECAS, CNCAS and CNPS/CREDETIP. The operations of CMS and those of the institutions affiliated with other systems are described below.

1) **Crédit Mutuel Sénégalaise (CMS)**

By far the largest grouping of mutuelles in the country is the CMS system established with the help of International Center of Crédit Mutuel (CICM) from France. Its headquarters is at Thies with regional offices at Thies, Kaolack, Tambacounda, and Ziguinchor. Its current structure of 75 mutuelles covers 8 out of 10 regions in the country; only Saint Louis and Louga are currently unrepresented. Out of the 75 caisses (=credit offices) in operation, 67 have been recognized by the Ministry of Finance. Plans for expansion include Hann, Kayar, Mboro and Saint Louis, which would give CMS better coverage of north coast fishing communities than it now has. The outline of CMS is as follows.

a. Membership

- Nearly 37,000 members at the end of 1995; expected to rise to 60,000 members by the end of 1996, over 70 percent of the members are women
- Membership fee of FCFA 1,500 (about US\$3) per person
- Both individuals and groups can hold accounts at CMS caisses
- About 1,200 women's groups having accounts in the system

b. Total deposit

- Approximately FCFA 2 billion (US\$4 million) by the end of 1995; the goal for savings is FCFA 3.5 billion (US\$7 million) by the end of 1996
- Currently no external lines of credit; savings are of primordial importance to the ability of the institution to lend

c. Loans granted

- Limit loans to less than 50 percent of savings;
- 10,000 loans for a total of FCFA 1.1 billion (US\$2.2 million) in 1995 is equivalent to 35 percent of savings
- Average loan size was FCFA 80,000 (US\$160) in 1994 and rose to 100,000 FCFA (US\$200) in 1995
- Repayment rate which was 98 percent in 1994 rose to 99 percent in 1995; the repayment rate of women is reported to be 100 percent
- About 24 percent for short-term loans and 16 percent for medium term loans in 1995

Membership is open to anyone in a community. Given the importance to

fishing, fish processing and marketing, a significant number of the members, particularly women's groups are involved in one way or another with the sector. Loans are made to members for the broad variety of small businesses in which they are involved as well as for their family financial needs.

Staff consists of a total of 160 employees, with the number per caisse varying between one and four depending on its membership size (minimum 250 members for a rural and 500 for an urban caisse) and the number of daily operations (up to 400 in the case of Thies). All the staff are local except for four expatriate staff financed by CFD. The General Assembly elects a board of directors (10 members, unpaid) which decides on loans and other business of the caisse and a Board of Surveillance which verifies all operations and the management of the caisse. Each caisse and the overall system present accounts annually; these accounts are audited by Ernst and Young, which is an internationally recognized auditing firm.

2) Other mutualist systems

Program of Assistance to Savings and Loan Mutuelles (PAMECAS)

CIDA is supporting the savings and loan cooperative movement with the PAMECAS project, which started in 1994. It includes four main components: concentration, training, support to ACEP and start-up of a new network of mutuelles in Rufisque and Pikine. Their future expansion program includes other areas on the outskirts of Dakar not currently served by banks or other mutuelles.

Agency for Credit for Private enterprises (ACEP)

This agency was established as a project in 1986 with initial finance from USAID of US\$1.7 million for the purpose of financing small businesses. Additionally funding has since been provided by the Senegalese Government and ACEP has continued financing small businesses. Its branch structure covers all 10 regions of Senegal with five regional offices including Saint Louis. ACEP has a total of 3,372 members; of whom 21 percent were women. ACEP currently has external funding from CFD and Belgo-Senegalese counterpart funds provided by the Government. It also borrows currently FCFA 200 million (US\$400,000) from CNCAS to fund agriculture which has a strong seasonal demand for credit.

CNCAS

Although CNCAS is an agricultural development bank, it provides technical assistance and some resources to a small number of caisses based on an agreement signed in 1989 with Pro-Peche. Technical assistance was provided by the Desjardin

Foundation. In Hann and Kayar, which are the target fishing areas of the Study, there are CNCA-supported Mutuelles; they are described in the "2.5 Credit System in the Study Areas." of this report.

(5) Other Credit-related Projects

1) Missirah Project

Although the Missirah project, under the technical and financial assistance of the Japanese Government, does not supply credit in the normal sense itself, it did help some local women access credit from PAPEC's line of credit with CNCAS. Through the efforts of project personnel, three women's GIEs were formed with a total membership of 43 women. Each woman received FCFA 100,000 (US\$200) for processing fish. According to the Project's 1995 annual report, the women all paid back their loans 100 percent on-time and were at the time the report was published (February 1996) waiting for a new loan, this time of FCFA 150,000 (US\$300) per woman.

2) Centre d'Assistance et d'Experimentation et Vulgarisation pour la Pêche Artisanale (CAEP)

CAEP provides assistance, research and training to the artisanal fisheries sector. Its personnel is composed of 11 permanent staff and 46 contractors. It is the successor organization to CAMP, the institution responsible in large measure for the motorization of the Senegalese artisanal fishing boats. One of the major activities was the sale to fishermen of equipment donated by the government of Japan in 1994, principally 100 Yanmar 27HP diesel outboard motors.

1.6 Gender Analysis on the Fishery Sector

(1) Situation of Women in Senegal

Data describing the situation of women in Senegal is shown in the Table I.1.6-1. One of the most common social customs practiced by the Senegalese people is polygamy. Polygamy is commonly accepted in the community and it is more popularly practiced in the rural communities rather than in the urban areas. Men are allowed to have up to four wives according to religious tradition. About 45 percent of all married women are married to polygamous men and this rate is relatively high even among the Islamic countries. The number of polygamous households do not appear to be declining.

However, women, who accept this type of marriage are generally self-sustaining and run various income generating activities independently. Their income usually supports the basic finances of the household.

(2) Women's Role in Fishing Activities

Women are mainly active in artisanal fish processing and micro-wholesaling. Most of them work independently and their income is separate from their husbands' income. However, under the guidance of projects supported by the government, donors and NGOs, women have formed groups for receiving credit, for conducting group activities including income generating activities and training.

(3) Institutions and Organizations Related to Women's Empowerment

There are various types of projects implemented by foreign donors and NGOs for improving institution building and women's empowerment in the artisanal fishery sector in Senegal. The following is an outline of major projects and organizations related to fishing community development. Fig. I.1.6-1 and Fig. I.1.6-2 outline those projects.

UOPAGC

An evaluation of the Pro-pêche project indicated that only four percent of the beneficiaries of the credit component were women. Based on the evaluation result, PAFGC (Programme d'Autopromotion des Femmes de la Grande Côte) has been started by CIDA. PAFGC exclusively targets women as its beneficiaries. The project has promoted institutional building and income generating activities in the Grande Côte.

A women's union of GIEs named UOPAGC (L'Union des Operatrices de la Pêche Artisanale de la Grande Côte) was established by the project. The union

consists of six management committees located in Saint Louis, Lompoul, Fass Boye, Kayar, Pikine, and Hann. Their activity include promoting group activities, operating an internal revolving fund, information exchange, and extension of marketing activities. They have been technically and financially supported by CIDA through the local consulting firm.

Ministry of Women, Children, and Families

The Ministry of Women, Children, and Families has implemented PAGPF (Project d'Appui aux Groupements de Promotion Feminine) and PATT (Project d'Appui Technique et Technologique) to promote female institution building for income generating activities in both the fishery and agriculture sectors. The total PAGPF budget for five years from July 1992 to July 1997, including an one-year extension was 5 billion FCFA which was funded by AfDB and FND. PATT is funded by UNIFEM.

The groups targeted by PAGPF are female groups including GIEs in the five regions of Dakar, Thies, Diourbel, Kolda, and Tambacounda. PATT has provided technical and financial assistance to four GIEs comprised of female fish and vegetable processors in Kayar, Fass Boye, and Keur Moussé.

CAEP

In addition to motorization of fishing boats and dissemination of navigation equipment, CAEP has been implementing literacy education to empower fishermen, processors, and wholesalers. Training in house economy, accounting, sanitation, family planning, utilization of credit system etc., are also provided through the literacy education. There are 10 classes located in the fishing centers throughout the country. In addition, they cooperate with PAGFP in the institutional strengthening activities of UOPAGC.

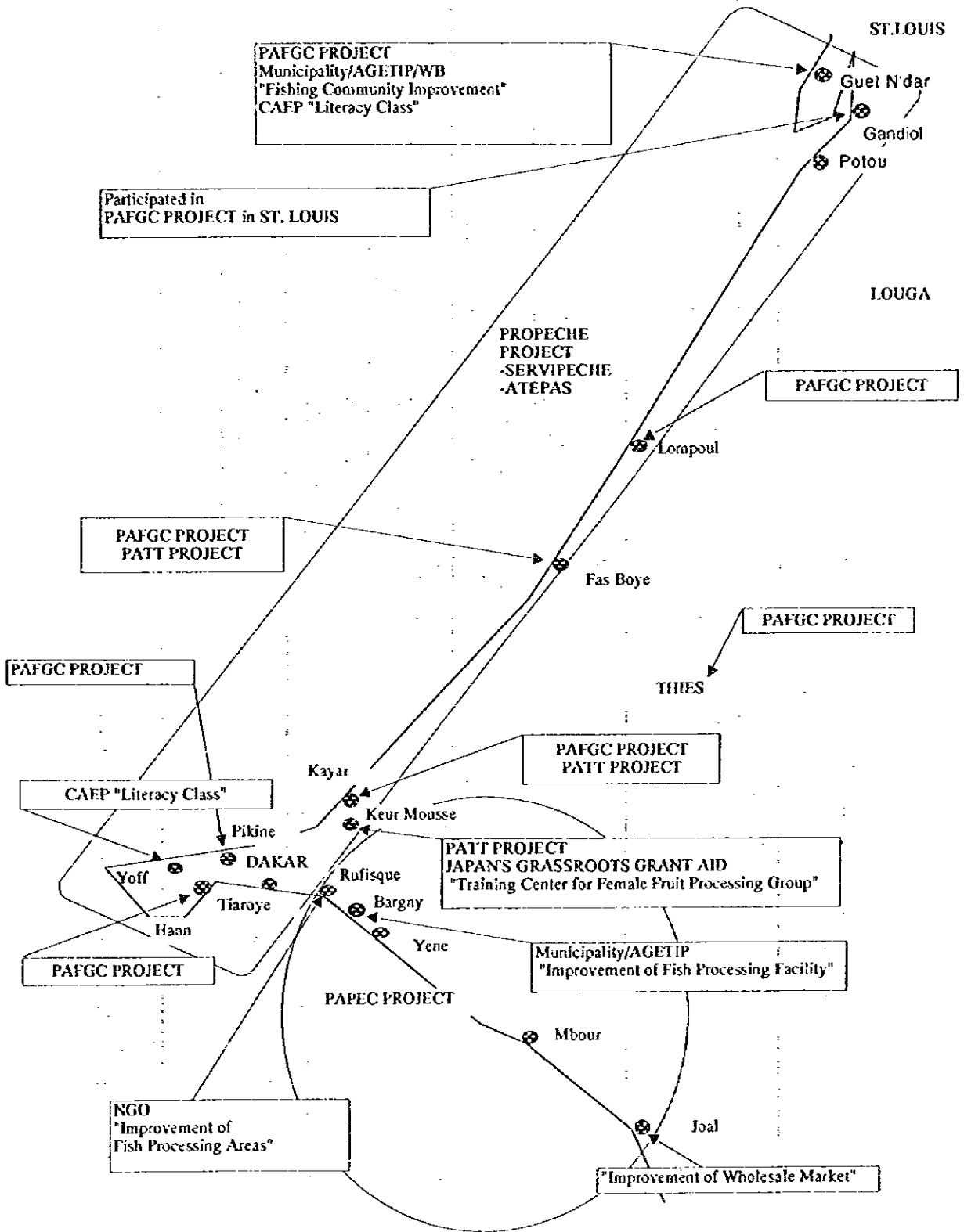


Fig. I.1.6-1 Projects Related to Women's Empowerment

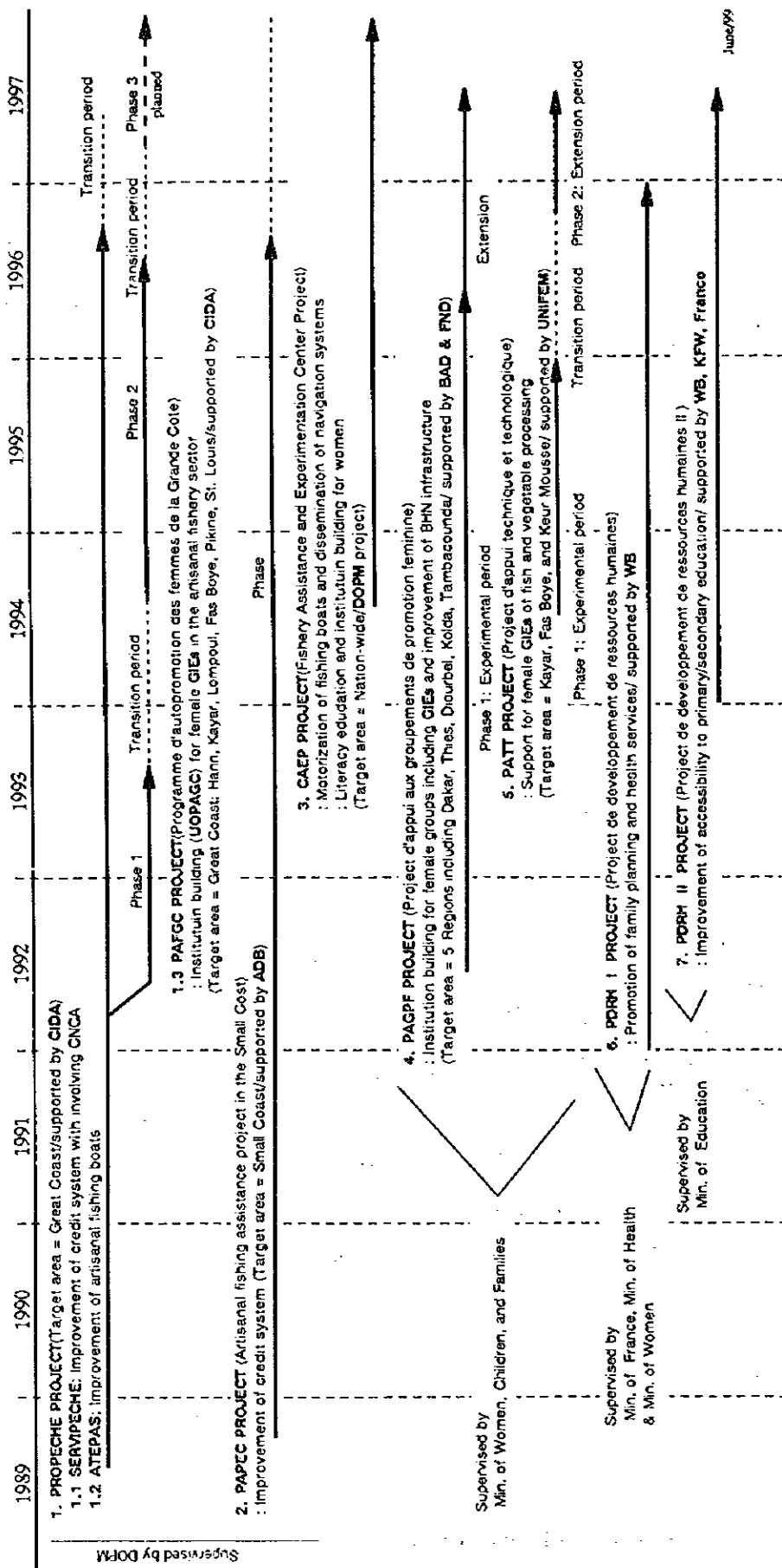


Fig. I.1.6-2 Map of Past and On-going Projects Related to Fishing Community

Table I.1.6-1 Socio-economic Data Related to Women in Senegal (1995)

Items	Data in 1995
Population:	8,347,000 persons
- % of women	52%
- % of women of reproductive age (15-49)	22.9%
GDP per capita	US\$559
Average age of women of their first marriage	16.6 years old
% of female headed families	18%
Infant Mortality Rate (total)	68/1,000 births (1993)
- girls	60/1,000 births (1993)
- boys	81/1,000 births (1993)
Maternal Mortality Rate	510/100,000 births
Life expectancy (total)	49 years old
- women	50 years old
Primary school enrollment (total)	59%
- girls	54%
• living in urban area	81%
• living in rural area	22%
- boys	64%
• living in urban area	92%
• living in rural area	47%
Secondary school enrollment (total)	21%
- girls	15.1%
Illiteracy rate	
- women	78%
- men	63%
Rate of women working	
- in the agriculture sector	68%
- in the commercial sector	19%
- in the public service sector	9%

Source: Plan d'Action National de la Femme Senegalaise, 1997-2001, Min. of Women, Sept. 1996

1.7 Institutions in the Fishery Sector

(1) Direction of Oceanography and Marine Fishery (DOPM)

The Direction of Oceanography and Marine Fishery (DOPM), which is directly under the Ministry of Fisheries and Marine Transports, is in charge of setting the policy of armament, production, processing and marketing in terms of artisanal and industrial fisheries. The organizational chart of DOPM is shown in Fig. I.1.7.1, and its overall functions are as follows.

- Study and provide its point of view on financial request presented to financial institutions
- Provide technical support or assistance to fishery professionals
- Propose any measure necessary for better promotion of fishery products
- Organize the training and promotion of fishermen
- Coordinate and control the activities of regional services related to fisheries and those of other projects

The DOPM, under the Director of fisheries, has three main divisions, namely Division of Industrial Fishery, Division of Artisanal Fishery and Division of Credit, and three bureaus (Bureau of Personnel, Bureau of Management, Bureau of Mail), CEPIA (Bank for Encouragement of Fishery and Fisheries Related Industries) and Fisheries Projects (PSPS, Missirah Project, PAPEC and CAEP).

Division of Industrial Fishing

The Division of Industrial Fishery has three bureaus, namely Bureau of Fish Production, Bureau of Fishing Industry, and Bureau of Licensing (for issuing identity cards for wholesalers and exporters). The division is in charge of :

- Sanitary control of fishery products
- Technical assistance to professionals
- Study of data related to the implementation of fisheries related industry and infrastructure
- Relation (links) with services and organizations related to industrial fishing
- Enforcement of legislation and regulations related to industrial fishing
- Consistency of files for fishing licenses and wholesale cards

Division of Artisanal Fishery

The Division of Artisanal Fishery has four bureaus, namely Bureau of Regional Service Office Coordination, Bureau of Statistics and Documentation and Bureau of Duty Free Fuel and Wholesaler Identity Card and Bureau of Fishery

Organization. The division is in charge of :

- Setting of the policy for the promotion of traditional fishing;
- Training of artisanal fishermen to whom equipment have been provided;
- Conception and spreading of new technology for artisanal fishing, the preservation, processing and marketing.

Division of Credit

The Division of Credit has four bureaux, namely Bureau of Credit, Bureau of Legal and Bureau of Study and Planning and Bureau of Statistics and Documentation.

The division is in charge of :

- Study and the setting of a policy for the financing of fishery and in charge of links with institutions dealing with credit
- Assistance of all fishery professional for any problem related to an application for credit to competent institutions
- Preparation and consistency (following) in terms of maritime fishery for the social and economic development plan
- Study and the preparation of legislation and regulations
- Links with the national and international institutions in the fishery sector
- Centralization and treatment of statistical data
- Documentation

Regional fisheries services office (SRPM)

There are seven Regional Fisheries Service Office (SRPM) located in Dakar, Saint Louis, Thies, Louga, Kaolack, Ziguinchor, and Fatick; and each SRPM has sector service office with control post. Each SRPM is in charge of :

- regional promotion of fishery economy;
- control of the armament, the production, the treatment and the distribution of marine products;
- enforcement of the legislation in terms of fishing;
- sanitary control;
- fishermen training and the spreading of technology;
- execution of programmes;
- consistency (following) of local projects for development.

(2) Projects under the DOPM

Centre d'Assistance et d' Experimentation et Vulgarization pour la Pêche Artisanale

Centre d'Assistance et d' Experimentation et Vulgarization pour la Pêche Artisanale (CAEP) is the successor organization of CAMP (Center of Assistance for

the Motorization of Pirogues) project, which began in 1972 and handled most of the sales and servicing of outboard engines in Senegal. CAEP's decree are to support for development of artisanal fishing by assisting in experiment, education and training of fisheries communities on production, processing, marketing activities; and by experimentation and popularization of technical innovations linked to the development of the artisanal fishing. CAMP's financial support for promotion of motorization through the revolving fund was transferred to CAEP, and CAEP is continuing the revenue collection of the revolving fund system.

CAEP provides assistance, research and training to the artisanal fisheries sector. Its personnel is composed of 11 permanent staff and 46 contractors. The institution is responsible in large measures for the motorization of the Senegalese artisanal boats, which is nearly complete. Its budget for 1995 reached nearly FCFA 180 million (US\$360,000), of which close to 97% went for operations. One of the major activities was the sale to fishermen of equipment donated by the Japanese Government in 1994, principally 100 Yanmar 27 HP diesel outboard motors.

Some experimental fishing and processing activities are also done. CAEP sponsors literacy classes for 300 people, supports the Grande Côte women's project (PAFGC), a workshop on engine repair, navigation, fishing techniques and quality control in fishing products.

Project for the Supervision and Protection of Fisheries

Project for the Supervision and Protection of Fisheries (PSPS) was established as a project in DOPM since 1981 with the assistance of Canadian Government, for surveillance, supervision and protection of fisheries resources. Since its inception, it has acquired wide experience in conservation of fisheries resources and also its means for supervision has also increased with fast coastal launches, coastal supervision ships and off-shore patrol boats. In addition to the control of fishing licenses, it also supervises the non-conformity of mesh sizes (nets), fishing in forbidden zones, transfer in sea without authorization.

From 1991, the Project has intensified the supervision of the coastal fringe implementing the six coastal supervision stations equipped with radar and radio means HF and VHF. PSPS office in DOPM has equipped with powerful radio functioning 24 hours in order to coordinate the operation conducted by the coastal stations and listen to the means of supervision, vessels operating in the Senegalese waters. This radio station allows also the PSPS to be linked twice per week to the supervision structures of other countries of the Sub-Regional Committee for Fisheries, namely Gambia, Guinea Bissau, Cape Vert Isles and Mauritania.

Missirah Fishery Center Project

The Missirah Fishery Center Project, located in Missirah, Fatick, started in 1989 under the technical and financial assistance of the Japanese Government for the purpose of assisting in fishing modernization, fish processing and marketing. The project is managed by an autonomous body and it has Japanese fishery experts dispatched by JICA for technology transfer. The project provided ice-making machines, cold-storage facilities, generators necessary to operate them, and a variety of types of fishing units.

It has also helped women involved in processing fish in organizing GIEs and getting access to credit from PAPEC's credit line with CNCAS. The Project has been successful in general in promoting artisanal fisheries activities in the surrounding areas by running fish related business.

Petite Côte Artisanal Fisheries Project

Petite Côte Artisanal Fisheries Project (PAPEC) project, established in 1987, supports artisanal fisheries development on the Petite Côte south of Dakar under the financial assistance of African Development Bank (ADB), and its objectives are to stimulate the artisanal fisheries sector which was handicapped through lacking of appropriate equipment for fish production, landing facilities, marketing means, etc., to increase the local fish production and to improve the supply of fish in domestic market. The project has had a major impact on artisanal fisheries in the region, principally through investment in infrastructure and provision of a line of credit through CNCAS.

In order to achieve its objectives, PAPEC had structured two plans: a plan for establishment of infrastructure such as landing facilities, processing sites, market hall, etc.; and the other plan for provision of credit all actors in the artisanal fisheries sector. The project was budgeted at FCFA 3,257 million (a loan of FCFA 2,757 million from ADB and FCFA 480 million from the Senegalese side). The PAPEC is confined to Petite Cote, but it administratively covers departments of Mbour and Rufisque and regions of Fatick and Kaolack. PAPEC has its headquarters in Mbour and decentralized branch offices in the fisheries centers in Mbour, Joal, Rufisque, Foundiougne and Djifere.

Some 1,207 millions CFA were allocated for two aprons and market halls in Joal and Rufisque, and processing area in Joal. For the complimentary works undertaken in Joal and Rufisque FCFA 243 million were allocated, and FCFA 71 million for processing area in Rufisque. The headquarters of the project in Mbour received about FCFA 149 million. The amount of fund allocated for the credit plan

was FCFA 1.6 billion to cover investment credit (long term) and equipment credit (short, medium and long terms), and working capital credit (short term). The financial management of the line of credit is the responsibility of CNCAS. The Joal fisheries center under the PAPEC is managed by management committee which is under the responsibility of the municipality, and Rufisque fisheries center is managed by PAPEC officer and his staff.

(3) Dakar Central Fish Market

Dakar Central Fish Market (CFM), a wholesale market in the consumption area, was established in 1992 in conformity with Resolution of Communauté Urbaine de Dakar. The CFM is managed by Communauté Urbaine de Dakar (Municipality), and it has its own financial autonomy. It is administered by a director who is under the control of a Management Committee, and the Management Committee is under the authority of the President of Communauté Urbaine de Dakar. The organization chart is shown in Fig. I.1.7-2.

The CFM has internal regulations for the daily operation of market with 19 articles from the management and administration of the market, access to the market, security and discipline in the market, sanitary control, sales organization, fish storage, rental of boxes and ice crushing. The tariffs in force currently have been deliberated and fixed on October 20, 1992 by "Le Comité de la Communauté Urbaine de Dakar" after open debate with the professionals, and approval by the Minister of Internal Affairs. Some of the tariff levied are as follows;

Annual registration card of wholesalers	5,000 FCFA/year/person
Parking of trucks	2,000 FCFA/truck
Taxis and other vehicles	100 FCFA/vehicle
Market hall charges	
- High price fish & crustaceans	100 FCFA/m ²
- Frozen fish	100 FCFA/m ²
- Other fish	75 FCFA/m ²
Fish storage	
- Fresh fish	5 FCFA/kg/day
- Processed fish	2 FCFA/kg/day
Rental of boxes	50 FCFA/box/day
Ice sales	
- November - April	450 FCFA/block (25 kg)
- May - October	500 FCFA/block (25 kg)
Ice crushing	15 FCFA/block (25 kg)

The above regulations are strictly enforced and are abided by the users; it is

rather easier to enforce in Dakar than in the production areas because of the high literacy rate in the urban area.

In 1995 total revenue earned was FCFA 247.8 million (about 63 % from the sales of ice), and its expenditure was FCFA 207.2 million where 25 percent was for electricity and 29 percent for salaries while the salary of DOPM staff despatched to CFM is paid by the State). The profit without depreciation was FCFA 40.5 million, which is deposited with Dakar Municipality.

(4) Centre de Mareyage de Kayar

The Centre de Mareyage de Kayar has the function of wholesale center in the production area under a Decree. The purpose of this center is to ensure regular supply of ice in sufficient quantity to artisanal fishery professionals for the preservation and marketing of fishery products, extension and rationalization of fish distribution flow to contribute to food security, advisory and training of professional organizations in the sector of marketing, creation of jobs in the artisanal fishery, management of resources, etc.

With all the above functions, its only function currently is the sales of ice, storage of fish and distribution of fish to the interior area of Senegal. There are no wholesale activities within the center. The current charges levied are FCFA 1,000/box of plate ice (40 kg), and fish storage FCFA 250/box of fish (40 kg).

The Centre de Mareyage de Kayar is administered by a director nominated by decree by the Ministry of Fishery and Marine Transportation (MPTM). The director is under the Surveillance Committee led by the Director of DOPM. The Surveillance Committee holds meetings three times a year. Below the director is the Management Committee led by the director, and the Management Committee is the consultation body between professionals and the Direction, and it holds a meeting every three months.

The Centre de Mareyage de Kayar has a staff of 19 persons (11 permanent and 8 contracted staff) and temporary workers about 9 persons during glut season. In 1995 total revenue earned was FCFA 55.2 million (mainly from the sales of ice), and its expenditure was about FCFA 29.8 million where 47 percent was for electricity and 34 percent for salaries (no salaries come from the state for any of the staff). The profit before depreciation was FCFA 25.4 million. In 1996 the total revenue was FCFA 130 million and the expenditure was FCFA 90 million; of which about 6 percent was salary and 44 percent was for electricity. The profit before depreciation was about FCFA 40 million.

(5) Joal and Rufisque Fisheries Centers (PAPEC)

Joal Fisheries Center established under PAPEC project has landing site and market hall covering an area of about 8,000 m² and truck berth of 6,000 m². This center has totally a different management system under the responsibility of the municipality which has set up a Management Committee chaired by the Mayor. The committee controls the landing site and the market hall. Manager and his staff are hired and paid by the municipality. Users pay charges which are used for the operation of the facilities and equipment. There are 24 staff in charge of the maintenance and security of the facilities, and there are 21 regularly hired staff on average salary of FCFA 20,000 - 25,000 a month. There are two kinds of charges; daily charges go to the Management Committee and the monthly charges are shared by the municipality and the Management Committee. The association of wholesalers receive FCFA 100 of the FCFA 500 paid by the wholesalers. The following charges are in force in the Joal market hall and the average monthly revenues collected is about FCFA 1.1 million.

- 25 FCFA for use of toilets
- 50 - 150 FCFA/day for retailers
- 500 FCFA/day for wholesalers
- 100 FCFA/day for horse carts
- 500 FCFA/day for trucks

For Rufisque fisheries center, a market hall to be used as packaging site, landing site, truck berth, water and sanitation facilities, water tower for sea water and fresh water were built under the PAPEC project. The total cost was about FCFA 288 million. The municipality built the wall and the administrative office. The infrastructure set up by the PAPEC is managed by a PAPEC officer and his staff.

(6) Centre de Recherche Oceanographique de Dakar-Thiaroye (CRODT)

The Centre de Recherche Oceanographique de Dakar-Thiaroye (CRODT) is under authority of the Ministry of Agriculture, and it conducts research related to fishery sector. Currently CRODT has a total of 73 staff member, consisting of 54 contractual staff, 6 government staff and 13 expatriated staff members. The main priority themes of its research are:

- Evaluation of fishery resources and the determination of their level of exploitation
- Identification of the causes of the variability of fishery resources depending on the fluctuations of the marine environment
- Application and the validation of the model of exploitation systems and identification of development scenarios
- Determination of the level of profitability of traditional and industrial fishing

units for the definition of the investment strategies

- Study of markets for fishery products and optimal marketing strategies
- Identification of causes of coastal erosion and the integration of the results of coastal development

(7) Institut de Technologie Alimentaire (ITA)

Institut de Technologie Alimentaire (ITA), located in Dakar and governed by Ministry of Science and Technology, is responsible for improvement in the agriculture food sector in Senegal. ITA provides various support for artisanal and industrial enterprises in dissemination of concept, production and certification of "agriculture products of good quality" in the agriculture food sector through the activities in its microbiology and chemical laboratories and pilot plants.

Their main activities includes:

- Research and development on services of food nutrition quality;
- Technology transfer to enterprises;
- Adaptation of local and international regulations and standards;
- Formation of technical specialty;
- Quality control

(8) Regulations on Fish Wholesaling

There is a Decree 73-585 (June 23, 1975) for the regulations for wholesaling in general and it has been amended several times. This Decree defines the wholesaling occupation, qualification for wholesalers, standards for products, issuance of wholesaling cards, control of wholesaling activities. Wholesaling occupation can only be operated by a person, association or company, who has a professional card issued by the minister of rural development, and also he has to provide evidence of being a civil servant and having adequate infrastructure and equipment dictated by the decree. There are three categories of non-transferable professional cards:

- 1) the first category professional card (fishermen-wholesaler card) issued to fishermen, companies or producer association who operate only in the marketing of fishery products of their own boats.
- 2) the second category professional card (wholesaler card) issued to wholesalers marketing fishery products within the national territory.
- 3) the third category professional card (wholesaler - exporter card) issued to wholesalers operating in exports.

The first and second category professional cards are issued only to Senegalese people, companies or corporation. The wholesaling cards are valid for three years and they can be validated. The professional cards can be suspended for a limit of six months or indefinitely for reasons of not complying with the laws and regulations.

There are other laws and regulations for wholesaling and processing that have been amended several times. Some of the laws and regulations related to wholesaling and artisanal processing are listed below.

- 1) Decree 90-969 (September 5, 1990) relates to Fixing Technical Conditions for Wholesale Practice, which covers general conditions, hygiene, transport and export and final arrangements (inspection)
- 2) Order 2348 (March 29, 1957) relates the Standards of Quality for Dry-Salted Fish (GUEDJ), which covers Quality Guarantee, Standards for Preparation, Choice of Raw Materials, Composition Standards, Sanitary Control and Inspection.
- 3) Order 3641 (April 15, 1991) relates to Particular Technical Arrangements Relative to Places Where the Treatment and Conditioning of Fishery Products Destined to Export, which covers conditions relative to the use and maintenance of the places and the material, treatment conditions and hygienic condition applicable to workers.

(9) Quality Control and Inspection

In Senegal there is a decree 69-132 issued on February 1968 related to the control of the fishery products and issuance of health certificate. Quality control inspection and health certificates are required for import, export, transport, sale of the fishery products. The Bureau for the Control of Fishery Products (BCPH) in DOPM has been authorized to conduct quality control inspection and to issue health certificates based on the decree.

BCPH has two functions; one is to control fishing regulations such as size of nets and issuance of licenses, and the other function is quality control inspection and issuance of health certificates. The quality control inspection covers from the landing of fish products to production, packing, transportation and marketing of fish products.

There are 23 inspectors in Dakar, eight in Saint Louis and five in Kayar. BCPH has a laboratory in Dakar Head Office with limited facilities and equipment and it conducts only sensory inspection. In case of chemical and bacterial analyses, the BCPH request the services of University of Dakar and private laboratories.

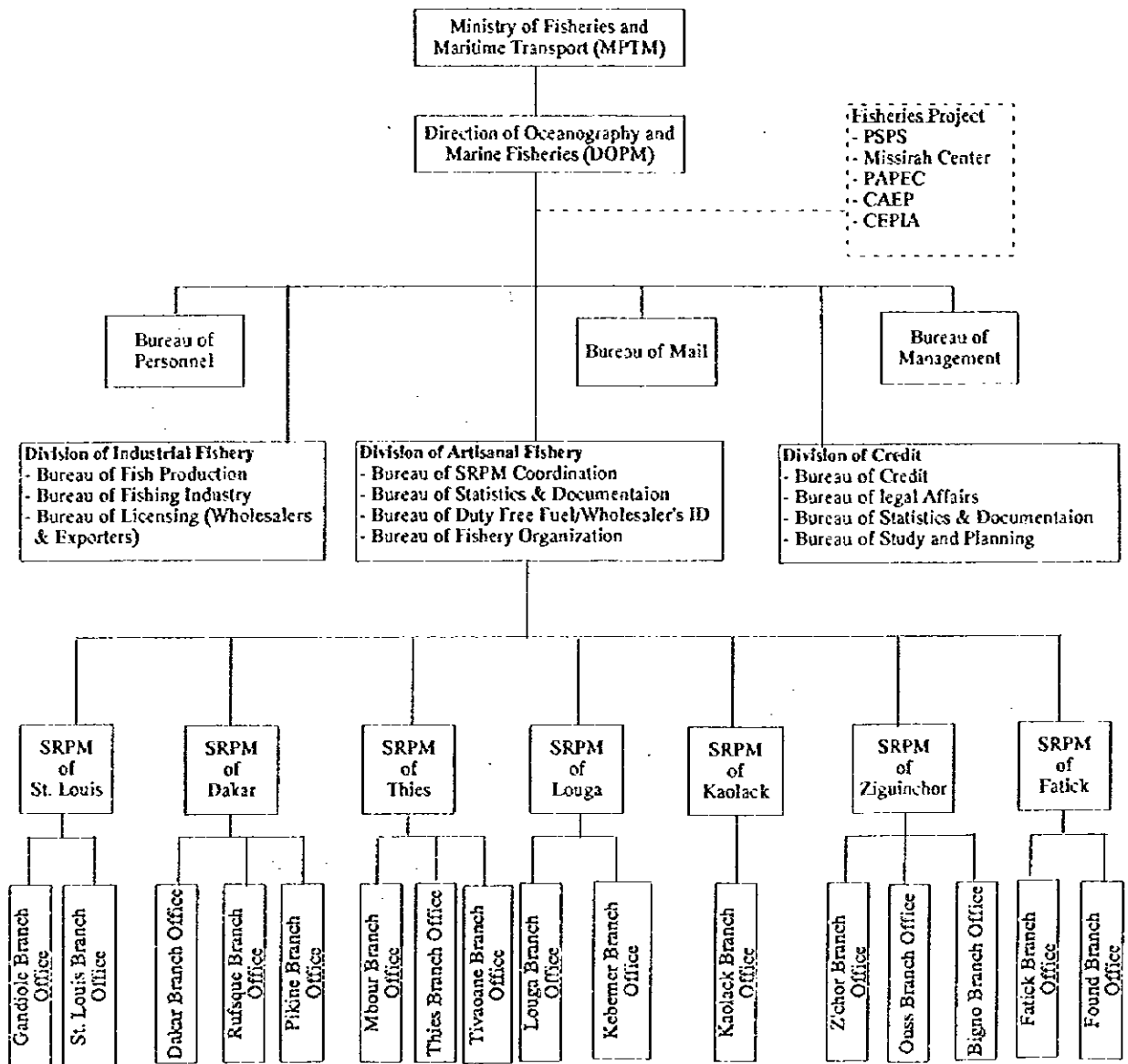
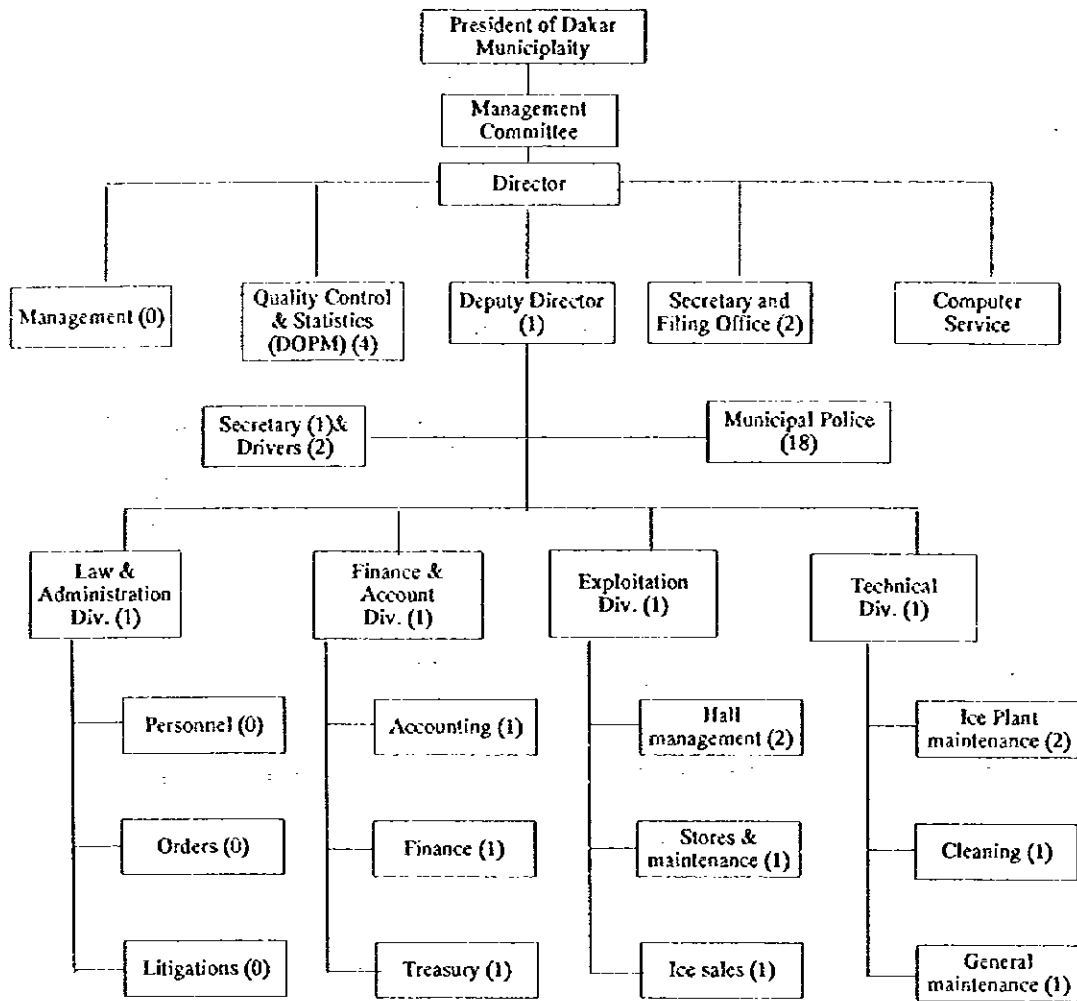
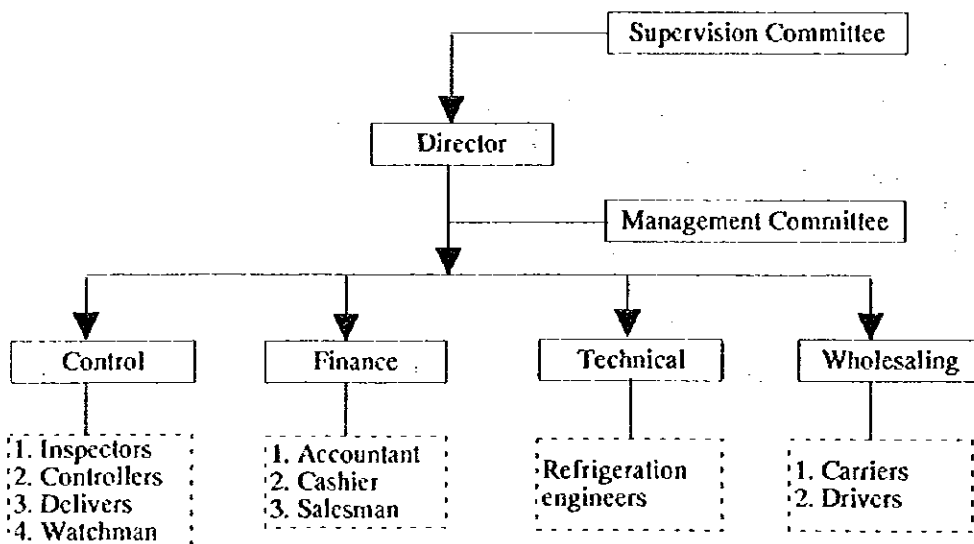


Fig. I.1.7.1 Organizational Chart of Direction of Oceanography and Marine Fisheries (DOPM)



Source: Dakar Central Fish Market, CFM 1995
 Remarks: Figures in parentheses indicate number of staff.

Fig. I.1.7.2 Organization Chart of Dakar Central Fish Market



Source: Centre de Mareyage de Kayar

Fig. I.1.7.3 Organizational Chart of Centre de Mareyage de Kayar

Table I.1.7.1 Revenue and Expenditure of Dakar Central Fish Market (1994 & 1995)

	Unit: FCFA	
	1994	1995
Revenue		
1 Hiring of halls	23,036,600	26,401,000
2 Wholesalers fee	820,000	90,000
3 Carriers fee	8,115,000	14,069,900
4 Lorries entry fee	26,766,000	28,464,000
5 Taxis entry fee	5,178,800	8,775,400
6 Ice sale	163,093,800	156,967,700
7 Hiring of boxes	5,704,100	7,650,150
8 Fresh fish storgae	5,152,350	4,620,120
9 Ice crushing	1,157,695	650,385
Total	239,024,345	247,748,655
Expenditure		
10 Office furniture	1,976,689	2,872,460
11 Registers & printed forms	3,469,192	2,984,800
12 Maintenance products	673,623	1,524,580
13 Transports	-	-
14 Other services	26,916,747	18,695,451
15 Other charges & losses	611,467	996,718
16 Staff fees	22,848,000	26,502,513
17 Taxation	160,000	60,000
18 Salaries	33,838,940	33,834,940
19 Overtime hours	5,560,844	4,983,860
20 Productivity bonus for collectors	1,308,151	1,140,214
21 Trips	-	-
22 Provident fund	1,206,073	-
23 State benefits paid to families	-	-
24 Work injury	309,189	-
25 Hospitalization	79,200	-
26 Recycling & formaion fees	100,000	411,500
27 Staff clothes	564,800	-
28 Factory products consumed	3,142,574	6,243,732
29 Workshop products consumed	5,286,732	6,513,345
30 Spare parts	2,898,628	2,429,432
31 Electricity	52,569,076	50,989,537
32 Water	21,112,934	8,608,384
33 Fuel for generator	1,820,850	2,348,756
34 Gasoline	6,027,176	6,948,254
35 Lubricant	857,949	1,646,078
36 Other products	743,100	1,651,400
37 Investment expenses	32,524,773	25,821,575
Total	226,606,707	207,207,529
Profit	12,417,638	40,541,126

Remarks: 1) Profit deposited in CUD (Communaute Urbaine de Dakar) account.

2) Depreciation is not included.

Source: Dakar Central Fish Market, CFM 1995

Table I.1.7.2 Revenue and Expenditure of Centre de Mareyage de Kayar (1995 & 1996)

	Unit: FCFA			
	1995	Share	1996	Share
Revenue				
Sales of ice	55,185,750			
	55,185,750		130,000,000	
Expenditure				
1 Salary	10,080,200	1649%	23,000,000	26%
2 Daily work force	355,900	58%		
3 Allowances, etc.	1,635,350	267%		
4 Electricity	14,060,603	2299%	40,000,000	44%
5 Maintenance of vehicles/engines	786,848	129%		
6 Transportation	145,875	24%		
7 Communication	582,267	95%		
8 Fuel	219,575	36%		
9 Consumable materials	1,141,075	187%		
10 Medical fee	138,901	23%		
11 Other expenses	646,453	106%	27,000,000	30%
Total	29,793,017	4872%	90,000,000	100%
Profit	25,392,703		40,000,000	

Remarks: 1) Depreciation is not included.

2) For 1995, the data refers to March to December (provided data).

3) For 1996, based on interview with the director.

Source: Centre de Mareyage de Kayar

1.8 Environment and Natural Conditions

(1) Environmental Legal Framework and Concerns

The existing standards and code de l'environnement

The applicable laws which have relevance to the control and management of the environment, sanitation, and natural resources are, Hygiene law (Loi portant Code de l'Hygiene), Water Law (Loi portant Code de l'Eau), Bill of Sanitation Law (Projet de Loi portant Code de l'Assainissement), Bill of the Environmental Law (Projet de Loi portant Code de l'Environnement), Town Planning Law (Loi portant Code de l'Urbanisme).

There are no specific limits or standards in Senegal with regards to the control of pollution. However, they apply informal standards adopted from various international standards (WHO, AFNOR, etc.).

There are no guidelines or requirements for environmental impact study. The Bill of the Environmental Law (law 83.95, January 1983), provides for implementation decree, however, none was taken or prepared.

There are new proposed Environmental Law, Sanitation Law, Law of the Beach (Littoral) that seek to better control and manage the use of the environment to keep up with the changing conditions and to update the law. . One of the most important component of the new Environmental Law is the requirement for an impact study before an authorization is granted for development that may adversely impact the environment or in any reserve forest.

The new Environmental Law which is being reviewed/debated in the State Council. It has already been adopted by the Social and Economic Council and the General Assembly. It is expected to be approved this or next year.

Requirement of impact study by the new environmental law (refer to Fig. I.1.8-1)

- A description of the proposed activity
- A description of the environment likely to be damaged, including the specific necessary information to identify and estimate / evaluate the effects of the proposed activity on the environment.
- A description of other alternative solutions if necessary
- An evaluation of potential or likely effects other proposed activity and the other possible solutions on environment, including the direct or indirect long term and short term cumulative effects
- Identification and description of existing measures aimed at reducing the negative effects of the proposed activity and other possible solution on

environment and an evaluation of these measures.

- An indication of the lack / insufficiencies of knowledge and uncertainties in the necessary information
- The likelihood that the environmental resources will be at risk or affected by the proposed activity or by the alternative solutions.

(2) Environmental Policy

The basic principle of MEPN's environmental policy is based on three points:

- Harmonizing all actions and conceptions of all partners involved in the management and Environment and natural resources protection by the means of a broad program MEPN aims mainly Youth and Women
- Involve and empower the population and partners from the public services in the decision making process of integrated programs and allow them to benefit to socio-economic outputs of these programs.
- Increase meaning fully the national participation in funding MEPN programs and the number of funding agencies. Simultaneously actions will be undertaken to maximize foreign funds.

One has to realize that sectorial approaches and lack of effective participation of local populations have so far reduced the results of the programs that have been developed. So the Senegalese ecosystem remains very vulnerable. Taking into account all these facts, MEPN has decided that the general policy should aim at the development of an environmental culture within all the social economic sphere in order to break the Poverty Populaton Environment (PPE) spiral.

(3) Natural Conditions

Context

Senegal is a West African country characterized by a flat and sandy landscape, with forest covering about one-fifth of its territory. In addition to two major rivers, the Senegal and the Gambia, the country also has several secondary rivers flowing through it. The port of Dakar is one of the largest ports in West Africa.

The Atlantic coast of Senegal is sandy and surf beaten. To the south of the Saloum River mouth, the coast consists of drowned valleys and is increasingly fringed with mangrove swamps. The relief is generally low except to the south-east where the topography is more broken and hilly.

Climate

The Project study area is known as the Zone of Niayes. This zone is located in the sub-canarian climatic zone characterised by the boreal trade wind (maritime). The wind blows from the northerly direction (NNW-NNE) after being cooled by the cold stream of the canaries. It predominantly blows from December to May keeping the temperature low on the coast (refer to Fig. I.1.8-2).

The coastal climate merges with the dry and hot interior under the influence of the hot dry wind called "harmattan". This creates a pressure gradient as we go from the coast to the interior. From June the trade wind is replaced by the monsoon (W-NW) and the specificity for the region, which is in fact related to the maritime trade wind, will disappear.

Rainfall

The rainy season lasts from July to October in the Sahelian zone and from June to October in the Sudanese, with annual rainfall of about 355 mm in the north and about 1,525 mm in the south.

The bulk (70%) of the rainfall takes place between August and September and there is a noticeable lessening of precipitation from the south to the north as well as from the coast to the interior area (refer to Fig. I.1.8-3).

Temperature

Temperatures vary according to the season, with an average range of 24 to 38 C, the highest being in the north. The lowest temperature is during the dry season and this also the period of the highest temperature in the interior area. The hottest period being June and October with the temperature going up from south to north, and from coast to inland area (refer to Fig. I.1.8-4).

Ocean current

Off the Senegalese coast, the general ocean current flows in two major directions. The north-equatorial stream carries cool waters of the Canaries stream westward and the equatorial counter current created by the warm waters coming from the southern edge of the north-Atlantic whirlpool going westward. Near the coast, these flows give birth to a south stream (moved by the equatorial stream) carrying cool waters from November to May during the period of the trade winds, and an unsteady stream with a predominant north direction carrying warm water coming from the equatorial counter current from June to August (refer to Fig. I.1.8-5).

(4) Initial Environmental Examination (IEE)

Methodology of IEE

In line with JICA environmental evaluation guidelines and considering the Senegalese environmental regulations, an Initial Environmental Evaluation was conducted to identify the significant impacts of project components / activities in the Study area. The flow-chart of the IEE for the Phase 1 study period is shown in Fig. I.1.8-6.

As a tool to identify the possible significant impact during this IEE stage, a check sheet was derived taking into consideration the environmental condition of the project study area. This check sheet was presented to the Senegalese counterpart for discussion and was approved to be used for the IEE.

IEE Checksheet

The IEE checksheet approved for use is shown in Fig. I.1.8-7. It list the major environmental resources that may be affected and the type of activities that may have impact on the environment and conversely the impact of the environment on the activities.

The significant impacts identified in the IEE checksheet was used during the planning stages to identify Environmental Impact Assessment (EIA) scope and investigation items for the feasibility study.

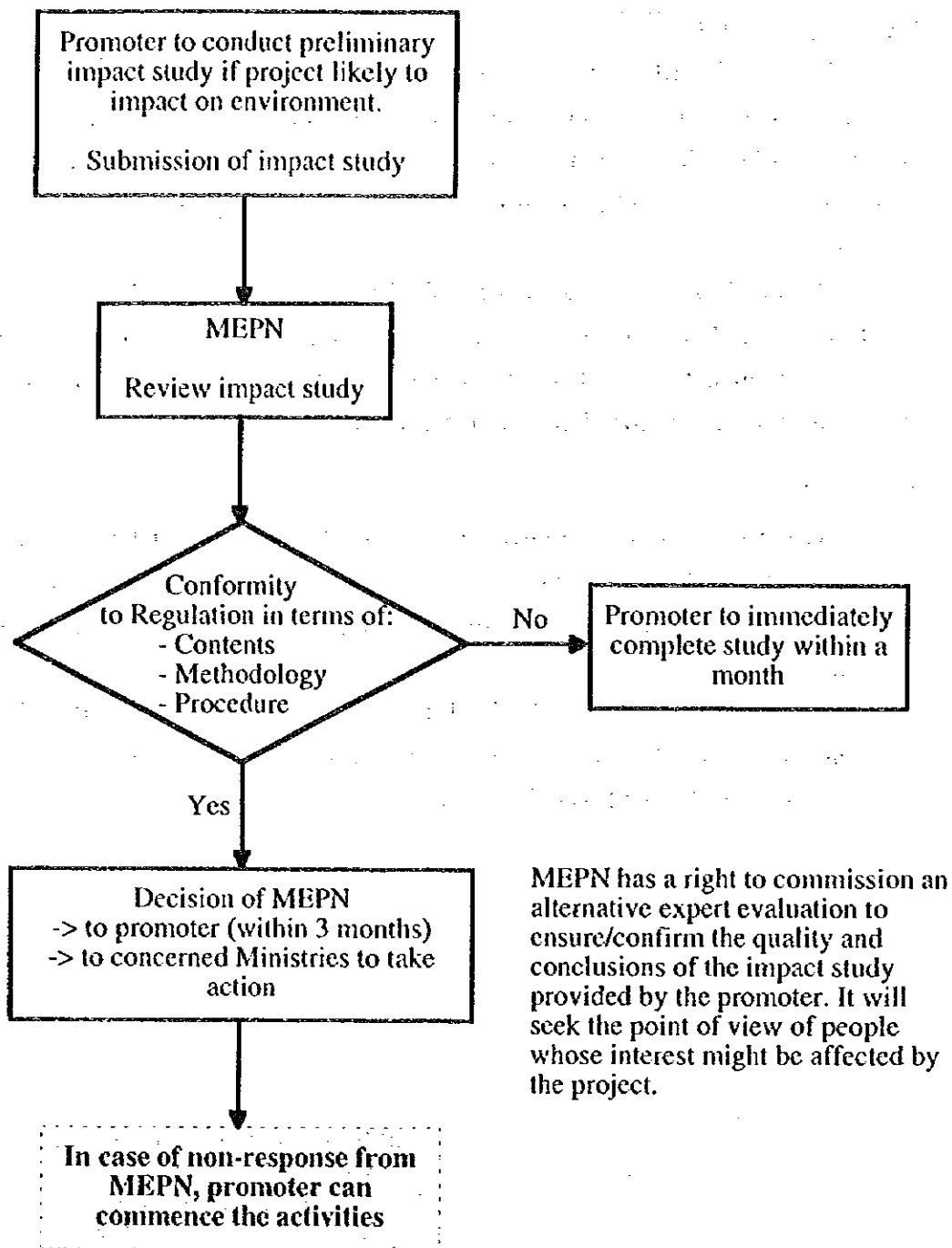
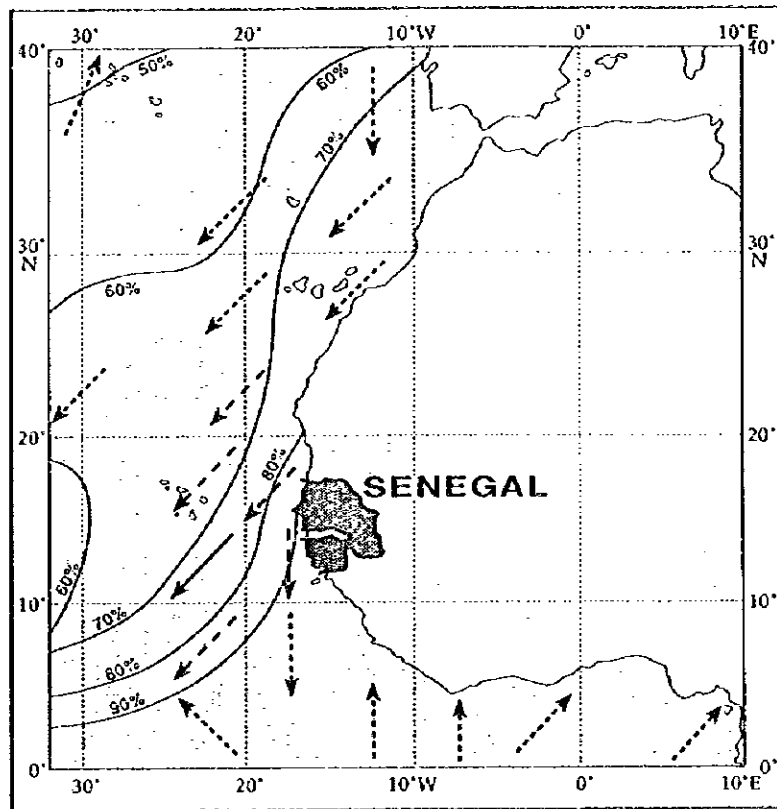
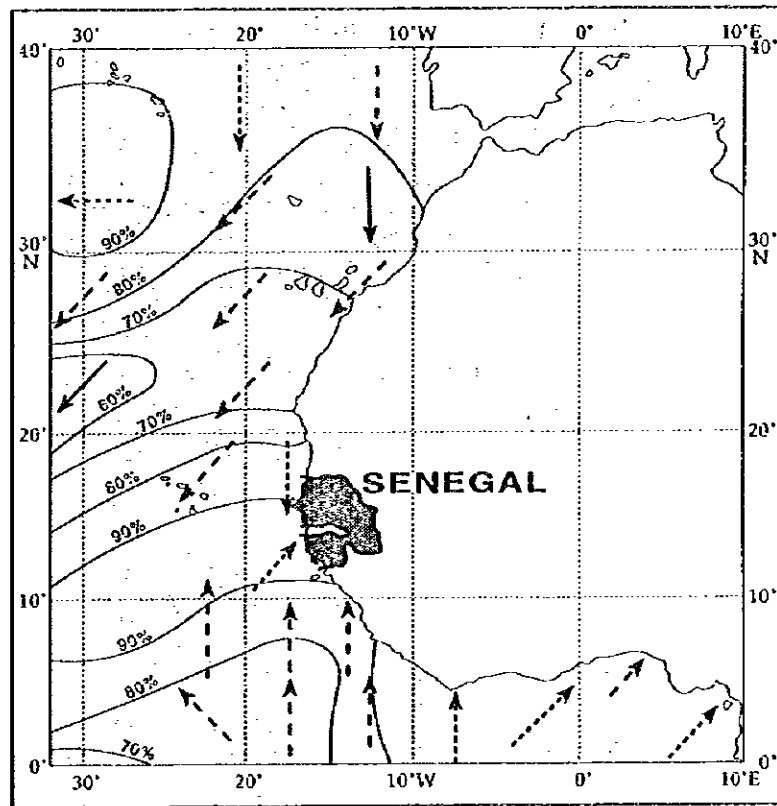


Fig. I.1.8-1 Requirement of Impact Study by the new Environmental Law



January



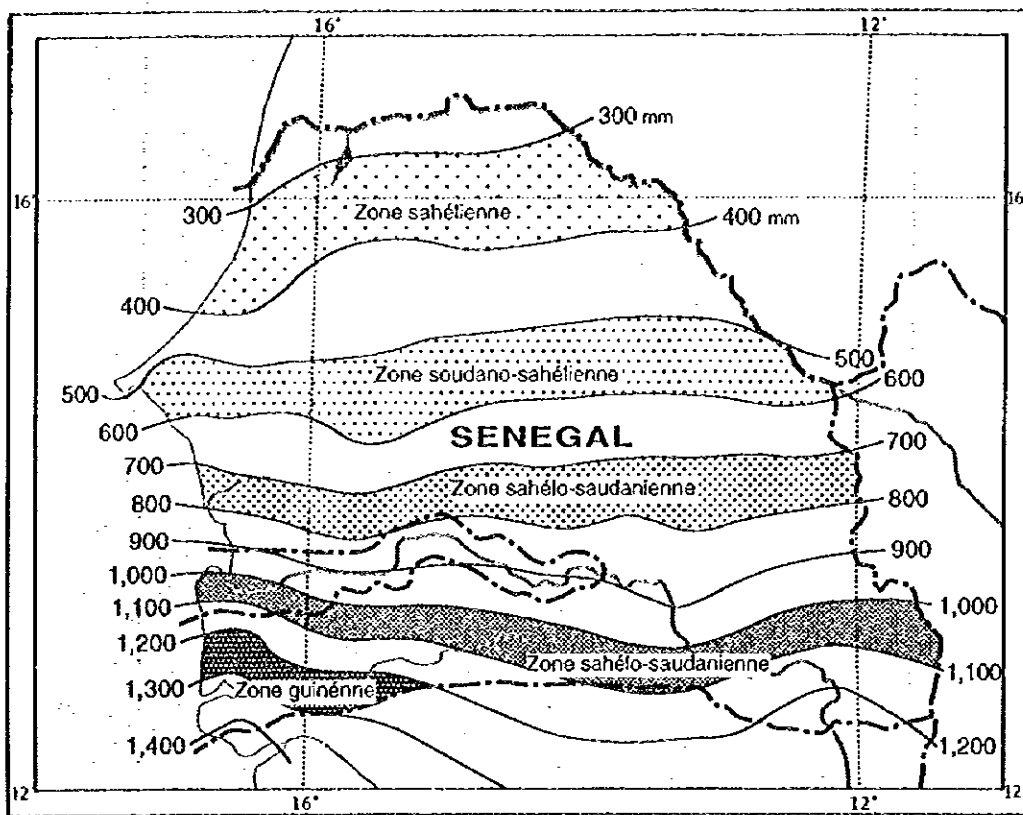
July

Remarks : 1. Arrows indicate direction of dominant wind
 2. Percentage indicates frequency of wind between Force 0-4 (Beaufort scale)

Source : Service Hydrographique et Oceanographique de La Marine, Instructions Nautiques Afrique, 1981.

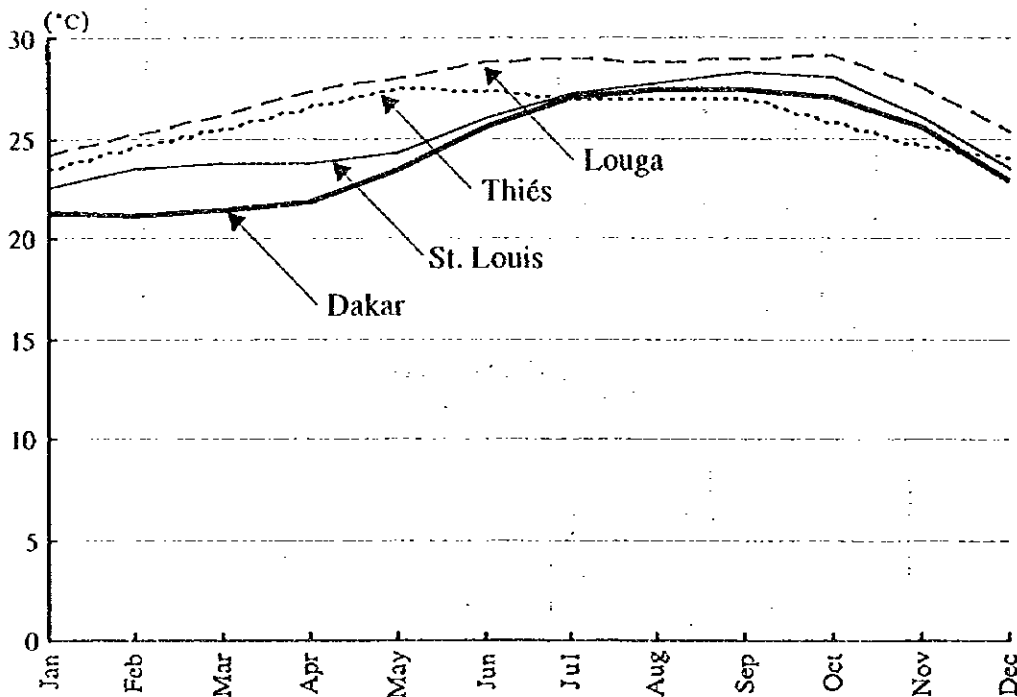
Fig. I.1.8-2 Direction & Force of Dominant Wind

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Source : Bilan - Diagnostic des Ressources en Eau du Senegal, Sep. 1994

Fig.I.1.8-3 Rainfall Isohyet Per Zone (from 1951-90)

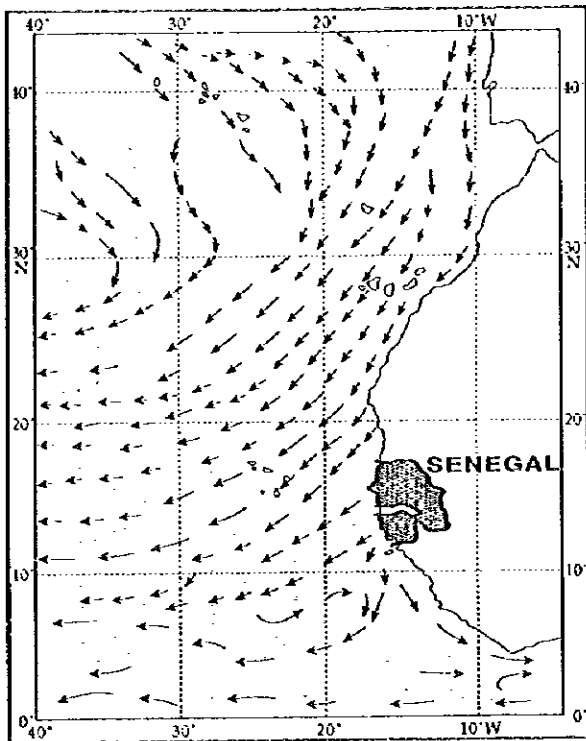


Source: Direction de la Meteorologie Nationale, 1951-1995 data

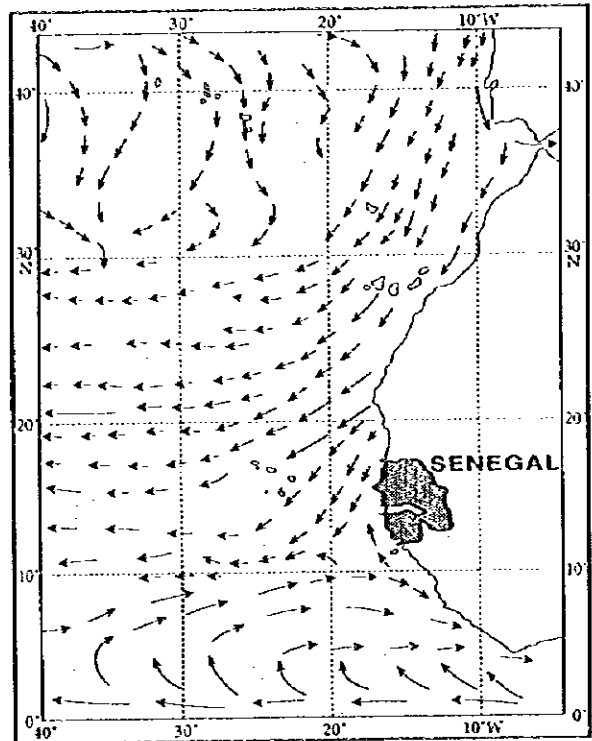
Fig.I.1.8-4 Monthly Annual Temperature

Fig.I.1.8-3 Rainfall Isohyet Per Zone (from 1951-90)
 Fig.I.1.8-4 Monthly Annual Temperature

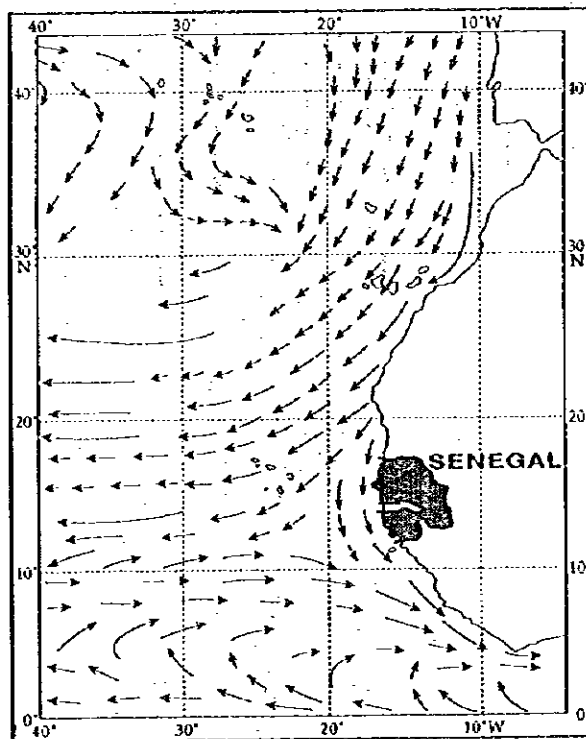
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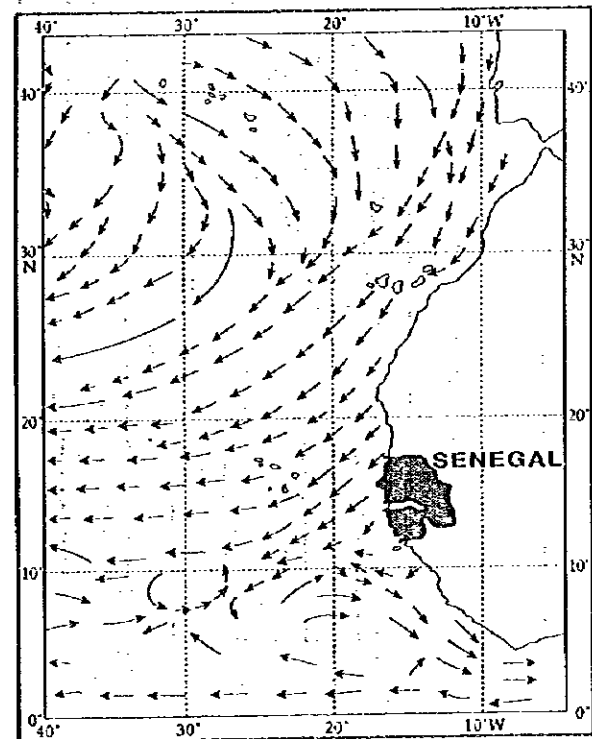
February



May



August



November

Source : Service Hydrographique et Oceanographique de La Marine, Instructions Nautiques Afrique, 1981.

Fig. I.1.8-5 Ocean Current Movement

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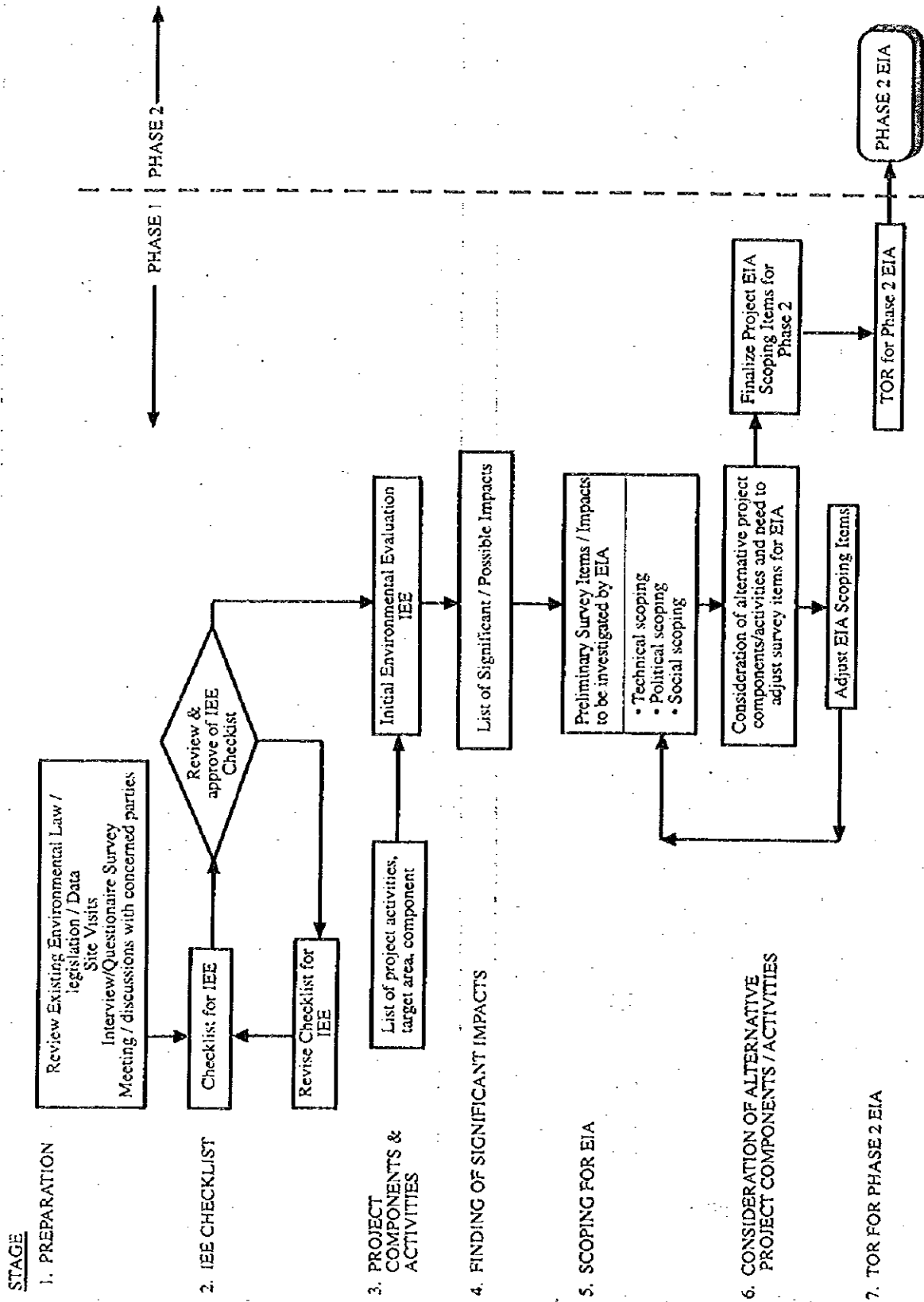


Fig. I.1.8.6 Flow Chart of Phase I Initial Environmental Examination

