

INTRODUCTION

Socio-economic Importance of Fishing : a Multipurpose Activity

The Senegalese economy had once depended heavily on phosphates and groundnut. Since the drought years and the crisis recorded in the agricultural sector, fishing has become the first sector of the economy. An essential component of rural development, fishing is a multipurpose activity strongly integrated in the rest of the Senegalese economy and society. Fishing plays a strategic role in ensuring durable growth of the national economy, notably, by contributing to reduction of balance of payments deficit, unemployment and to the satisfaction of the populations' protein needs.

Fishing is a major component of the government's food security policy (in all regions of Senegal, the share of fish in animal protein consumption is higher than 75%). It employs about 15% of the working population, that is, about 600,000 people thus contributing largely to filling the unemployment gap. Furthermore, the Government is paying special attention to this sector in its effort to restore trade balance. It accounts for about one-third of the value of foreign sales.

Exports Growth, Social and Environmental Pressures

Despite its economic and social importance, the sector has to face serious disequilibria both in resource exploitation and market supply : the coastal demersal (deep lying fish) stocks with high market value - mostly exported - are fully to over exploited with a serious risk of local market supply shortages looming ahead. Simultaneously, pelagic stocks (surface fish), locally consumed, are less fished than before, which threatens food security.

These pressures became clear as the sector took a turn towards meeting external demand. In a structural adjustment context, this move was facilitated through exogenous stimulation into the play of market forces.

Liberalised Trade of Piscatorial Products

Despite its distorted effects, the sector's connection to external markets had some advantages because of its important role in efforts to strike trade balance. However, the connection is threatened by multilateral liberalisation of trade. The new Lome Agreement provides for phasing out ACP (Africa, Caribbean and Pacific) countries trade advantages. In the meantime, the process towards custom tariff reduction initiated under the aegis of the World Trade Organisation (WTO) should speed up their erosion. While crisis factors have already been identified, it is important to verify whether the advent of liberalisation is not likely to aggravate them, to produce other ones or on the contrary, whether it will facilitate, if anticipated, the search for solutions.

Managing to combine, in a Liberalisation Context, the Search for External Competitiveness, Sustainable Resource Management and Food Security

While the sector faces serious problems, the latter must be resolved in a context complicated by the multipurpose nature of the activity. In view of the various purposes served by the Senegalese fisheries, any solution tending to favour a strategic objective at the expense of others will entail quite a number of inconveniences.

Chapter I

Senegalese Fisheries under Adjustment

At the time when structural adjustment policies touched Senegal along with a great number of other African countries, the piscatorial sector was in full bloom. The development of fishing activities was mainly underpinned by small-scale fishing sub-sector, which had long been neglected by regulating measures. To the extent that adjustment did not translate, as in the case of agriculture, into a substantial decline in production. Nonetheless, it would be wrong to conclude that it has had no impact on activity orientation. By emphasising the need to balance external accounts, adjustment entailed an incentive to link up the sector to export (already encouraged by other mechanisms).

1.1. A Sector dominated by Small-Scale Fishing the Expansion of which is primarily based on the Domestic Market

During the colonial era and after independence, the Senegalese piscatorial sector witnessed numerous interventions aimed at organising its production. Most of these interventions were characterised by a "modernist" bias, which tried to model small-scale fishing on industrial development pattern represented by European fisheries. These attempts failed. While it absorbed most of the financing made available to fishing, the industrial sub-sector has remained more or less pale with clearly lower performance than that of its counterpart (pirogue fishing accounts for 80% of catches). Hence, the spectacular growth of the sector, the production of which increased from 50,000 tons in 1965 to about 450,000 tons today should be mainly attributed to a dynamic small-scale fishing sector.

1.2. Structural Adjustment and Domestic Market Liberalisation

In the early 1980s, Senegal was confronted with a serious crisis resulting from the persistent difficulties in various sectors. The balance of payments continuously deteriorated over the past decade due to declining export receipts and increased prices of imported goods, resulting in increased Government's debt. Given the size of the deficits, Senegal could no longer avoid adjusting to its external environment. It was the first sub-Saharan country to sign, in 1980, an extended Fund facility with the International Monetary Fund (IMF) and a structural adjustment programme with the World Bank.

With structural adjustment policies, the Government gradually withdrew from the fishing sector. It has withdrawn from input and fishing equipment distribution since 1985 and was replaced by the private sector while maintaining reduced tax on motors, fishing gears and fuel. The Government, with the support of international donors, replaced official funding with private funding. Fish marketing and the profession of fish wholesaler have been liberalised.

1.3. An Uninterrupted Dynamism Despite Government's Withdrawal

Noted to have been in constant progress over several decades, small-scale fish landings were marked by a spectacular increase over the past twenty years. From 130,000 tons in the early 1980s, production rose to 170,000 tons in 1985, 250,000 tons in 1990 and has reached 350,000 tons today.

Stating from the foregoing that adjustment has had globally positive consequences on piscatorial activity is a conclusion that empirical observations on piscatorial activity does not allow one to jump to at present. Since the introduction of SAP, production not only increased but sales on the international market also rose. Yet, this situation, which can be traced more or less closely to adjustment finally raised both socio-economic and environmental problems.

1.4 Adjustment and "Growth through Exports"

The application of SAP in Senegal coincided with increased share of piscatorial products in exports. Since 1986, the sector has topped the list of external trade ahead of the combination of phosphates and groundnut and accounted for about one-third of external receipts. As a result, authorities and donors' interest in the fisheries could no longer be denied. Hinged on efforts to restore equilibrium in the external accounts, which is required to balance liabilities, adjustment favoured "growth through exports" policies. Fishing then played an important role in the whole mechanism.

An export subsidy was instituted in 1980 for agricultural products, in general; it was extended to tuna in 1983 with an increase in its rate from 10% to 15%. When the system was recast in 1986, it extended the base to all types of piscatorial products and raised the rate to 25%. The subsidy was cancelled in March 1994 by presidential decree, following devaluation of the Cfa franc by 50% in 1994.

1.5 Encouragement Mechanisms and Producers' Rent

A number of factors have favoured sector's increasing linkage with exports. In most cases, these were exogenous stimulants to enter the play of market forces. Paradoxically, some of these stimulants were therefore linked to SAP. This was of course the case of export subsidy, which, in a context of foreign exchange shortages, consecrated the importance assumed by piscatorial products in the Senegalese exports structure. But this was also the case of devaluation imposed by multilateral financial institutions (IMF).

In the years that followed devaluation, exported volumes did not increase significantly (table 1). 1999 should not create an illusion, as the sudden increase in volumes was mainly attributable to the exceptional conditions of octopus exploitation and such conditions are less likely to be regularly met (table 2).

TABLE 1

Senegalese Exports of Piscatorial Products (tons)

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Volume	124672.6	118850.6	86110.65	83822.79	93674	103463	107080	112157	109448	124338

Source : DOPM

TABLE 2

Senegalese Exports of Molluscs (tons)

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Volume	1646.1	25917.8	86110.65	12774.85	14946.95	13271	12924	11327	14650	46626

Source : DOPM

The increasing extraversion of the piscatorial sector was also due to stimulus not linked to adjustment. Such is the case of the Lome Agreement, which from 1982 considerably strengthened ACP countries competitiveness on the European market (See supra). It is today estimated that the European market absorbs up to 80% of African exports of sea products (and 66% of exports of Senegalese piscatorial products).

All these incentives have therefore strongly contributed to increasingly linking the sector to exports. While all the operators with a linkage to external market benefited from a favourable environment, the economic and financial situation of the various components of production chain is

different. It is necessary notably to make a distinction from that standpoint between the capture component and the packaging and processing units. The increased number and capitalisation of demersal fishing units did not prevent their operating accounts from improving despite resource scarcity, especially that strong demand exerted upward pressure on commodity prices. On the contrary, the export-oriented packaging-processing component felt the full force of the blow dealt by the monetary illusion that followed devaluation. Though higher demand sent sale prices upward, if failed, in view of limited stocks, to compensate for rare raw materials and to cover higher costs. This situation probably turned out to be favourable to fresh or frozen exports, which require fewer investments hence fewer charges than processed products.

1.6 Socio-economic and Environmental Pressures

The creation of a favourable environment for exports finally influenced the conditions of reproduction of export breeds. A number of breeds are apparently on the verge of biological rupture. Should exploitation be pursued at current rate, the developments observed regarding processing component is likely to be repeated at the capture level. Concurrently, while official incentives stimulate exports, an increasing number of specialised operators in the capture of domestic market breeds, notably, small pelagic fish, have turned to coastal demersal fishing. They have been all the more encouraged to do so as devaluation has increased capital charges without changing the level of domestic demand. The resulting gap often required that production be adapted or face bankruptcy. Therefore, the conditions for lower supply on domestic market had been met, triggering an increase in prices, which is dangerous for the country's food security.

Chapter II

Study of the Costs and Incomes of Small Scale Fishing Units

2.1 Study Context

The catches of industrial units are clearly insufficient to cover fish export needs. Therefore, in a move to ensure their regular supply of piscatorial products, some industries resort to small-scale fishermen through fish and seafood wholesalers to the extent of providing them with the equipment they need for their activity. The fishermen then reserve their catches for the industry that buy them at an agreed pre-set price. On the whole, small-scale fishing units provide about 60% of fish exporting industries' supply.

Following devaluation of the CFA franc in 1994, the prospect of substantial gains on the international market entailed a shift of efforts from fishing for domestic market breeds to export breeds. This is not a new phenomenon, but it became more accentuated at the instigation of a broad demand export market for great quantities of piscatorial products (solvent external demand, appealing prices) and fishermen who quickly moved to adjust to the conditions of resource exploitation.

This prolonged pressure of fishing effort resulted in the over exploitation of coastal demersal resources and a decline in local fish trade. The study on the costs and income of small-scale fishing units should help to :

- better control fishing effort redeployment terms and conditions as well as the other strategies adopted by small-scale fishermen;
- facilitate better understanding of the financial profitability levels of investments in small-scale fishing;
- evaluate better trends and opportunities of the small-scale sub-sector with a view to maximising investments.

2.2 Methodology

The outcome of field investigation in the form of semi-structured interviews with small-scale fishermen owning fishing units was used to update investment costs and the operating charges recorded in 1993 and 1996. The fishing units profitability levels were obtained together with the price levels of the main breed catches from the CRODT data bank and were used to estimate generated income. The field investigation was carried out on the *Petite Côte* of Senegal (*Mbourg* and *Joal*) : more than 25% of fishing units are operating there and account for 40% of total fish landings in Senegal ;besides, all types of fishing are represented there. The purpose of the study on the financial and economic profitability of fishing units was to reconstitute their operating accounts from available data (catch per unit of effort and landings price) and investigations (investment and operating costs).

Taking the fishing production sharing system into consideration made it possible to determine capital (fishing unit owner) and labour (number of fishermen aboard) income, leading to the calculation of internal rate of return (boat owner's net income/invested capital ratio) and time needed to amortise invested capital.

2.3 Fishing Units

Coastal pelagic stocks have long been exploited in Senegal on a small-scale through purse seines and gill nets. Many small-scale fishing gears have targeted coastal demersals. Moreover, due to the scarcity of these breeds, fishing gears have become blended, replacing standardisation within each unit. Blend fishing combines mainly three types of fishing : angling, dormant net and pot fishing (ADNP). Thus, the study used ice angling (traditionally dominant) and ADNP blend to assess small-scale exploitation of coastal demersal fish.

2.3.1 Purse seines

FAO introduced purse seines in Senegal in 1972 in an effort to put at the disposal of small-scale fishermen, more performing fishing gears to exploit the small coastal pelagic fish. The target breeds of purse seines also include, small flat sardinella, small round sardinella, yellow scad, bonito mackerel (*Cybiium tritor*), *Euthynnus alleteratus* and the great scad (*Caranx carangus*).

2.3.2 Surrounding gill nets

Introduced in Senegal in 1965, surrounding gill nets is the speciality of the *Nominka*, who are native of *Iles du Saloum*. These gears are in operation mainly in *Joal*. Great surrounding gill net captures ethmaloses while small surrounding gill net is more adapted to fishing small flat sardinella.

2.3.3 Ice-box pirogue

The unit icebox pirogue can carry along several types of fishing lines at each tide : scad (*Decapterus sp*, *Trachurus sp*), wreck fish (*Epinephelus sp*, *Serranidae*) and Sparidae (*Sparus caeruleostictus sp*, *Sparidae*) lines. The lines are hand-held aboard motorised pirogues measuring between 16 and 18m, fitted with an icebox and carrying a crew of seven (7) on average. Fishing trips last five days on average.

2.3.4 The Lines

Traditional hand-held lines or *palangrotte* is made of a nylon fibre with variable diameter and length. There are different types of lines depending on the demersal targeted species :

- the ground lines used for demersal fish fished from a anchored pirogue;
- jig fishing is used mainly to capture cephalopods (cuttlefish and octopuses).

2.3.5 Dormant Nets

Dormant nets are made of a set of several sheets the length, depth and stitch size of which vary according to breeds sought. There are different types of nets :

- fish dormant nets some of which are of surface type targeting sardinella or grey mullets as well as demersal breeds (soles, ray);
- dormant nets the target breed of which is *Cymbium* spp. (*Yeet*) ;
- lobster dormant nets.

2.3.6 Pots

The most commonly used pots are a steel-framed parallelepiped of about 1.20m long and 0.80cm wide. They have two round openings each located on either side of the trap. Pots are used to capture cuttlefish.

2.4 Investment Components and Related Costs

Depending on the type of fishing, investments in small-scale fishing consist mainly in purchasing pirogues, motors, fishing gears and accessories.

The comparative analysis of tables 3, 4 and 5 shows a clear upward trend in the different capital components of fishing units between 1993 and 1996 : 169% for outboard motors, 29% for pirogues and 67% for net sheets, lines and accessories. This sharp increase is linked to the effects of devaluation, which occurred in 1994. The rate of increase was clearly lower between 1996 and 1999 and never exceeded 15%. Incidentally, the prices of 40 horsepower outboard motors decreased by about 15% and that of 25 horsepower outboards, by 14%.

TABLE 3

Annual Investment and Operating Costs of Small Scale Fishing Units 1993

	Purse seines		Surrounding gill nets		Icebox line		ADNP Motor	
	<i>CFAF</i>	%	<i>CFAF</i>	%	<i>CFAF</i>	%	<i>CFAF</i>	%
Invested Capital								
Pirogue (8 to 12 m)	-	-	-	-	-	-	1 000 000	51,5
Pirogue (16 to 18 m)	1 400 000	15,4	1 400 000	42,9	1 400 000	63,3	-	
Pirogue (18 to 21 m)	1 850 000	20,4	-				-	
Motors	1 320 400	14,6	660 200	20,3	660 200	29,9	390 000	20,1
FishingGears	4 000 000	44,1	1 000 000	30,7	100 000	4,5	500 000	25,8
Accessories	500 000	5,5	200 000	6,1	50 000	2,3	50 000	2,6
TOTAL	9 070 200	100	3 260 200	100	2 210 200	100	1 940 000	100
Fixed costs								
- Depreciation								
. Motors	660 200	58,2	330 100	57,9	330 100	63,5	195 000	60,0
. Pirogues	325 000	28,6	140 000	24,6	140 000	26,9	100 000	30,8
- “ Insurances ”	150 000	13,2	100 000	17,5	50 000	9,6	30 000	9,2
TOTAL	1 135 200	100	570 000	100	520 100	100	325 000	100
Variable Costs								
Fuel	6 880 000	70,6	4 129 000	81,9	2 500 000	58,3	500 000	47,7
Food	1 000 000	10,3	400 000	7,9	500 000	11,7	150 000	14,3
Minor upkeep	120 000	1,2	60 000	1,2	60 000	1,4	50 000	4,8
Ice	-	-	-	-	800 000	18,7	-	-
Baits	-	-	-	-	250 000	5,8	100 000	9,5
Repair	-	-	-	-	-	-	-	-
Fishing Gears	1 000 000	10,3	250 000	5,0	25 000	0,6	125 000	11,9
Motors	251 000	2,6	125 500	2,5	125 500	2,9	74 100	7,1
. Pirogues	495 000	5,1	75 000	1,5	75 000	1,8	50 000	4,8
TOTAL	9 746 000	100	5 039 500	100	4 285 500	100	1 049 100	100

TABLE 4

Annual Investment and Operating Costs of Small Scale Fishing Units 1996

	Purse seines		Surrounding gill nets		Icebox line		ADNP Motor	
	<i>CFAF</i>	%	<i>CFAF</i>	%	<i>CFAF</i>	%	<i>CFAF</i>	%
Invested capital								
Pirogue (8 to 12 m)	-	-	-	-	-	-	1 300 000	35,6
Pirogue (16 to 18 m)	1 800 000	11,9	1 800 000	32,7	1 800 000	47,2	-	-
Pirogue (18 to 21 m)	2 400 000	15,9	-	-	-	-	-	-
Motors	3 560 000	23,6	1 780 000	32,3	1 780 000	46,7	1 454 000	39,8
Fishing gears	6 680 000	44,3	1 670 000	30,3	167 000	4,4	835 000	22,9
Accessories	650 000	4,3	260 000	4,7	65 000	1,7	65 000	1,8
TOTAL	15 090 000	100	5 510 000	100	3 812 000	100	3 654 000	100
Fixed Costs								
- Depreciation								
. Motors	1 780 000	74,3	890 000	74,2	890 000	78,6	727 000	81,1
. Pirogues	420 000	17,5	180 000	15,0	180 000	15,9	130 000	14,5
- " Insurances "	195 000	8,1	130 000	10,8	65 000	5,5	39 000	4,4
TOTAL	2 395 000	100	1 200 000	100	1 132 000	100	896 000	100
Variable Costs								
Fuel	10 600 000	70,5	6 361 540	81,4	3 851 745	60,8	770 350	45,2
Food	1 300 000	8,6	520 000	6,7	650 000	10,3	195 000	11,4
Minor Upkeep	156 000	1,0	78 000	1,0	78 000	1,2	65 000	3,8
Ice	-	-	-	-	1 000 000	15,8	-	-
Baits	-	-	-	-	275 000	4,3	125 000	7,3
Repair								
Fishing gears	1 670 000	11,1	417 500	5,3	41 750	0,7	208 750	12,2
Motors	676 400	4,5	338 200	4,3	338 200	5,3	276 260	16,2
. Pirogues	630 000	4,2	97 500	1,2	97 500	1,5	65 000	3,8
TOTAL	15 032 400	100	7 812 740	100	6 332 195	100	1 705 360	100

TABLE 5.

Annual Investment and Operating Costs of Small Scale Fishing Units 1999

	Purse seines		Surrounding gill nets		Icebox line		ADNP Motor	
	<i>CFAF</i>	%	<i>CFAF</i>	%	<i>CFAF</i>	%	<i>CFAF</i>	%
Invested Capital								
Pirogue (8 to 12 m)	-		-		-		1 443 000	38,9
Pirogue (16 to 18 m)	1 944 000	12,4	1 944 000	34,5	1 944 000	51,9	-	-
(Pirogue 18 to 21 m)	2 592 000	16,5	-	-	-	-	-	-
(Motors)	3 100 000	19,7	1 550 000	27,5	1 550 000	41,3	1 275 000	34,3
Fishing Gears	7 415 000	47,0	1 853 000	33,0	185 000	5,0	926 000	24,9
Accessories	702 000	4,4	281 000	5,0	70 000	1,8	70 000	1,9
TOTAL	15 753 000	100	5 628 000	100	3 749 000	100	3 714 000	100
Fixed Costs								
- Depreciation								
Motors	1 550 000	69,6	775 000	69,2	775 000	74,2	637 500	77,1
Pirogues	453 600	20,3	194 400	17,4	194 400	18,6	144 300	17,5
“ Insurances ”	224 400	10,1	149 600	13,4	75 000	7,2	45 000	5,4
TOTAL	2 228 000	100	1 119 000	100	1 044 400	100	826 800	100
Variable Costs								
Fuel	11 130 000	79,0	6 679 000	79,7	4 043 500	58,0	808 500	42,3
Food	1 326 000	9,4	530 400	6,4	663 000	9,5	199 000	10,4
Minor Upkeep	176 000	1,3	90 000	1,1	89 000	1,3	73 000	3,8
Ice	-	-	-	-	1 230 000	17,6	-	-
Baits	-	-	-	-	313 000	4,5	141 000	7,4
Repair								
Fishing gears	178 500	1,3	463 300	5,6	46 300	0,7	231 500	12,1
Motors	589 300	4,2	294 600	3,6	294 600	4,2	242 400	12,7
Pirogues	681 100	4,8	291 800	3,6	291 800	4,2	216 600	11,3
TOTAL	14 080 900	100	8 379 100	100	6 971 200	100	1 912 000	100

2.5 Operating Costs

Operating expenses consist of fixed and variable expenses.

2.5.1 Fixed Costs

These are expenses, which do not vary with a change in the level of fishing units' activities. They consist mainly of depreciation of equipment and "insurance". Motors and pirogues are amortised over 2 to 10 years respectively. Insurance consist of all of the expenses incurred by fishermen owners of fishing units as part of their traditional beliefs in order to ensure a favourable fishing campaign and to protect themselves against any accident out at sea. Their annual amount has been estimated on the basis of fishermen's indications.

2.5.2 Variable Expenses

These are expenses that evolve with the fishing units' levels of activities and production. They usually consist of five elements : fuel, food, bait, ice, maintenance and repair as well as the purchase of small equipment (ropes, strings and hooks). Fuel is by far the most important item of these expenses though it enjoys a 51% subsidy.

The comparative analysis of fishing units' operating costs in 1993, 1996 and 1999 reveals a very substantial increase between the first two years (55% for fuel, 30% for food and minor upkeep, 25% for ice and 10% for baits) and a relatively low one between 1996 and 1999 : between 5 and 15% (Table 1, 2 and 3) (AGC 1998).

2.6 Generated Income and Remuneration of Production Factors

In small-scale fishing, crewmembers share the economic risks of going out at sea. Production factors are remunerated separately, remuneration is shared between the fishermen and the owners of fishing equipment following deduction of common charges from gross income (fuel, baits, ice, food and minor upkeep).

Income has been calculated by recouping catch per unit of effort and landings price. Producer prices are especially characterised by their extreme variability. These sharp fluctuations depend on the quantities landed, the place of landing, the season, predictions about additional landings and on the market absorption capacity.

The nature of distribution channels strongly influenced landings price trends over the last few years. Between 1993 and 1996, small coastal pelagic fish produced for the domestic market increased slightly (26 to 45% on average) compared to demersal fish (200% on average) the production of which was targeted at the export market (European or Asian) where substantial gains were achieved by exporters. Between 1996 and 1999, the prices of these breeds increased by 5 to 15% respectively except for octopus the price of which fell to its all time low following the record catches of 1999.

After the increase in factor costs that occurred in the aftermath of the devaluation of the CFA franc, purse seines annual income dropped sharply by 25% from CFAF 9 to 7 million between 1993 and 1996 (Kébé and Dème 1996). The internal rate of return of invested capital (TIR) fell from 83% to 45%. The time needed to recover invested capital, which was just about a year extended to two years (Tables 6, 7 and 8). In the case of surrounding gill nets, devaluation almost nullified boat owner's net income, which dropped from CFAF 448,000 to CFAF 47,000. On the other hand, icebox pirogues owners' net income soared from CFAF 67,000 in 1993 to CFAF 345,000 in 1996 or an increase of 415%. Profitability rate also clearly rose among dormant net and/or angling and/or pot fishing pirogues, from 4 to 29%. The boat owner saw his income rise from CFAF 78,000 to over a million CFAF while time needed to recover invested capital narrowed from 25 to 3 and a half years.

TABLE 6.

Operating Costs of Small Scale Fishing Units 1993

	Purse seines	Surrounding gill nets	Icebox line	ADNP Motor
Turn Over	31 400 000	10 100 000	8 300 000	2 300 000
Common expenses				
. Fuel	6 880 000	4 129 000	2 500 000	500 000
. Food	1 000 000	400 000	500 000	150 000
. Minor upkeep	120 000	60 000	60 000	50 000
. ice	-	-	800 000	-
. Baits	-	-	250 000	100 000
TOTAL	8 000 000	4 589 000	4 110 000	800 000
Net Income	23 400 000	5 511 000	4 190 000	1 500 000
. Labour	13 000 000	4 006 497	3 427 420	848 000
. Capital	10 400 000	1 504 503	762 580	652 000
Repair				
. Fishing gears	1 000 000	250 000	-	125 000
. Motors	251 000	125 000	125 000	74 100
. Pirogues	495 000	75 000	50 000	50 000
TOTAL	1 746 000	450 500	175 500	249 100
Insurances	150 000	100 000	50 000	30 000
Gross Result	8 504 000	954 003	537 080	372 900
Depreciation				
. Motors	660 200	330 100	330 100	195 000
. Pirogues	325 000	140 000	140 000	140 000
TOTAL	985 200	470 100	470 100	295 000
Boat's owner Net Result	7 518 800	483 903	66 980	77 900
Invested Capital	9 070 200	3 260 200	2 210 200	1 940 000
Rate of Return (%)	82,8	14,8	3	4
Pay back period (year)	1,2	6,7	33,3	25

TABLE 7.

Operating Accounts of Small-scale Fishing Units 1996

	Purse seines	Surrounding gill nets	Icebox line	ADNP Motor
<i>Turn Over</i>	39 564 000	14 645 000	16 600 000	6 900 000
Common expenses				
. Fuel	10 600 000	6 361 540	3 851 745	770 350
. Food	1 300 000	520 000	650 000	195 000
. Minor upkeep	156 000	78 000	78 000	65 000
. Ice	-	-	1 000 000	-
. Baits	-	-	275 000	125 000
TOTAL	12 056 000	6 959 540	5 854 745	1 155 350
Net Income	27 508 000	7 685 460	10 745 255	5 744 650
. Labour	15 282 223	5 585 608	8 778 014	3 246 975
. Capital	12 225 777	2 099 852	1 957 241	2 497 675
Repair				
. Engin de pêche	1 670 000	417 500	41 750	208 750
. Motors	676 400	338 200	338 200	276 260
. Pirogues	630 000	97 500	97 500	65 000
TOTAL	2 976 400	853 200	477 450	550 010
Insurances	195 000	130 000	65 000	39 000
Gross Result	9 054 377	1 116 652	1 414 791	1 908 665
Depreciation				
. Motors	1 780 000	890 000	890 000	727 000
. Pirogues	420 000	180 000	180 000	130 000
TOTAL	2 200 000	1 070 000	1 070 000	857 000
Boat's owner Net Result	6 854 377	46 652	344 791	1 051 665
Invested Capital	15 090 000	5 510 000	3 812 000	3 654 000
Rate of Return (%)	45	0,8	9,0	28,8
Pay back period (year)	2,2	118	11	3,5

TABLE 8

Operating Accounts of Small-Scale Fishing Units 1999

	Purse seines	Surrounding gill nets	Icebox line	ADNP Motor
Turn Over	31 425 000	13 500 000	23 250 000	9 450 000
Common expenses				
. Fuel	11 130 000	6 679 000	4 043 500	808 500
. Food	1 326 000	530 400	663 000	199 000
. Minor Upkeep	176 000	90 000	89 000	73 000
. Glace	-	-	1 230 000	-
. Appât	-	-	313 000	141 000
TOTAL	12 632 000	7 299 400	6 338 500	1 221 500
Revenu net	18 793 000	6 200 600	16 911 500	8 228 500
. Labour	10 441 135	4 506 577	13 816 584	4 651 498
. Capital	8 351 865	1 694 023	3 094 916	3 577 002
Repair				
. Fishing gears	178 500	463 300	46 300	231 500
. Motors	589 300	294 600	294 600	242 400
. Pirogues	681 100	291 800	291 800	216 600
TOTAL	1 448 900	1 049 700	632 700	690 500
Insurances	244 400	149 600	75 000	45 000
Gross Result	6 678 565	494 723	2 387 216	2 841 502
Depreciation				
. Motors	1 550 000	775 000	775 000	637 500
. Pirogues	453 600	194 400	194 400	144 300
TOTAL	2 003 600	969 400	969 400	718 800
Boat's owner Net Result	4 674 965	- 474 677	1 417 816	2 122 702
Invested Capital	25 753 000	5 628 000	3 749 000	3 714 000
Rate of Return (%)	18.1	-	37.8	57.1
Pay back period (year)	5.5	-	2.6	1.7

Between 1996 and 1999, the operating results of purse seines and surrounding gill nets dropped further. The annual net result of purse seines owner fell by 46% from CFAF 6,854,377 to 4,674,965 while surrounding gill nets owner suffered a 475,000 loss. Unlike the fishing units the catches of which are mainly meant for the domestic market, the financial ratios of icebox pirogues and of ADNP clearly improved. As far as icebox pirogues are concerned, the owner's income rose from less than CFAF 350,000 to about CFAF 1.5 million. The same trend was observed in the case of ADNP with a 28% increase. As a result, the time needed to recover invested capital clearly shortened while internal rate of return more than doubled in the case of ADNP and quadrupled in the case of icebox pirogues.

2.7 Strategies developed by professionals

The higher profitability rates of some small-scale fishing units (the ones that catch demersals) encouraged small-scale fishermen to develop new strategies in the last few years. Fishing effort was witnessed to have been shifted from domestic breeds capture to export breeds. Thus, it was noted that on the *Petite Côte*, the majority of small-scale pelagic and demersal fishing units look for cephalopods (cuttlefish and octopuses) in priority to supply industries between June and September. Many pirogues that usually go angling now used sole nets over the October to May period. In *Kayar*, fishermen preferred to fish for red mullet. Cheap fish becomes increasingly rare as fishing shifted to priority export-oriented breeds (soles, lobsters, shrimps, *pageots*, sea breams and wreck fish).

Coastal pelagic fish (whether fresh or processed) constitute the main source of animal proteins for the low-income urban and rural populations. The partial redeployment of purse seines and

surrounding gill nets' fishing effort towards these priority breeds disturbs domestic market supply, raising fears about increased protein deficit which is already the case in the countryside. By the way, the price of a kg of *kethiakh* (grilled fish) which was once CFAF 75 on average in 1993, is now between CFAF 200 and 250 as a result of supply shortage.

Many fishermen of Saint-Louis, in particular, migrated to Mauritania during 1994. Others had their pirogues ferried far out at sea to fish industrial boats. These practices jeopardise all the more the domestic market, as Saint-Louisian fishermen own most of the purse seines.

Instead of immobilising their fishing units, fishermen responded to the increase in pirogue fuel price rather by adopting new strategies :

- purse seines pirogues fish in closer areas or go out at sea with a single pirogue instead of two. In *kayar*, pirogues have limited their fishing trips to once a day (Dieng 1998);
- icebox pirogues clearly extended fish trip duration, which is likely to impact on the quality of products put on ice;
- surrounding gill nets opted for a reduced crew;
- some fishing units took exclusively to picking up gastropods and other fish captured by industrial fishing thereby encouraging the latter to operate into the 6 miles area reserved for pirogue fishing. This violation of existing regulation often translates into conflicts with small-scale fishing units resulting in equipment loss or at times, human casualties;
- fishermen organised themselves such that they can make maximum gains from their captures despite the high costs of fishing equipment by restricting supply of piscatorial products. Thus, a daily quota of *pageot* captures (3 crates of 13kg each per fishing unit) was imposed in *kayar*, in the wake of devaluation.

All these strategies aimed at fishing effort redeployment and restricted supply of piscatorial products contribute to domestic market supply shortage.

Chapter III

Typology of Piscatorial Resources, Potentials and State of Exploitation

As coastal surface and deep-water resources are less threatened, the study of Senegalese potential piscatorial resources examines the trajectories of abundance of high-sea pelagic and coastal demersal breeds marketed. Exploitation and abundance levels can be determined on the basis of temporal series data on biomass, catches and fishing effort. The analysis of the evolution of biological parameters over time (individual average size, in particular) coupled with specific profusion possibly confirms, for a given breed, a state of overexploitation.

To undertake these actions, presupposes the availability of long data series on a great number of biological and ecological parameters focusing on catches, fishing effort and size frequency. Processing is laborious and requires combination of many factors, as well as a good understanding of fishery dynamics. In the framework of the country-study, a special analysis of the situation of main marketed coastal demersal breeds is under way. In the absence of complete results on ongoing processing, this resource study is limited, for the time being, to a global synthesis of piscatorial potentials and status of resource exploitation based on CRODT works under its 1998-2003 Strategic Thematic Plan. On the whole, the country study specific analysis seem to show, at this stage, that the situation is worse than it appears in these works.

3.1 High-sea Pelagic Resources

The three main breeds of tropical tuna are *albacore*, *listao* and *patudo*. They are targeted by surface gears and trawl lines. Other tuna-allied and dependent breeds (thonine, bonito, mackerel, sailfish, and spearfish) are also present in the area. They are the targets of marginal fishing by industrial units, though small-scale units shows a growing interest in some of them. The piscatorial potential of high-sea pelagic resources is estimated at 25,000 to 30,000 tons. The migrating behaviour of tuna-allied species is one of the decisive factors to be taken into consideration should one be interested in their exploitation. Senegal is on their trajectory. National production is therefore seasonal, and local potential is influenced by the global state of resources in the whole area of distribution. The different working groups held by ICCAT reported major trends and optimum conditions for exploiting deep-sea pelagic stocks migrating through the Senegal's EEZ.

- All reports indicate that albacore stock is fully and even slightly overexploited to the extent that it is recommended to freeze activities at the present level.
- *Listao* is reported to be moderately exploited. Record catches of 122 000 and 147 000 tons were recorded in 1991 and 1993, as a result of higher catches through jig fishing. Intensified fishing should increase *listao* production in the area.
- The stock of *patudo* is unique in the Atlantic Ocean. Of late, its stock was reported very close to full exploitation or slightly overexploited while fishing in this area is not expected to increase.

3.2 Coastal demersal resources

Coastal demersal resources are mainly exploited by four fisheries : small-scale fishing (line, pot, crate, dormant, mesh fishing etc), cord fishing (cording), Senegalese and foreign trawl fishing (diverse trawlers for crayfish, fish and cephalopods). The balanced production of coastal demersal resources is estimated at 125 000 - 130 000 tons. Changes in the abundance parameters through adjustment of linear models to catches per unit of effort of Senegalese trawlers reportedly indicate a general declining trend in the quantity of coastal demersal resources starting from the early 1980s. Only three species appeared to have been spared : *brotule* (*Brotula barbata*), cuttlefish or sepia and octopuses (*Octopus vulgaris*).

Species that have been mostly affected are, in decreasing order:

- *Arius spp.*;
- *thiof*, and other wreck fish (*Epinephelus spp.*);
- blue sea beam (*Sparus coeruleostictus*);
- white crayfish (*Penaeus notialis*) and grey dorade (*Plectorhynchus mediterraneus*);
- white dorade (*Pagellus bellotti*);
- *tiékem* (*Galeoides decadactylus*), *Pseudotolithus spp.* and the *Pomadasyss spp.* ;
- (language) sole (*Cynoglossus spp.*) and red mullet (*Pseudupenaeus prayensis*) ;

Chapter IV

Exports and Liberalisation of International Trade

4.1 Context

The Senegalese piscatorial sector is now facing serious difficulties resulting especially from overexploitation of certain stocks and domestic market supply problems. At first glance, exports appear to be performing better than the rest of the sector. Actually, since devaluation, they have kept growing in value from CFA F 49 billion in 1993 to CFA F 185 billion in 1999 (table 1). However, while exported volumes expanded rapidly in the 1970s and 1980s, they seem to have

reached in the past decade a ceiling, which is now apparently difficult to exceed. Recent trends even tend to arouse fears of a decline in exported volumes – at least of noble breeds – which is more attributable to resource constraints than to competitiveness (demand and prices remain sustained). To these constraints must be added some others linked to the gradual questioning of trade advantages on the European market.

This, indeed, is the background against which a new external shock is looming up the consequences of which will potentially determine the future of exports i.e. the liberalisation of international trade led by the World Trade Organisation (WTO). WTO is founded on the principle of national treatment and most-favoured nation clause. Most-favoured nation clause bans, in principle, application of different treatments to countries at equal development stage. As it appears, the whole foundations of the Lome Agreement, especially the one authorising ACP countries to penetrate the European market with lifted customs duties, are threatened by WTO rules.

As a result, Senegalese exports are threatened in two ways; first, by difficult access to raw materials in a context of resource overexploitation and secondly, by the questioning of the Lome regime, which gave them access to the European market, by far, the most remunerating one.

4.2 Government Encouragement Mechanisms

The domestic and external mechanisms that greatly supported the connection of the piscatorial sector to external markets include notably : granting of free exporting enterprise status, export subsidy, Lome Agreement, devaluation and fish agreements.

4.2.1 Free Point or Free Exporting Enterprise Status

Law 74-06 establishing the Dakar Industrial Free Zone was signed on April 22, 1974. This zone was expected to provide an attractive framework for encouraging foreign investors to come and establish export-oriented and labour-intensive industries. Therefore, authorised enterprises benefit from a variety of tax and customs facilities. Later on, law 91-30 of April 13, 1991 establishing the status of free points extended these facilities to exporting industries operating outside the Industrial Free Zone (IFZ). Finally in 1995, the scope of application of law 91-30 was further extended to all agricultural enterprises operating on the national territory and exporting at least 80% of their production (fishing being included in agriculture).

Duty-free exporting enterprises benefit from many customs, tax, financial, social and economic advantages :

- authorisation to transfer abroad all the amounts they need to finance their investments, their trade and financial operations;
- payment of reduced company tax of 15 % instead of 33%;
- tax exemption on security yield deducted by the enterprise from distributed dividends, on employers' fixed contributions, on registrations and stamp fees for statutes design and modifications...

4.2.2 Export Subsidy

The export subsidy instituted by law 80-38 of August 15, 1980 was a trade measure aimed at facilitating penetration of external markets by national products. The drive was to contain trade deficit in a context of imports growth and poor performance of traditional exports (groundnut and phosphates). Initially set at 10% of FOB value, it was raised to 15% in 1983. Previously limited to agricultural products, it was later extended to tuna at the same period. Law 86-37 of August 4, 1986 gave a more accurate definition of subsidy base by introducing the criterion of national industrial value-added incorporated in the finished product. The rate was then raised to 25% with the subsidy being extended to all piscatorial products. This mechanism was cancelled after the 1994 devaluation of the CFA franc.

4.2.3. Devaluation

The devaluation of the CFA franc had a significant impact on the sector. While exports had been noted to have sharply declined between 1991 and 1993, especially exports of frozen products to Europe, devaluation immediately improved their competitiveness. It restored operating margins and boosted exports up to 125,000 tons in 1999 whereas they stagnated at 80,000 tons in 1993. Obviously, the exceptional volume of exports of octopuses in 1999 must moderate this sharp increase of about 56%. Nonetheless, the volumes of 100,000 tons and 110,000 tons achieved in previous years do constitute a high average in view of stock limitations.

The negative effects of devaluation also emerged about a year after the change in CFA F parity. Strong external demand inflated export prices, heralding prospects of important profits for those who would be able to take advantage of this godsend. In fact, while between 1993 and 1994, exports increased only by 10,000 tons (from 80,000 to 90,000 tons), exports receipts soared from about CFA F 50 to 83 billion. They later pursued their upward trend and reached CFA F 174 billion in 1998 whereas volumes stagnated between 100,000 and 110,000 tons. This is a perfect illustration of a situation in which devaluation in a context of some production constraints induced a price-effect rather than a volume-effect. This effect not only led to the reopening of various companies once shutdown, but it also attracted new investors. In about a year or so, the number of enterprises in operation thus rose from about 40 units to almost 80.

4.2.4. Lome Agreement

While a number of its former colonies had or were about to conclude structural adjustment agreements with the IMF, in 1982 Europe concluded with them, the co-operation agreements known as the Lome Agreement. In a context in which many ACP economies generally experienced public finance deficits and struggled to balance their external accounts as a priority, the trade aspect of the agreements were naturally essential. The Agreement, therefore, instituted a customs duty-free regime applicable to most of the products originating from ACP countries on entry onto the European market. Piscatorial products are covered by this regime.

The Lome Agreement largely contributed to stronger competitiveness of Senegalese piscatorial products on the European market. In the years following its adoption, Senegalese exports to Europe kept growing. Actually, between 1982 and 1991, exported volumes rose from 90,000 tons to about 120,000 tons (table 9) and the European market absorbed the greatest share of that increase. Canned tuna and frozen products benefited most from the preferential regime.

TABLE 9

Exports Trends (Volume and Value) 1980 - 1990 (tons and CFA F)

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Volume	84036	90204	91742	93344	94102	95449	93975	110808,6	111125,5	118326	124672,6
Value	32506359	37498726	47930780	52332207	61873032	74044942	89563789	98390104	94969956	91325566	110498253

Source : DOPM

4.2.5. Fishing Agreements

The dependence of Senegalese exports on piscatorial products in relation to the European market was due in part to colonial heritage. The presence of European processing units and fishing fleets especially French ones actually dates back to the colonial era. The Lome Agreement further increased this dependence by facilitating penetration of this big remunerating market by sea products. Since the early 1980s, fishing agreements with the European Union have also boosted

exports to Europe as they provide for the consignments' landings of a number of tuna boats supplying industrial processing units. As it appears, the increase in exports of canned tuna in the 1980s is largely attributable to these agreements.

4.3 Exports Trends

4.3.1. Exports by Product Type

The 1990s were marked by two major trends. Export volumes first of all declined sharply between 1990 and 1993, from 124,000 tons to 84,000 tons (table 10). They later increased up to 125,000 tons in 1999. This increase was naturally due to devaluation, which restored competitiveness of Senegalese piscatorial products especially on the European market. Looking more closely into inter-annual fluctuations reveals however that exports stagnated at around 100,000 and 110,000 tons. Despite efforts made to intensify deep lying fishing through trawler and small-scale fishing, exported volumes climaxed at 112,000 tons in 1997. Though the level of 1990 was again reached in 1999, but the level of exports achieved was due only to the important share of cephalopods in that year's exports structure. As clearly evidenced by the supply difficulties encountered by the factories, exported volumes of tuna, demersal fish, crustaceans and cephalopods are not elastic. Resource problem thus constitutes a major difficulty for the future of exports. It calls for the search of solutions excluding increased fishing effort and emphasising instead actions favouring valorisation rather than volumes. Unfortunately, the already important share of exports of whole, fresh or frozen products tended rather to increase since devaluation at the expense of exports of processed products.

Senegalese exports of sea products are clearly dominated by whole products. Between 1993, the year preceding devaluation, and 1999, the share of whole products in total exported volumes rose from 60 to 80%. These figures probably reveal the prevalence of speculation among fishermen over adjustment of production structures. Devaluation encouraged some to look for secure income through increased volumes. Effort to increase capacity (more factories and intensified demersal fishing through both trawlers and small-scale units) seemed to have prevailed sometimes over equipment modernisation and balanced operational management.

TABLE 10

Exports Trends by Product 1990 - 1999 (tons)

Year	Fish	Crustaceans	Molluscs	Processed & developed Products	TOTAL
1990	79233,3	5432,9	16146,1	23860,3	124672,6
1991	62231,6	5181,9	25917,8	25522,5	118853,8
1992	46370,5	3924,88	12774,85	21040,42	84110,65
1993	33969,28	4883,44	12187,82	32762,15	83802,79
1994	44054,27	4631,91	14946,95	30040,56	93673,69
1995	43327	5677	13271	41188	103463
1996	53558	5993	12924	34547	107022
1997	57698	6239	11327	36893	112157
1998	51490	8438	14650	34910	109488
1999	44990	7111	46626	26611	125338

Source : DOPM

Senegalese processing consists of practically only canned tuna. Preparation of fillets, fish steak, shrimp peeling are almost insignificant. Whereas canning factories are now facing an acute crisis. Only one out of the three owned by Senegal operates regularly. This crisis is first due to the shock resulting from upgrading to international technical standards. In order to respect European

directives and to be eligible to exporting permit, canning factories invested CFA F 4 billion in 1995. But this investment was not followed by significant productivity gains.

4.3.2. Exports Destination

Europe remains by far the destination of Senegalese exports of piscatorial products with 79,000 tons out of the 125,000 tons exported in 1999 that is about 60% of total. Every year, the European market absorbs about 2/3 of fish exports. From 1993 to 1999, exports of fresh products to Europe remained practically stagnant (increasing from 9,415 to 9,938 tons) while the number of companies doubled; hence, factories' chronic deficits. Following devaluation, the exports of frozen products to Europe increased significantly from 21,000 in 1993 tons to 58,000 tons in 1999. This is evidence that devaluation tended to encourage export growth through higher volumes based on sustained demand rather than efforts to valorise products and to develop processing level.

As it appears, exports to Europe represent the biggest share of overall exports. Though the African market certainly holds an honourable position with almost 1/3 of exported volumes, its weight becomes marginal in value terms. From that standpoint, Europe continues to hold a decisive position as it absorbs alone most of the high market-value exports. This precisely explains why there are fears about the liberalisation effects threatening the trade advantages linked to the Lome Agreement, and hence, the competitiveness of Senegalese piscatorial products on that market.

4.4 Erosion of Trade Advantages and Competitiveness of Senegalese Exports

The Lome Agreement put in place a regime authorising almost all the products of ACP countries to penetrate the European market without any tariff (customs duties) or non-tariff (quotas) barriers imposed on other supplying countries. These provisions explain why exports of African (80% of total) and Senegalese (about 2/3) piscatorial products depend so much on the European market. Yet, WTO rules condemn this regime arguing that the advantages conceded are not reciprocal and violate the principle of non-discrimination between countries at an equal stage of development. The Generalised System of Preferences (GSP) provides, indeed, that all developing countries must benefit from equal trade advantages.

WTO actually tries to reduce or eliminate both tariff and non-tariff barriers and even to turn non-tariff barriers into customs duties because they are more transparent and easier to reduce. During *Uruguay Round* the three main import markets reduced substantially their applicable tariffs under most-favoured Nation clause : USA applies 0.9%, Japan 4.1% and European Union 10.7%. But on the whole, Europe reduced its tariffs by a lower rate than the other developed countries. Thus, the advantages that ACP countries enjoyed on the European market in relation to other developing countries remained significant. The prospect of their being called into question constitutes, therefore, a threat to the exports of piscatorial products originating from ACP countries, which are so dependent on the European market.

As a way of assessing the impact that questioning of trade advantages provided under the Lome Agreement might have, European markets of processed and non-processed products should be studied. On the market of non-processed products, ACP countries hold a narrower position than the other developing countries despite their market gains. On the other hand, on the market of processed products, they not only made market gains over the past thirty years but they also hold a better position in relation to the other developing countries. Asian countries have the best position though ACP countries have almost caught them up and especially they won 12% of market shares between 1976 and 1996. This can be explained by the "escalating tariff" phenomenon. In fact, customs tariffs tend to increase according to the level of product processing, which penalises exports of processed products originating from developing countries. However, this situation is favourable to the exports of ACP countries' processed products. The comparative study of European canned tuna and frozen shrimp markets perfectly illustrates this advantage. ACP

countries lost market shares of exports of frozen shrimps in relation to their competing developing countries. On the other hand, they won on a market that they largely dominate, that of canned tuna.

The different positions of ACP countries in these two markets can be explained by much higher customs duties on canned tuna, a processed product, than on frozen shrimps, a non-processed product (table 11).

TABLE 11

**Customs Duties Applicable on Shrimps
and Canned Tuna on Entry of European Union Market**

	Frozen Shrimps	Canned Tuna and Loins
Most-favoured nation	12 to 18 %	24 %
GSP	3 to 4.5 %	18 %

Source : GATT, 1997

Hence, any questioning of the Lome Agreement is likely to entail very negative consequences on Senegalese exports of processed piscatorial products starting with canned tuna. For different reasons (Cost of raw materials is lower in the Pacific Ocean, take-over by Thai industry of the most performing enterprises on the market, relocation in countries with tax advantages and cheap labour, devaluation following Asian financial crisis...), production cost differential between a Thai canned tuna and its Senegalese counterpart varies between CFAF 70 and CFAF 90 in favour of the former. This difference represents almost exactly the amount of customs duties applicable to Thai canned tuna.

Chapter V

Trade Liberalisation and Valorisation of Piscatorial in a Domestic and Sub-regional Context

5.1 Study Context

Small-scale processing and fish trade play an important role especially in terms of food security. In all regions of Senegal (except Tambacounda), fish share in animal protein consumption represents more than 75%. Many factors explain the prevalence of fish over meat in the Senegalese food diet : successive droughts have decimated livestock, there is no sociological restrictions to fish consumption and food tradition has always favoured it at all times. Besides, meat is partly imported and the devaluation of the CFA franc has raised its price making it inaccessible to the majority of the population. Also, the creation of permanent communication links allows fast disposal of fish products.

The valorisation of piscatorial products, however, is confronted with serious problems. For fresh fish, the problem is especially the precariousness of product conservation processes (handling on board the pirogues and during landings), packaging and distribution. In the case of processed fish, the difficulties have to do, notably, with quality, storage, packaging and transport. These constraints have multiple consequences of a sanitary, social, economic and environmental nature. Though they are meant for human consumption, piscatorial products do not always offer sufficient sanitary guarantees. Problems of infrastructures ended up weighing on the costs and exerted an upward pressure on retail prices, thus jeopardising food security objective. The level of losses

among the catches is all the more detrimental as resources became rare. Lastly, poor quality products also penalised exports.

The purpose of the study is to analyse the main obstacles to catches development in order to make a diagnosis and a number of practical recommendations. It becomes so imperative to comprehend fish trade and small-scale processing, as indeed fish has become the staple of low-income populations. As stocks are threatened of exhaustion, the issue is not to produce more but rather to develop as much as possible current levels of catches.

5.2 Piscatorial Products and Domestic Market

5.2.1. Fish Trade

History of Fish Distribution in Senegal and Liberalisation of Fish Trade

In 1991, the sector started to be gradually liberalised. With the structural adjustment policies applied by Senegal over the past few years, the government completely withdrew from the marketing of piscatorial products. Fish trade has been liberalised since 1995 and the profession of fish wholesaler is no longer governed through presidential decree. From the socio-economic point of view, this is an efficient activity the interest of which is that it attracts idle labour from agriculture for most of the year. Members of the fish wholesaler profession are recruited from the fraction of farmers confronted with the long drought.

Present Situation of Fish Trade

The average fish consumption is 26 kg per inhabitant and per year across Senegal (African average is 8.2 kg/year/inhabitant) and 43 kg for the sole region of Dakar. The concentration movement noted in fish trade seems to be expanding as a result of fuel price increase over the past five years, translating into a clear gap in fish distribution and consumption in Senegal : 50% of Senegalese consume 73% of fish meant for human consumption (76, 000 tons). Disparity is first of all regional: coastal regions alone absorb 80% of traded quantities (132,000 tons), Cap-Vert consumes 46% of fish (76,000 tons) while it represents only 25% of the population (2,250,000 inhabitants). It also opposes urban and rural areas : in the land-locked town of Linguère, individual consumption is 44 grams of fresh fish per day while it is only 3.8% in the region of Diourbel (rural area). Piscatorial products are therefore in good supply in the coastal regions and in towns but there is less supply in the countryside and rural areas.

Main Constraints to Fish Trade

◆ At the Resource Level

Various available results indicate that coastal demersal fish are globally and substantially overexploited (CRODT 1994; ISRA 1995). The observations made within the fisheries (operating deficit of fishing units, exacerbation of conflicts between industrial and small-scale fisheries - and even within the small-scale fishery - adoption of new strategies, sharp reduction of average sizes, stagnant or reduced profitability according to type of fishing despite sustained effort...) provide traditional signs of a state of overfishing.

◆ At the Production Level

For small-scale units, production constraints derive mainly from product handling on board (icebox pigoues, dormant nets, purse seines and surrounding gill nets) and during landings.

- ◆ At the Packaging Level

Most of the landing centres for small-scale fishing are quite insalubrious. They constitute domestic waste dumps and latrines for neighbouring populations. Landings are done on the sand to wait for buyers, risks of contamination are very high. However, the situation is being corrected with the programme on landing wharf building in the main centres of small-scale fishery.

- ◆ At the Distribution Level

The vehicles used by fish wholesalers, except for the few fitted with thermal insulation boxes, are not suitable for fish transportation under high ambient temperature. The majority of fish wholesalers possess obsolete vehicles. The daily transportation of wet products, generalised overloading, insufficient upkeep and bad road links especially during the rainy season quickly wears down transport facilities. To the extent that fish transportation turns out to be very risky as any vehicle failure translates generally into the total loss of the consignment. Many fish wholesalers being confronted with working capital shortages, such accidents could turn into bankruptcies.

5.3 Small-Scale Processing

5.3.1. Economic and Social Importance of Small-Scale Processing

Small-scale processing stabilises fresh fish market, as it constitutes an important and secure outlet for the fishermen during periods of overproduction. It also has a very important social function. It employs massive labour mostly women and also greatly contributes to the satisfaction of animal protein needs in food especially in the inner parts of the country where fresh fish is hardly or not at all available. The production of small-scale processing is, like fresh or frozen fish, exported to countries of the West African sub-region (Mali, Côte d'Ivoire, Ghana, Burkina Faso, Nigeria etc.) thus contributing to the expansion of regional trade.

5.3.2. Government Interventions and Small-scale Processing

Despite its economic and social importance, government interventions in this sub-sector have been very limited and mainly involved the introduction of new products or new processing techniques (ITA 1986).

5.3.3. Main Constraints of Small-scale Processing

There are several obstacles to durable development of small-scale processing : irregular markets supply, transport problems, product losses, stocking problems, availability of information, inconvertibility of some countries' currencies etc.. (Dème 1996).

- ◆ Competition and Irregular Markets Supply

The quantities of processed and marketed fish are very limited because of supply difficulties and fierce competition among the economic agents of the various sub-sectors to accede to raw materials (with the factories for tuna, with the wholesalers for fresh products...).

- ◆ Bad Quality and Product Losses

Despite the economic and social importance of small-scale processing, the techniques used in Senegal have remained rudimentary and do not valorise the products (Faye 1990). Processing of main small-scale products unfolds on the soil, which entails important losses and affects their quality.

Though the duration of their conservation is longer than that of fresh fish, processed products remain fragile goods which should be protected against deterioration or contamination risks. Important product losses (30%) are noted in processing and distribution operations.

◆ Product Stocking Constraints

Stocking is a strategic element in marketing processed products. It allows traders to anticipate variations in demand, to face up to fluctuations in producer prices and to limit paying costly transport to the processing centres for their supply. Though it is one of the most important trade components, it is, however, constrained by limited material means.

◆ Problems of infrastructures

Processing units are located near landing ports making fish transport to those sites cheaper. While efforts focused on improving landing points through construction of wharves in main small-scale fishing centres, the processing sector is still constrained by inadequate infrastructures. Working and stocking conditions constitute severe limiting factors to the development of small-scale processing.

◆ Weak Organisational Capacity

Women who contributed to pulling it out of its marginalized economic situation dominate small-scale processing. This sub-sector is, however, not yet sufficiently developed and remains marked by weak organisation. Due to the operating difficulties of women processing co-operatives, self-promotion organisations have emerged. However, many problems still exist starting with training needs (functional literacy and technical training), low income and the absence of an appropriate credit system in lieu of an informal system with high rates.

◆ Land claims and Space occupation Problem

The development of tourism along the coast revives land claims and maritime coastal space occupation problems. The right to access land is gradually threatened by the expansion of tourist infrastructures and by decentralisation policy, which reactivates conflicts between local and traditional authorities in relation to land management.

5.4 Piscatorial Products and Sub-regional Market

5.4.1. Multilateral Agreements and Possibilities for Senegalese Products to Penetrate Markets in the Sub-region

The supplementary bill n° 004/96 of the West African Economic and Monetary Union (UEMOA) instituted a transient preferential tariff regime applicable to trade within the Union. The regime, which became effective on July 1, 1996 exempts piscatorial products from all entry taxes – including those processed traditionally – as they are considered as local products. This full exoneration is subject to the production of a certificate of origin delivered by competent national authorities of the exporting country. Concurrently, the tax levied as Community Solidarity Contribution on imports originating from non-member countries is marked up by 0.5% under.

5.4.2. Product Types, Quantities and Main Destinations

Despite the existence of trade links between Senegal and its African partners, exports of piscatorial products to the continent declined steadily over the past ten years. Once absorbing 31% of the global volume of Senegalese fish sold abroad in 1992, the African market consumption fell to only 24% in 1999 (Table 12).

TABLE 12

Exports Trends of Senegalese Piscatorial Products to Africa (tons)

YEAR	FRESH				FREEZED				SMALL-SCALE Processed	TOTAL
	Fish	Molluscs	Crustaceans	TOTAL	Fish	Molluscs	Crustaceans	TOTAL		
1992	471		1	472	22 825	32	12	22 869	3 594	26 935
1993	1 012	1	1	1 014	16 952	96	60	17 108	5 014	23 136
1994	11			11	15 566	1	1	15 568	8 894	24 473
1995	1	1	1	3	22 269	2	2	22 273	13 360	35 636
1996	2	1		3	26 482	4	3	26 489	6 695	33 187
1997	3			3	34 395	4	8	34 407	8 971	43 381
1998	10		1	11	31 106	8	12	31 126	5 506	36 643
1999	1	10		11	25 369	51	4	25 424	5 021	30 456

Source : DOPM

Frozen products represent the most important volumes on the African market, well ahead of fresh products and traditionally processed ones. They account for 62% of export volumes with a peak of 85% in 1998. The prevalence of frozen fish can be explained by the fact that it constitutes the most important raw material for traditional transformers of piscatorial products in the sub-region.

Fresh fish holds a relatively marginal position in exports to Africa. Apart from the exceptional volumes recorded in 1992 and 1993, Africa never absorbed more than 1% of this type of product.

Processed products rank second in terms of volumes with a clear dominance of the *salé-seché* (salted and dried) and fermented and dried types. Congo and Ghana are the main destinations of these products, followed by Nigeria and Cameroon depending on the years.

5.5 Constraints to greater Penetration of Senegalese Products

Many factors hinder optimum penetration of African market by Senegalese products. These constraints are variable : transport, non-operational clearing mechanisms, insufficient knowledge of markets and administrative and customs procedures, trade restrictions imposed by certain countries...

5.5.1 Product transport Problems

The very bad condition of the main accommodation roads especially during the rainy season has a negative impact on the transport of fishing products and largely contributes to significant losses from the catches. Communication links between Senegal and bordering countries are of a very poor quality with rivers or other springs cutting through them.

5.5.2 Non-operational Clearing Mechanisms

Regional trade still faces serious payment problems. While trade transactions are favoured between French-speaking countries by the existence of a CFA monetary area, this is far from being the case between French-speaking and English-speaking countries. Despite the existence of a number of clearing mechanisms, the inconvertibility of some national currencies extends payment time and

does not encourage Senegalese traders to go on those markets. As it appeared, many national professionals do not know how the banking system works in those countries.

5.5.3 Insufficient Knowledge of the Markets

Senegalese exporters of piscatorial products have little information on trade, product types and prices. Operating on a small scale, they do not have enough means to experiment new products or to promote use of existing products on new markets. In general, national exporters confine themselves to traditional products and markets. They take very little initiatives and hardly make any efforts to explore new ones. Transformers generally ignore what products are adapted to the different regional markets.

5.5.4. Insufficient Knowledge of Administrative and Customs Procedures

Despite the preferential tariff regime instituted by UEMOA, exporters of the informal sector have problems getting information and having this new regulation implemented to the extent that they still pay the same taxes as before the new system. This situation is linked to the prevalence of the informal sector in fish trade and to traders' bad organisation. Neither did the absence of powerful professional organisations favour the emergence of a functional credit system to the extent that traders generally mobilise only small quantities of products commensurate with their limited financial standing.

5.5.5 Trade Restrictions

The financial strategies implemented by a number of African countries contribute to trade restrictions. Nigeria and Ghana limited fish imports during the 1980s in order to save foreign exchange. Some countries keep increasing entry duties in a move to replenish the coffers of their public treasury. An instance of this is that several UEMOA countries instituted additional taxes or marked up existing ones in order to compensate for the customs receipts losses entailed by the new system, which lifted entry duties. In Mali, for example, imports of piscatorial products are liable to domestic taxes viz. VAT (15%); service tax (5%) and community solidarity contribution (1%).

5.5.6. Other Constraints

Other equally important factors hinder marketing of piscatorial products processed in West Africa. Official language and landing problems constitute as many obstacles to product flows. Frustrating administrative and customs redtape often lead to boat immobilisation in the port for several weeks, causing important product losses. Thus, despite strong demand for processed products and the existence of maritime links between Dakar, Abidjan, Accra, Lagos, Douala, Libreville and Pointe Noire, Senegalese exports to most of these countries still remain marginal.

Chapter VI

Fisheries Management and Resource Access

In a bid to protect stocks of sea resources and optimise their value, Senegal established a Fishing Code (Law 76-89 of 21 July 1976, which was annulled and replaced by Law 87-27 of 18 August 1987 and Law 90-32 of 14 April 1998 respectively). These laws defined usage rights and standards of utilisation of national sea potentials.

6.1 National Industrial Fishing

Law 90-32 of 30 March 1998 establishing Sea Fishing Code and its Decree of Application provided that fishing boats flying Senegalese flag should possess evidence of authorised fishing issued by the Minister in charge of Fishing. Complementary provisions were incorporated banning fish collection boats and boats with packaging and processing infrastructures on board for finished or semi finished products. (1987). Fish collection boats will neither offload collected catches in Senegal nor generate any value-added, nor will they contribute to meeting domestic consumption nor to the country's exports. By entering into association with small-scale fishing units, they bypassed in that way the terms and conditions for gaining access to resources (licence and tax) and enjoyed access to coastal resources reserved for small-scale fishing.

Fishing licence is given for a period of six to twelve months by the Minister in charge of maritime fishing, after consultation with the Fishing Licensing Advisory Committee made up of Administration (Prime Minister's office, Department of Fisheries, Merchant Shipping, Surveillance Department, Finance Department, the Army) Fisheries Research Institute (CRODT) and Professional Association (GAIPES....).

6.2 Small-Scale Fishing

Up to 1998, small-scale fishing was neither subjected to any prior condition for access to resources, nor liable to any payment of taxes or fees; it was free from all obligations except those of registering pirogues with port authorities (in accordance with decree 4732/MDR/SERA of 23 April 1986) and wearing life jacket (in accordance with article 15 of the Fishing Code of 1987). The fact that small-scale fishing was not subjected to any restriction explains in part its strong development. The pirogues are estimated today to number about 11,000 compared to only a few hundreds in the early 1960s.

For the first time, small-scale fishing was timidly regulated with the advent of the 1998 Fishing Code. The new Law was limited to authorising the Minister in charge of Fishing to ban pursuit of small-scale fishing subject to certain conditions (non registration, utilisation of unauthorised fishing gears, non compliance with security standards, lack of adequate resource management...). Other provisions of the Law relate to mesh of small-scale fishing nets and the minimum required size of marketed species.

6.3 Other dispositions in the Fishing Code

Law 90-32 of 14 April 1998 fixing the code on maritime fishing and its application decree define fishing gears, fixing the dimension of the mesh of nets and trawlers used in waters under the Senegalese jurisdiction, and decreeing the fishing zones for all types of authorised licences. Thus, the area of the first 6 marine miles is exclusively reserved for small scale fishing. The aims sought through this zoning are the protection of sea resources and the prevention of conflicts between traditional fishermen and industrial fishing units.

6.5 Rationing of catches: extent and limits

To put in place a rationing mechanism, it is necessary to know, amongst other things, the exploitable potentials and their net annual growth. This method allows, in principle, stock preservation at the desired level of production through a direct control of fishing mortality. However, in a multi-specific tropical fishery such as the Senegalese one, fishermen can be tempted to conserve only species of high commercial value, which could lead to an overexploitation and an increase the risk of dependent rejections. In the hypothesis of global quotas, ship owners and fishermen are inclined to develop their own fishing capacity to get the highest catches possible before the quota is attained. Fishing can equally continue once the quota for protected species is

attained, catches of rationed species being thus rejected, representing mortality not taken into consideration in analyses.

Individual quotas can reduce the negative economic effects of competition. Competition could thus be reduced between ship owners to whom individual quotas have been attributed and fishermen would be encouraged to minimise the costs of catches of their quota. However, in spite of their advantages in the preservation and the reduction of over capitalisation, individual quotas are difficult to control and create great difficulties in application, particularly in tropical fisheries characterised by a big instability in equipment and a great diversity of species.

Chapter VII

Senegal/European Union Fishing Agreements under the test of time

7.1 UN Convention on the Law of the Sea and Fishing Agreements

The adoption of this Convention constitutes an extremely important questioning of the principle of free access to sea resources, since it creates an Exclusive Economic Zone (EEZ) of 200 marine miles (Art. 62) within which, coastal States dispose of sovereign rights on sea resources (living or non-living). The Convention on the Law of the Sea even recommends that coastal States should authorise other States to catch resources that they do not have the means to exploit.

7.2 The Complementarity Principle

Thus, the conclusion of fishing agreements rests on the principle of complementarity between national and foreign fishing concerns. All the coastal States – beginning with developing countries – do not always have the possibility of exploiting the totality of their EEZ resources. In theory, there should then not be any conflict between national and foreign fishing concerns, since the latter is limited, in principle, to what remains after satisfaction of the capacities of national fishing concerns. It will however be seen that the situation in reality is not so simple.

7.3 Overcapacity and fishing agreements

In addition, certain States were, right from the end of the 70s, confronted with problems of over capacity that led them to envisage the redeployment of their fleet to other waters. All these favoured the conclusion of fishing agreements between coastal States and distant waters fishing Nations. The powerful fishing Nations are criticised for encouraging over fishing (the EU subsidises, to the tune of 90%, access to resources for its fleets through agreements, ship owners being responsible for only 10% of costs), slowing down development and competing with small-scale fishing. They equally have the tendency of not understanding the state of stock distribution and of the biomass.

7.4 Limits of the principle of complementarity

The development of fishing agreements coincides with that of small-scale fishing in the 1980s. As from this period, the landings of small-scale fishing sharply increased from about 150 000 tons in the early 1980s, to 250 000 in 1990 and reached 350 000 tons today. As regards coastal, demersal and pelagic resources, national fishing ships seem not only capable of exploiting almost all of the stocks but also exploiting them fully. Therefore, complementarity only concerns, in principle, high-sea resources. It would be necessary, should the complementarity principle be fully operational, that agreements be actually based on available scientific estimates. Yet, such is obviously not the

case, firstly because researchers' opinion has not always been taken into consideration and secondly, because the indices retained for the evaluation of sold quantities are not realistic. On the whole, in the event that conditions for a theoretical complementarity between national and foreign fishing concerns exist, the principle would continue to face practical problems. If foreign fishing is normally allocated what remains beyond national fishing capacity, both of them will be competing in the same fishing zones. The development of small-scale fishing has multiplied the risks of conflicts with industrial fishing concerns, national as well as foreign, and one should even consider the possibility of extending the limits of the reserved zone.

7.5 Risks of Conflicts with the Agreement on Straddling and Migrant Stocks

Chapter V of the Convention on the Law of the Sea contains provisions on migrant and straddling stocks, but do not clearly specify the rights and duties of Distant waters fishing Nations and of coastal States in relation to these species. This uncertainty entailed conflicts between these two categories of Nation, leading to the adoption, in 1995, of the Agreement on Straddling and Migrant Stocks.

While the Convention on the Law of the Sea was criticised for not having responded efficiently to the problem of overfishing, Agreement on Straddling and Migrant Stocks goes much further. Concerning the management of fishing operations, it regulates not only the conduct of coastal States, but also that of Distant waters fishing Nations. Besides, it integrates the new principles on sustainable development and the environment, such as precaution principle, biodiversity preservation and the respect of small-scale fishermen's rights. It also recommends impact assessments, endorsing the idea that all the impacts of fishing activities (economic, social, environmental) must be examined. Its Article 6 stipulates that the absence of information should necessitate an increased vigilance in exploitation. This is a major change in the management of fisheries, where ignorance can no longer be alleged to justify bad practices (the administration of evidence has been inverted, since the issue now is not to demonstrate that exploitation threatens conservation but rather that it does not threaten it). While some straddling and migrant stocks covered by Senegal/EU agreement are fully or overexploited (tuna), agreements' impact on dependent species is also called into question. Hence, it would now be necessary to administrate evidence, in case of litigation, that the agreements do not threaten the species in question. Thus, the arguments of those opposed to fishing agreements will be fed with a new piece. The Agreement on Straddling and Migrant Stocks has not yet become effective, but it represents a notable evolution of international law, reinforced by the FAO's code of conduct for responsible fisheries.

7.6 Access to Market in exchange for Access to Resources ?

Unlike other OECD members, EU proposed, during the Uruguay Round, a moderate drop in its customs tariffs on fish products. As an explanation, EU recalled that its negotiation strategy is based on the principle of "access to market in exchange for access to resources", meaning that it expressly subordinates tariff concessions to the conclusion of fishing agreements authorising its ships to accede the sea resources. However, the options provided for by the new Lome Convention (ending non-reciprocity) and tariff erosion tend to question this principle. If the access to market no longer relies, as in the past, on significant commercial privileges, what about access to resources ?

7.7 The Agreements Coherence : Trade or Development ?

As indicated earlier on, EU-ACP fishing agreements have often been called "commercial" agreements for several reasons. But there is a coexistence, therein, of provisions of both commercial and development nature. Since their origin, they have been marked by this ambiguity and evaluated from on the basis of their specific contribution to development. This circumstance is evidently linked to the fact that a co-operation agreement, Lome Convention, is the framework of the relations between Europe and its former colonies.

The Lome Convention contains provisions specific to fishing, and providing for technical and financial assistance as part of an effort to improve knowledge on the fishing environment and on its resources in ACP countries, to increase contribution of fishing to industrial development through greater catches and results, processing and exports. EU support includes normally capture, management and protection, as well as processing and marketing. It encourages rational management of sea resources and promotes the development of small-scale fishing.

Yet, these agreements were noted to be incoherent, by both either parties because of the gap between their development objectives and their practical consequences. Competition between European fleet and national fishing units, especially in the context of resource scarcity, has already been raised. This problem grew worse under the latest agreement by the decision to allocate quotas (25,000 tons) on small coastal pelagics, which constitute the staple of the Senegalese food diet. Regarding funds allocated to research, it would be necessary to take into account the opinion formulated by competent authorities to contribute effectively to the definition of durable water policies. Yet, the EU ignored CRODT's opinion on a former agreement, by asking that its quota of high-sea fish be increased by 57%. Next, gradual substitution of foreign ships by national ones to as regards tuna fishing was finally never realised. Caught between a small-scale fishing using cheap production costs and a very capitalised European fleet – with the support of its officials – the Senegalese industrial fleet is unable to exploit further than coastal fish. Failure by Senegalese fleet to gradually substitute for foreign industrial fishing units leads one to question the impact of the agreements on the whole production chain.

7.8 Unrealistic Calculation Modalities and Problem of Secondary Catches

In the framework of agreements, Europe acquires "fishing capacities" in terms of tons of gross gauge. Yet, this obsolete method of calculation is contravenes international recommendations aimed at promoting sustainable fishing (Porter 1997). This method presents the inconvenience of being based on catches made over the past 10 to 20 years by ships of the same tonnage fitted with less sophisticated detection gears and fishing materials. Electronic means of detection are, indeed, widely popularised and the capitalisation race in the North Atlantic has revolutionised fishing techniques. By emphasising estimates instead of real catches, the calculation in tons of gross gauge allow measuring actual stocks withdrawals. Finally, and this is certainly its major inconvenience, it tends to favour the rejection of secondary catches.

Thus, the method of calculation in tons of gross gauge is inaccurate because it is not adapted to a ecosystem-managed fisheries which is most favourable to a sustainable management of resources (*a fortiori* in a tropical multispecific fishery). This problem makes it such that the risks of conflicts between fishing agreements and new legal instruments of marine resources conservation are high.

7.9 Compliance with WTO Rules : Trade Agreements or “Disguised Subsidies”

The WTO rules limit the possibilities of subsidising production or exports as it could give undue comparative advantage to exporters or subsidised products. Subsidies encourage over capacity, which is one of the main causes of over fishing. Most discussions devoted to fishing at the WTO trade and environment committee have dealt with subsidies. Fishing agreements tend to be considered as disguised subsidies. The fact that the European Union finances 80 to 90% of access prices to resources (ship owners pay the balance by buying licences) leads to question the commercial nature of fishing agreements (Porter 1998). In any case, the interest shown by WTO and environmentalists on the question of subsidies threatens agreements. In the future, possibilities of seeing them challenged before the WTO dispute settlement organ should increase.

RECOMMENDATIONS

Sustainable Management of Senegalese Fisheries through Resource Preservation and Product Valorisation

Between regulation and market mechanisms, solutions to current constraints should be mindful of resource preservation and product valorisation. While stocks are overexploited, resource preservation must be treated both as an environmental, social and economic objective. Yet, whether it will alone restore in the medium term the financial position of enterprises facing more or less immediate difficulties is left to doubt. This observation applies both to exporting industries and pelagic fishing units or small-scale processing units. Hence, sustainable management of the sector socially, ecologically and strictly economically also calls for the institution of a series of measures aimed at reinforcing production valorisation. As a result of pressures exerted on resources, efforts should focus on increasing product value-added without volume expansion at least that of exports.

In the first analysis, resource preservation seems to justify a regulating power. With regard to commons like renewable natural resources, the simple play of competition, indeed, may have environmentally and economically counter-productive effects.

On the contrary, product valorisation seems to require more market-based (or economic) instruments than support mechanisms. The latter were not compatible with maximum sustainable yield. A closer examination will reveal that official intervention may also have counter-productive effects on resource as evidenced by the history of support mechanisms. Similarly the creation of a flowing export market through non-discriminatory granting of many advantages did not necessarily translate into uniform economic performances. This fact is illustrated by the crisis in the processing component linked to the increase in the number of inputs. It is, therefore, necessary for resource preservation and production development, to set up simultaneously market-based instruments and regulation together with institutional measures securing participation of the people involved in the management of the sector.

Resource Preservation

Market-based or economic instruments

The market-based or economic instruments that are likely to facilitate preservation are also involved in access to resources. Irrespective of the role played by external demand, it is also because access to resources was free that export-oriented fishing units were able to exploit the stocks of coastal demersal resources beyond maximum sustainable yield. Thus, notwithstanding traditional regime of free access to natural resources, the question of their usage price should be raised with all the fishermen starting with those responsible for demersal captures. This question touches notably on the problematic of quotas, fishing agreements and capture component support mechanisms

- With regard to **quotas**, individual quotas appear to be more efficient than global quotas. However, many obstacles complicate the institution of quotas in multi-specific tropical fisheries and even more so when these fisheries are, like in Senegal, dominated by the small-scale sub-sector. Small-scale fishing is much less specialised than industrial fishing, which increases, with quota perspective, possibilities of rejections. To these technical obstacles must be added, in a developing country, the social inconveniences of such a policy. While developed countries can set up accompanying mechanisms, what would become of small-scale fishermen who would not be allowed to benefit from transferable individual permits ? How to chose, if one agreed, for example, to six or seven thousand permits out of the ten thousand or so

pirogues that Senegal has, those that would be admitted into the system? In any case, such an arrangement could be efficient only if based on a schedule of landings according to the fishing seasons of targeted breeds and to handling possibilities on the ground. On the other hand, midway between free access and private ownership, one could also envisage collective quota systems put in place by the communities of fishermen. The Casamance and Saloum estuaries are the most suited areas for these types of arrangements, but some marine areas, like Kayar, could also be considered. Again, this possibility should be carefully studied and deeply debated at a time when there are growing conflicts between fishermen's communities.

- The issue on the price of access to resources calls into question the **fishing agreements** concluded with foreign fleets, starting with those binding Senegal and the European Union. European boat owners who first benefited from these agreements have very reduced price of access to resources thanks to the financial counterpart granted by the European Commission. We have seen that these agreements were based especially on the principle of complementarity between national and foreign fisheries. And yet, if this principle continues to be justified for high-sea pelagic fishing, it is no longer operational for coastal demersal fishing. In this case, various solutions can be considered for relieving coastal demersal resources currently overexploited. First of all, one can not brush aside, given the level of resource exploitation, the possibility of not renewing these agreements. But it may also be envisaged to limit the agreements only to deep demersal and high-sea pelagic resources. It would be also possible to increase considerably the prices of licences granted to boat owners so as to deter the least profitable enterprises.
- Still in connection with the problem of price of access to resources, a number of **capture component support mechanisms** need to be investigated. Many facilities for the acquisition of fishing units (reduced interest rates, reduced tax on motors, equipment and subsidised pirogue fuel price) were instituted. While pelagic fishing units should always benefit from these measures in view of their deteriorating operating accounts and their contribution to the country's food security policy, their maintenance for coastal demersal fishing units needs to be discussed. While these units fish for endangered species under most favourable conditions and their economic results improve, one can consider at least the possibility of reducing some of their advantages. Thus, the subsidised motor fuel price might now be applied only to purse seines and surrounding gill nets.

Regulating Power

For the authorities to exercise their regulating power, there is need to ensure a better application of existing rules and to enact new measures

- Before considering organisational measures based on quotas, **existing regulations must be enforced** especially those relating to stitch and marketed breeds sizes. Therefore, the use of small stitch beach seines is still widespread and especially in spawning areas (Bargny), in violation of existing law. Similarly, incursions by industrial ships in the six miles zone are still too frequent. A reflection involving all the professionals of the sector should be initiated in order to grasp the sources of non-compliance with the law and the ways and means to end it.
- Concerning the **new regulations**, exports of endangered species as whole products might be banned or surtaxed. A freeze on global fishing (small-scale and industrial) effort on coastal demersals also seems to be desirable. Regarding industrial ships, the principle of a freeze on licence issuing must be respected and dues must not be based on gauge tonnage but rather on the value of landed breeds. As far as small-scale fishing units are concerned, they might also be required to be licensed. Finally, in view of growing conflicts between industrial and small-scale fishing, the limits of the area reserved for the latter might be extended beyond the six nautical miles.

Institutional Measures

The adequate measures that can preserve resources have all the more chances to be efficient if they were decided and applied with the involvement of professionals of the sector and of all interested parties (fishermen, boat owners, fish processing women, researchers, NGO, etc.).

- Regarding, for example, the quota systems or community ownership rights, the latter not only imply internal **consultations within the communities** concerned but also discussions open to competing communities. There is no longer in Senegal a fishing area remaining the prerogative of a single community. On the other hand, the authority of a community on a given fishing area, might be recognised subject, however, to its being regulated and providing for mutual concessions. To that extent, some fisheries might be collectively organised.
- An effective involvement also presupposes that those concerned should take on greater responsibilities. Thus, the **Licensing Committee might be consulted for a conform** and non optional **advise**. As a rule, delegating a number management powers to this type of institution should increase the efficiency of organisational measures.
- Lastly, the **structures charged with preserving and marketing resources should come close** to each other. Thus, relations between CRODT – in charge of studying the stocks – and the Economic Observatory of Senegalese Fisheries (OEPS) in charge of product competitiveness analysis might be institutionalised.

Product Valorisation

Official Interventions

Official interventions which are likely to better valorise production of piscatorial resources should be in the form of infrastructures construction, support to some fisheries and banning measures.

- With regard to **infrastructures**, the programme on the construction of fishing wharves is likely to reduce post-capture losses. It should be complemented with a programme on the organisation and security of small-scale fish processing sites. Such a measure would make it possible to improve the working conditions of fish processing women, activity profitability, sanitation and product quality. It will at the same time contribute to the food security policy. The installation of stocking infrastructures in the main small-scale processing centres aims at the same objectives. The improvement of existing roads or construction of new ones at the national and sub-regional levels would also help to better valorise sea production.
- As for **support to some fisheries**, the revival of sardine semi-industrial fishing would provide more raw materials to industrial processing (canned fish, freezing...) without competing with small-scale fishing (products of smaller size). It would extend the range of products exported to Africa. The organisation of a system of collecting rejections of industrial fishing with the use of pirogues assembled in secondary coastal surveillance centres would contribute to increasing available quantities for the domestic markets and small-scale processing.
- The packaging and processing components being in a clear overcapacity situation, **a freeze on new plants** would be recommendable. Failing which, the arrival of newcomers attracted by a depleting rent might entail the bankruptcy of all the owners.

Market-based Mechanism and Economic Measures

Market-based mechanisms and economic measures are also likely to increase the value of production. These include notably tax and customs incentives, measures facilitating the use of technologies adapted to industrial and small-scale processing and systems designed to support market exploration.

- The **extension of free export enterprise status** would help to reinforce, in liberalisation context, the sector's external competitiveness. However, such a non-discriminatory measure applicable to all the parties of an overcapitalised component might strengthen, unless specific banning measures are enacted, attempts at exporting whole products. It seems, therefore, to be more appropriate to **grant tax and customs advantages in proportion with product industrial value-added**. Such a measure offers the advantage of reconciling external competitiveness and sustainable management of resources. On the other hand, the persistence of tax barriers hinders the circulation of sea products within regional customs unions despite lower customs duties. It is therefore necessary to **negotiate, at the sub-regional level, a customs and tax harmonisation policy** that would profit all the States.
- Next, **financial incentives** notably in terms of credit, might facilitate acquisition of **technologies adapted to industrial and small-scale processing**. As far as small-scale processing is concerned, its yields and quality and healthiness might be improved through diffusion of CHORKOR and PARPAING ovens, handling tools and stocking infrastructures.... Concerning industrial processing, the preparation of fillets, fish steak or shrimps peeling require relatively simple and cheap technologies. Incentive mechanisms might facilitate their diffusion.
- The penetration of **new markets** both African, Asian or American would be eventually favoured through **study** of their specific features. Technical obstacles and those relating to the consumers' tastes might be surmounted.