MASMANAP country report:
France

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SUMMARY – France represents one of the major aquatic food markets within EU15, whose domestic production of fish is mainly supplied by capture fisheries and, that of shellfish (especially bivalves) by aquaculture. From 1988 to 1998, French aquatic food supply from aquaculture became more pronounced. On the one hand, the domestic production by capture fisheries levelled off, due to the depletion of demersal fish resources; on the other hand the growth of seafood imports was steady and partly supported by the significant rise in farmed products (salmon and shrimps). Finally, the French apparent seafood consumption slightly increased whereas the supply of fish became more dependent on aquaculture. From the viewpoint of demand analysis, the main trends in aquatic food consumption are related to the socio-demographic features of the French population, and are analysed through the available quantitative data, e.g. mainly from on-going consumer panel surveys which are home consumption-oriented.

Key words: France, fishery, aquaculture, seafood, supply, consumption.

RESUME – *"Rapport national dans le cadre de MASMANAP : France". La France représente l'un des principaux marchés pour les produits aquatiques au sein de l'Union Européenne, avec une production domestique approvisionnée en majorité par la pêche en ce qui concerne le poisson, et dominée par l'aquaculture dans le cas des coquillages. De 1988 à 1998, l'origine aquacole de l'offre de produits aquatiques sur le marché français s'est accentuée. D'une part, les apports de la pêche ont plafonné, avec la diminution des ressources de poissons démersaux, d'autre part la progression des importations a été régulière et en partie soutenue par l'accroissement significatif des achats de produits d'élevage (saumon, crevettes). En définitive, la consommation apparente de produits aquatiques a légèrement augmenté sur la période, tandis que l'offre de poisson est devenue plus dépendante de l'aquaculture. Du point de vue de l'analyse de la demande, les principales tendances de consommation sont resituées par rapport aux caractéristiques socio-démographiques de la population française et analysées à partir des données d'enquête des "panels consommateurs" qui suivent l'évolution de la consommation à domicile.*

Mots-clés : France, pêche, aquaculture, produits de la mer, offre, consommation.

Statistical methodology evaluation

The main objective of this first report is the collection of data in order to assess and to characterize the national seafood consumption. As such, supply and demand existing data are reviewed successively. On the supply side, the evaluation is straightforward, based on the aquatic food availability for human consumption (balance sheets). The main difficulty lies in selecting the right data, while highlighting the main shortcomings within the field of both production and external exchanges of aquatic food. On the demand side, the inventory aims at collating the main available information about the environment of seafood markets, economic indicators and the main buying features of seafood.

Production database

The reliability of different sources of data is quite variable, according to the sector concerned (fishing or farming), the environment (sea, inland waters) and the way of organization of the first hand sale. We must bear in mind that the French fishing statistical system is entirely separated from that of aquaculture, and that Fisheries and Aquaculture authority (DPMA) joined the Ministry of Agriculture only a few years ago, to have an idea of the specificity of the official database in the case of marine fish and shellfish production. The evaluation of the capture data aims at recording all the landings at the stage of the first hand sale. As a necessary tool for fisheries management, it brought together all

the work and statistical means. The estimation of farmed shellfish production firstly lay in the counting of each production dedicated to consumption, considering that the initial objective was related to the sanitary control.

In this section, we are going to limit our assessment to information on the fisheries statistical system, which represents the only on-going database. This database attempts to be exhaustive, but this objective is not reached equally depending on the region or the product. In France, the majority of fresh fish landings are directed to auctions which have set up an efficient system of first hand sales registration. The fish frozen at sea do not follow the same trade channels.

Chilled seafood market: the rate of auction sales depends on the dispersion of landing places, the scale of production, the scarcity and value of catches, and the local trade practices. For instance, along the Channel shores, the crab market is controlled by fish merchants who have regular contracts with the fishing firms. Another example: high value species, encouraging the direct sale to customers or to restaurants, especially in area where tourism outlets are key and may represent a better way to valorize the captures.

Frozen fish market: the producer association of frozen tropical tuna directly transmits its catches to the fishing authority (DPMA). The pattern is the same in the case of other fishing companies specialized in frozen fish.

As far as non-auction sales are concerned, the estimation of non declared production is obviously more tricky and would require additional data collection means to improve the coverage rate of this category of data. Another crucial issue is related to the statistical stability in order to ensure the homogeneity of the series (e.g. the fluctuation of the means devoted to collecting the data over the last twenty years).

Concerning the statistics of aquaculture production, the background of the national statistical system will be presented in the following section. The SCEES (Central Department of Surveys and Statistical Studies), which is the governmental agency commissioned to provide statistics, economic indicators and to conduct census in the field of agriculture and food industry, has been involved in the field of aquaculture, through the farmed fish sector, only few years ago. The first statistical and economic survey about aquaculture was conducted by the SCEES in 1992 (covering 1991 data) on the production sector of freshwater trout, and again in 1998. The involvement in marine aquaculture is more recent, with a first census undertaken in 1998 within the farmed sea fish sector. Although these one-off statistical operations are not undertaken frequently (six-year interval in the case of salmonid farming industry), they are useful to assess and adjust the empirical yearly estimations of production issued from semi-official sources.

Foreign trade database

French customs data on aquatic food were selected to make up this report because they represent the initial source of Eurostat data. The main criticism one can make about importation or exportation data is related to the flaws of the nomenclature which limits the accuracy of the data. Moreover, the item "other chilled fish" reaches a significant level for French export statistics, that makes the analysis of external trade more approximate and unable to demonstrate the great variety in the species purchased by neighbouring countries. Another remark is related to the statistical consistency of the data series following on the modification of the registration system in 1993. This issue will be examined in the following section, with the presentation of statistic figures.

Marketing and consumption data

The official data source in France is the National Institute for Statistics and Economic Studies (INSEE) which provides, among its numerous publications, several economic indicators for all goods, namely consumption indexes in volume, production prices, industrial and retail price indexes, and household budget expenses, etc.

The main usable INSEE data concern the structure of household expenses derived from the specific survey about French household consumption. This latter provides the sharing out among the

main items of household budget (housing, food, transport, leisure, health, etc.) and about food the division into the main categories (meat, fruits and vegetables, fish, etc.).

In other respects, as far as monthly price series are concerned, the INSEE publications cover: (i) wholesale prices provisioned by primary data from the largest wholesale market place of Rungis; (ii) industrial price index for canned and frozen fish; and (iii) retail price index for fresh fish and shellfish and processed seafood. The main reservations expressed towards these on-going data series refers to the lack of representativeness of the selected items (low level of detail, seldom updating of items, unavailable aggregate items), which limits the relevance of the data series and therefore the scope of the results, whatever statistically significant they might be. This state, probably more pronounced due to the low economic weight of seafood chain in gross national income, brings us to let aside the INSEE price series in most cases and to rather prioritize more specialized and alternative data sources.

The review of "semi-official" consumption data comprises the inventory of the existing panel surveys. The term of semi-official data has been retained here in reference to the status of such surveys, which are conducted by private companies commissioned by public organizations (such as OFIMER). Three panel surveys have been identified, with different level of implication:

(i) Consumer panel survey: continuous survey, covering the main aquatic food markets (fresh, cured, frozen, canned).

(ii) Distribution panel survey: on-going ad-hoc survey on chilled value-added aquatic products.

(iii) Restaurant panel survey: one-off ad-hoc studies.

Respectively, the samples surveyed are made up of households, large retailers and restaurants, while registrations aim at measuring: (i) household purchases intended to home consumption regardless of the buying place; (ii) the sales of large retailers; and (iii) restaurant supplying. To simplify, the objective of CPS and DPS are to keep track of changes in the structure of home consumption, whereas the RPS aims at estimating the importance of out of home consumption.

Over the latest years, the majority of public funding have been dedicated to survey the French seafood consumption at home, and accordingly we have got the access to a lot of detailed data for this main demand segment. The assessment of quantitative data on home consumption will be undertaken in the section on "National seafood market information", together with the presentation of the main results provided by SECODIP consumer panel survey. On the other hand, the background about the catering sector is far from being so rich, due to more intermittent and less detailed surveys, and the resulting data are fewer. For this reason the main material used in the analysis of French seafood consumption will be provided by SECODIP database on household purchases, and the methodological analysis will focus on it. The catering sector will be more briefly considered, despite its significance in final consumption, which will be emphasized.

Production and total supply of aquatic food

French production of aquatic food is characterized by diversity, in terms of species, type of production, range of price, regional specificity, etc. that has an effect on sales practice and finally on statistical system heterogeneity, etc. Over the last 20 years, and according to national statistic data, the total of capture fisheries and aquaculture amounted to between 700,000 and 900,000 t. During the first period (1978-1987), the trend was not very marked and the total annual production fluctuated around 750,000 t average. Between 1988-1997, the upward trend was greater. The comparison with the previous period shows an extra annual yearly production of around 100,000 t on average. But this tendency was not constant. The aquatic species production began to pick up in 1990, topped in 1994 and from 1995 a downward trend was observed. In any way, it is necessary to confirm these general trends from a statistical point of view, taking into account breaks in data series.

Total production by capture fisheries

From 1988 to 1997, the volume of landings with regard to total aquatic food production have slightly decreased. In 1997, fisheries provided 68% of the French total production in quantity, versus

72% in 1987. In terms of value, the contribution of capture fisheries within the overall domestic production of aquatic food is a little lower, about 65% during the latter period. The majority of French capture fisheries are landed in a fresh form. In 1997, the catches frozen at sea represented 33% of the total volume but generated no more than 16% of the fisheries turn over.

Evolution by species categories

The selected categories are relevant in terms of halieutic and economic aspects, in spite of the remaining diversity of the non-pelagic fish group. The interest of this first classification, although approximate, is to identify the main issues that arose in the different types of exploitation.

Volume trends (Fig. 1)

In the first position, both categories of fish present specific trends. The category of non-pelagic fish, represented the main supply of sea fish ten years ago, has fallen off since then, due to the declining production of traditional fisheries in species such as *Saithe*, W*hiting*, *Haddock*, *Ling, Cod,* etc. On the other hand, the production of pelagic fish (50% frozen tropical tuna) saw a marked increase until 1994 before recording a slight decrease. The predominance of fish in French landings (about 85% in quantities) is moreover boosted by the national statistical system which presents some shortcomings for the shellfish and crustaceans sales recording.
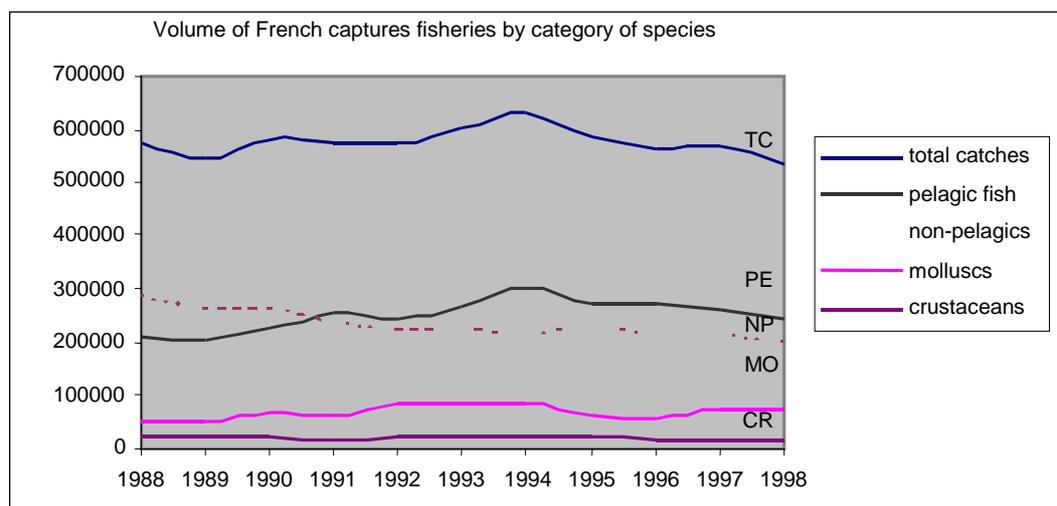

Fig. 1.   Evolution of the French captures fisheries in volume (source: CNPMEM/FIOM).

Value and average price trends (Figs 2 and 3)

In monetary terms, the average price of the overall landings levelled out in 1989, reached a trough in 1994, before rising again slightly from 1995. The simultaneous fall in landings and prices marked a break against the previous trends and indicated the extent of the crisis which affected the French seafood market following on the opening of the "Single Market". This general trend was markedly influenced by the tendency of groundfish prices, as the major category of landings.

According to the scale of price, crustaceans are ranked in first position (between 4 and 5 Ecu/kg), followed by non-pelagic fish (2-2.5 Ecu), then molluscs (1-1.5 Ecu) and finally pelagic fish (0.8-1 Ecu). These indicators provide an interesting element of value which complete quantity factors, for instance in reducing meconomic importance of pelagic fish in the total gross production, and also in showing the part played by the decrease of groundfish catches in the calculation of the overall price indicator.

Finally, the total value of French fishery catches recorded a 24% decrease from 1988 to 1995, whereas the slight recovery in 1998 did not reach more than 7%. At the end of the period, the non-pelagic fish category represented no more than 54% of the total production value, versus 62% ten years ago. The new breakdown of captures, resulting from groundfish depletion, is a structural

element of price decrease that continues to interfere in the production price index in spite of the upward movement of unit prices.
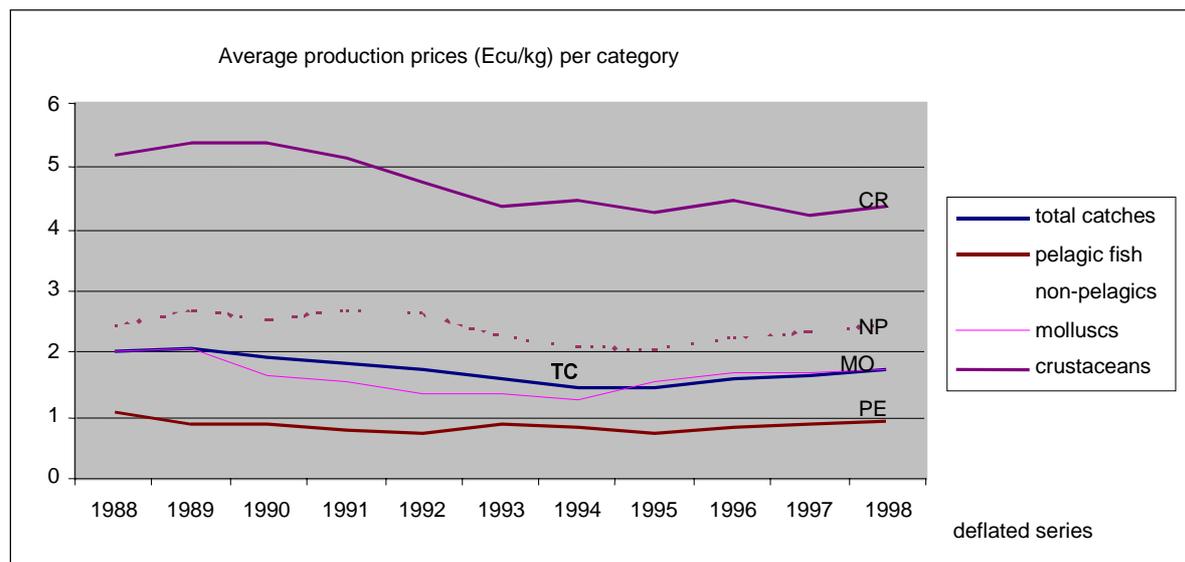

Fig. 2. Evolution of the average prices of French landings (source: CNPMEM/FIOM).
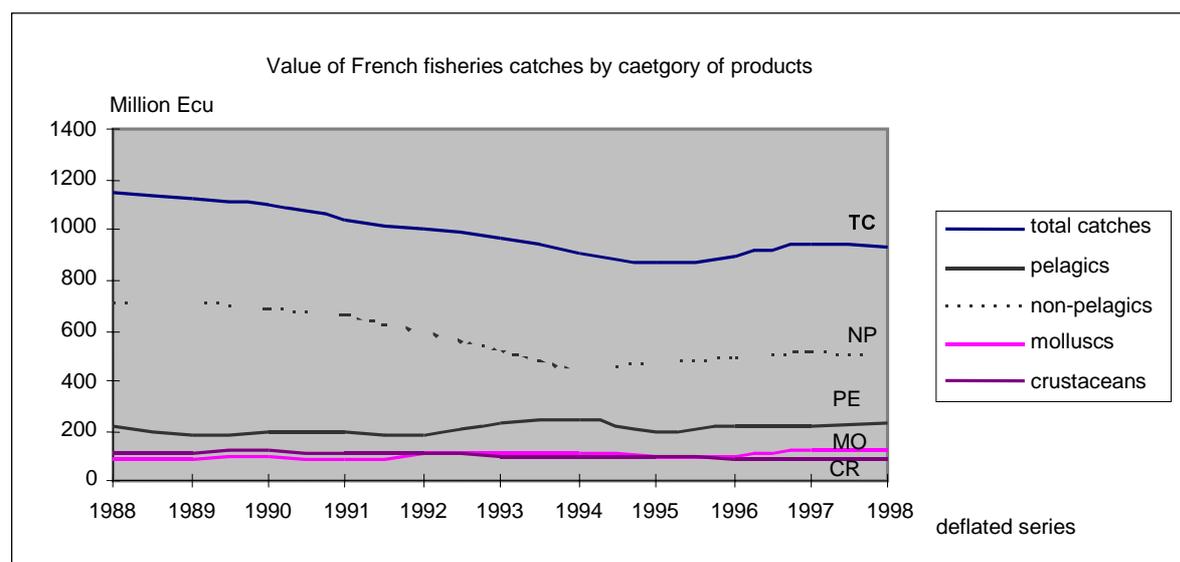
Fig. 3. Evolution of the turnover of the French landings (source: CNPMEM/FIOM).

Breakdown of the landings by species in 1998

The *non pelagic* fish category (Fig. 4) which is the leader in value is also the most diversified, including groundfish from both offshore and coastal fleets and varied scale production. Hence, the broad range of prices observed depends not only on the species, but also on the fishing conditions and the main outlets targeted in the seafood market.

In 1998, the foremost species were two high price fishes, the *Sole* and the *Anglerfish*, which represented together 28% of the total non-pelagic fish value, versus only 12% in quantity. In economic terms, the increasing market share of these top species (they only contributed for 15% of the value in 1988) is above all indicative of the general downward trend of the groundfish group over the 1988-

1998 period, which particularly affected the species belonging to the *Gadidae* family. The fall in landings of the 5 following species (*Cod, Hake, Whiting, Saithe, Ling*) from around 147,000 to 80,000 t (51% of the groundfish catches to 40%), is a good example of the white fish depletion. The concomitant slight rise in value of the "5 species" aggregated market share (from 28% to 30%) gives evidence of the increasing pressure on price on white fish market resulting from short supply context.

Breakdown of non pelagic fish captures in 1998
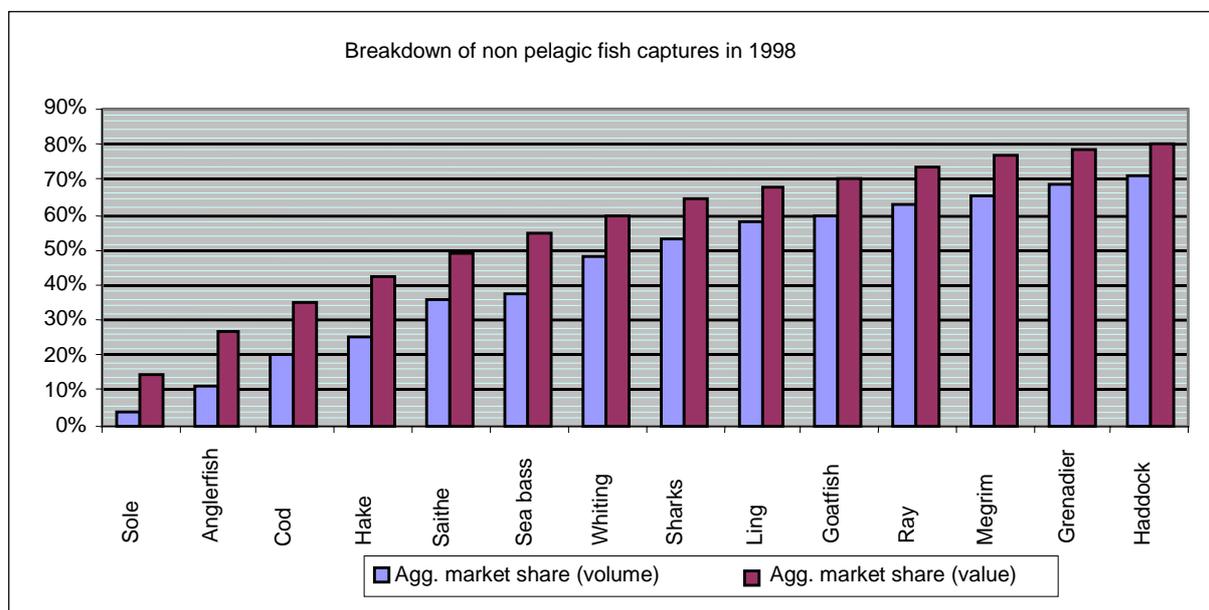
Fig. 4. Breakdown of non pelagic fish in 1998 (source: FIOM/OFIMER).

The common feature of French groundfish fisheries is that the bulk is landed and traded in chilled form (whole or in slices, fillets), for the domestic or export market. Very few products are frozen at sea, or bought by the national processing industry. At this level, a first segmentation of non-pelagic fish captures appears, which distinguishes whitefish to be filleted from the other fish. In the first group, average prices differential is less marked, from 1 to 2 Ecu, with *Saithe* placed at the lower limit and *Ling, Cod* and *Pollock* at the upper limit. It concerns also the category which suffered the most the decline of landings over the last 20 years.

The category of *pelagic fish* (Fig. 5) is dominated by frozen tropical tuna captures from overseas (East Atlantic and Indian fishing areas) and dedicated to canned fish processing in foreign factories located near landing places. Fresh *Albacore* and *Bluefin tuna* which are also included in the tuna production represents a smaller but more specialized market (14% of the total pelagic fisheries value), with outlets orientated to the fresh market. *Anchovy* production hold second position and aims at chilled market too. It strongly depends on Spanish production sector, exploiting the same resources, located in the Gulf of Biscay, and with prices directed by Spanish outlets in the fresh market or processing industry.

Nowadays the main captures of *Herring, Horse mackerel* and *Mackerel* are provided by industrial pelagic trawlers, frozen at sea, and directly landed in The Netherlands. This production is influenced by quotas reduction, especially in the case of *Mackerel*. The exploitation of *Sardines*, from the Atlantic coast or Mediterranean sea, supplies both the fresh market and the cannery industry.

In comparison to groundfish, pelagic fish captures are mainly processed by ships with freezers and the catch is destined to the cannery industry, excepted small scale production for local and regional fresh fish markets. Their prices are broadly determined at an international trade level and sensitive to high natural variability of pelagic fisheries.

In volume, *molluscs and crustaceans* do not exceed 100,000 t, but in value, their total sales are not far behind pelagic fish. In decreasing order of value, *Norway lobsters, Scallops*, C*uttlefish* and S*quid*

are the most common landed species. This concerns very regional exploitation areas, the North Atlantic coast and especially the South Breton fleets for *Norway lobsters*; Channel fishing areas in North Brittany and Normandy bays for *Scallops*. The exploitation of scallops remains economically sustainable thanks to the very strict fishing rules applied for many years and in spite of a risk of non to respect the obligation of sales registration in auctions. This necessarily implies under-evaluation of the national scallops production data, but it is difficult to predict to what extent. The same problem related to high value species and (or) the landing places scattering concerns crustaceans, such as *Lobsters, Crayfish, Shrimps,* etc. The low quantities involved in this type of exploitation favours short trade channels like direct sales to consumers or to restaurants, and in consequence limits data exhaustivity. The crab trade organization in North Brittany, which is based on contractual links between fishermen and wholesale fishmongers, provides another example of the difficulty in the national statistical system in estimating non auctions sales data.
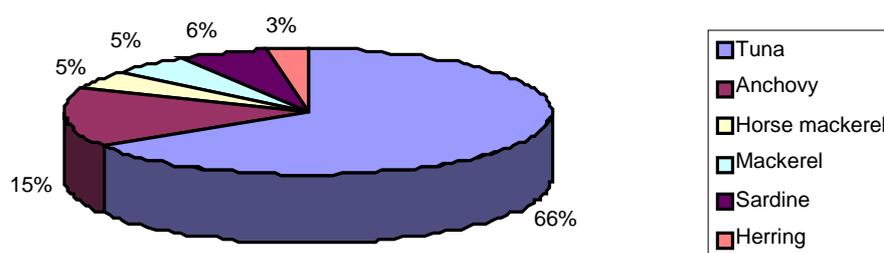

Fig. 5. Breakdown of pelagic fish captures in value in 1998 (source: FIOM / OFIMER).

Total production by aquaculture

Shellfish farming is the most common and the most long-established activity of French mariculture. This traditional and local activity is carried out all around the French coast. Sea fish farming involving an intensive exploitation system and overall biological cycle control began at the start of the seventies. As the growing potential of this activity is partly hampered by marine area accessibility constraints, marine fish farming still trails behind the inland farmed production (mainly trout).

Evolution by type of farming

From a statistical point of view, aquaculture data are mainly based on professional and administrative estimations.

Before 1992, shellfish estimation data came from the sanitary control system which cleared shellfish sales for human consumption. This system which implicated together administrative and scientific research services was a limited but useful tool in measuring the quantities of oysters, mussels, or other shellfish dedicated to final consumption. Since then, the delivery system of sanitary certificates has been entrusted to the veterinary authority, and no longer provides any basic information to produce even the most crude statistic data.

The reliability of marine finfish data is indisputably higher, but does not count for much in overall statistical results. The researchers involved in the development of new aquaculture have set up early their own database, thanks to preferential relationship with producers and their small number. The yearly collect of information with the profession is essential in providing growth activity indicators. As far as commercial production is concerned, professional declarations may be considered exhaustive, which is not the same in the case of the pilot stage production (held confidential). A first national statistical survey about new farmed fish (seabass, seabream and turbot) was conducted by the statistical department of the Ministry of Agriculture and Fisheries in 1998 and confirmed the reliability of IFREMER's production estimations for 1997.

For the other categories, salmonids and freshwater fish, the data source used in this section are respectively, the CIPA (Interprofessional Committee for Farmed Trout) and the Ministry of Agriculture and Fisheries. It is noteworthy that the trout production has been measured precisely with the help of national statistical surveys led by the SCEES on two occasions, in 1991 and 1997.

Volume trends (Fig. 6)

With reserve, it does seem that the farmed aquatic production has increased over the last ten years, due to the upward trends of oysters and trout. The first break in the shellfish series in 1990 covered up a statistical rectification of oyster production level. The second break in the series, related to methodological changes of oysters production evaluation little affected the results on first inspection, for the simple reason that new estimations referred to previous data, including evolution rates. But, as and when the year of reference passed, extrapolations became more and more difficult, depending on individual willingness to estimate and on hands on experience of both administrative and professional bodies.
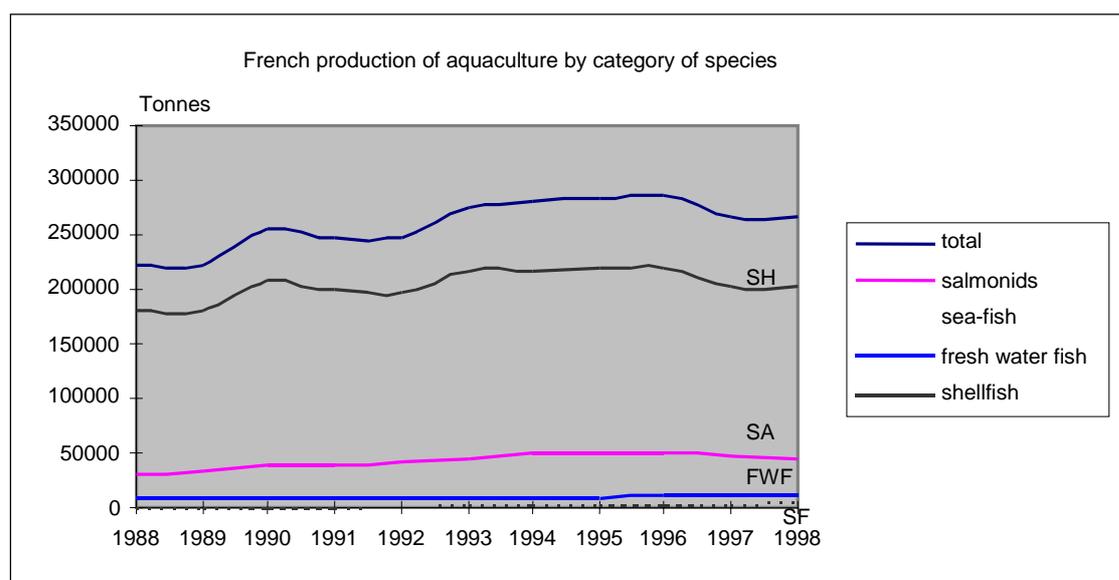

Fig. 6. Evolution of the French production of aquaculture in volume (source: CNPMEM/FIOM/IFREMER).

Value and average price trends

In the series expressed as value, the problem of statistical consistency becomes more acute with the introduction of a supplementary variable such as price. A priori, the approximation related to prices is not higher than quantities. For these two variables, estimations are obtained by the cross-checking of different sources of information, and so are equally empirical, seeing that they do not lie in statistical methods.

Nevertheless, an additional problem arises with the price, due to different sale levels to be taking account. It is really ambitious to determine a price of production, that squares with the farm gate price (e.g. covers only operating costs, without carriage costs) whereas a reference selling place, like auctions, does not exist for farmed products. The possible misunderstanding about which price, introduces an additional margin of error. In Fig. 7 the evolution of shellfish prices and values are intended to reflect the turnover of farming activity, excluding the margin related to consignment.

Breakdown of the aquaculture production per species in 1998

The aquaculture which takes up one third of the domestic seafood supply still remains little diversified, mainly depending on monoculture activities (Fig. 8). The cultivation of *oyster* and *mussel*, and the *trout* farming amounted to 88% of the overall gross production of French aquaculture in 1998.

The French production of *bivalve molluscs* mainly depends on farming activities. In the case of oysters and mussels, the mariculture production even makes up the referent market, unlike most other aquatic species for which capture fisheries are prevalent. Another particular feature of the bivalve

production can be highlighted: oyster, mussel and other shellfish are sold alive and dedicated to consumption raw, especially in the case of oysters.
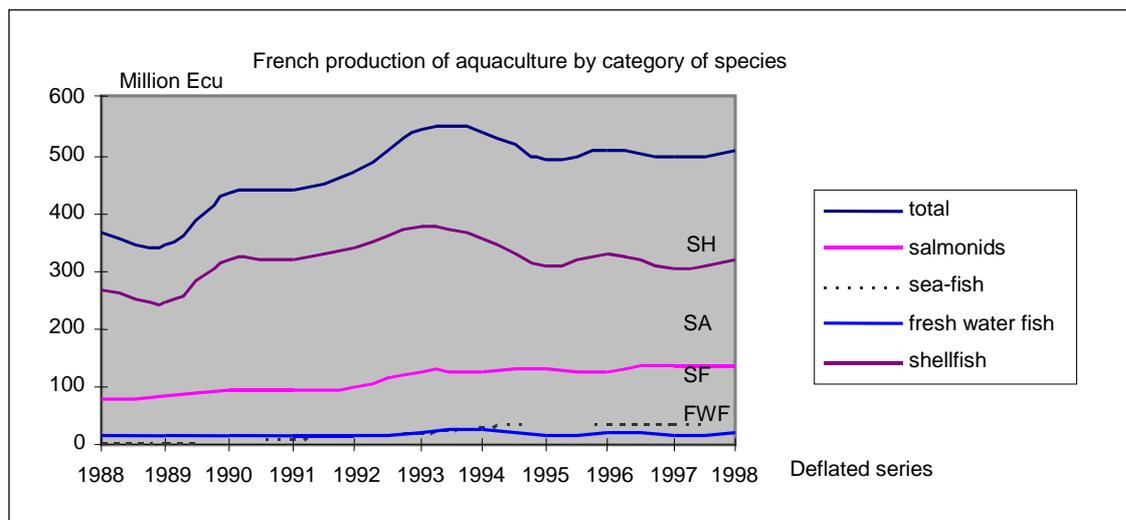

Fig. 7.   Evolution of the French production of aquaculture in value (source: CNPMEM/FIOM/IFREMER).
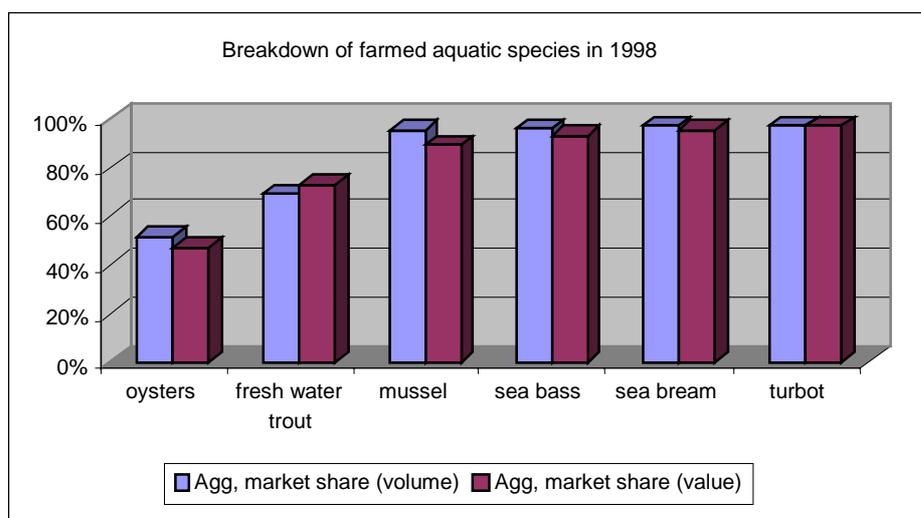
Fig. 8. Breakdown of the French production of aquaculture in 1998 (source: FIOM/IFREMER).

The specificity of oyster cultivation is further marked if bearing in mind the French position which is both leader and almost self sufficient on the European market. Around 140,000 t of oysters are produced for sale every year according to the professional bodies (CNC, SRC), and the production price was estimated to 1.7 Ecu in 1998. As far as mussels are concerned, the cultivated production roughly amounting to 60,000 t per year is completed by the fishing of wild stocks, which did not come to 10,000 t in 1998. The average production price of farmed mussels was worth 1.25 Ecu at that time (0.35 Ecu/kg in the case of wild mussels).

As dominant species of *freshwater fish farming*, *Trout* hold a special place in the French aquatic fish production. This traditional activity, distinct from that of *Salmon* farming in terms of production sector, integration and outlets, has been suffering from the competitiveness of the increasing salmon industry. Nowadays, freshwater trout farming may be regarded in its turn as a substitute for salmon

within the chilled seafood market, thanks to the recent diversification of product (broadening of the size range, filleting, development of smoked trout, etc.). The estimated average price of trout, amounted to less than 3 Ecu/kg in 1998, versus 3.5 Ecu regarding farmed domestic salmon.

The fast progression of *French marine fish farming* at the start of the nineties, has slowed in the last three years. The species which made up the target of new aquaculture development, such as S*ea bass*, *Sea bream* and *Turbot*, belongs to the expensive fish category (higher than 7 Ecu/kg), in spite of the price decline following the sharp increase of the Mediterranean supply. In comparison with their fishing counterparts, the farmed fish are globally located in the same price range at the first hand sale level, bearing in mind that the wild fish price is still the reference. However, "wild fish" does not always mean "single quality", and the *Sea bass* market provides one example of the price differentiation according to exploitation methods. The highest price is attributed to S*ea bass* captured by lines, the lowest to trawler catches, while the price of farmed S*ea bass* is between the two.

Total French production of aquatic food

Main trends in volume and value

The computation of fisheries and aquaculture production gives us an overview of the evolution of the French seafood supply. With respect to the volume (Fig. 9), the production potential remains mainly dependant on capture fisheries (580,000 t plus or less 50,000 t) and shellfish farming (200,000 t plus or less 20,000 t). Over the 1988-1998 period, the downward trend of non-pelagic fish catches looked significant and was not counterbalanced by the growth of fish farming (with a resulting loss of 40,000 t). In other respects, the peak of 900,000 t of the total production in 1994 showed catch variability of wild stocks, especially pelagic fish and shellfish, plus very likely a statistical bias.
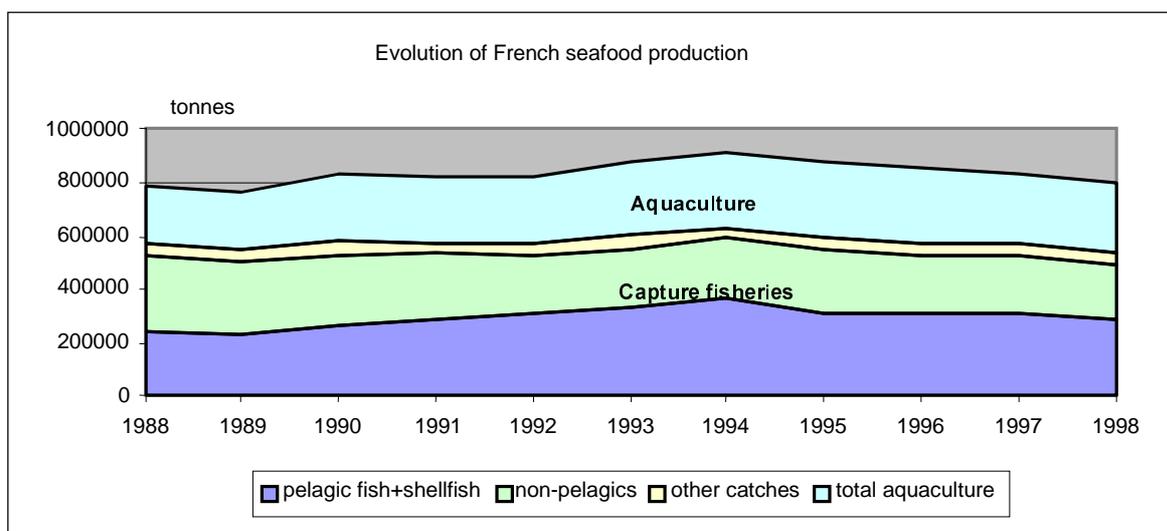
Fig. 9. Evolution of the French seafood production in volume (source: CNPMEM/FIOM/IFREMER).

In terms of value (Fig. 10), the impact of catch fluctuations in the turnover assessment is not so determining, owing to the lower average price of pelagic fish. The downward trend of non-pelagic fish production was stressed at the time of the "fishing crisis" characterized by an overall drop in first hand sale prices. The effect of this slump was reduced by the consequent resource depletion and the inevitable upward price trend. Nevertheless, the measure of the effects of both the evolution of captures and the overall economic situation, resulted in an estimated loss of turnover amounting to nearly 200 million Ecu for the non-pelagic fish captures (-30%) between 1988 and 1998. At the same time, the increase of farming activities was worth around 150 million Ecu (+40%), of which 100 millions were from fish farming (salmonids and marine finfish).
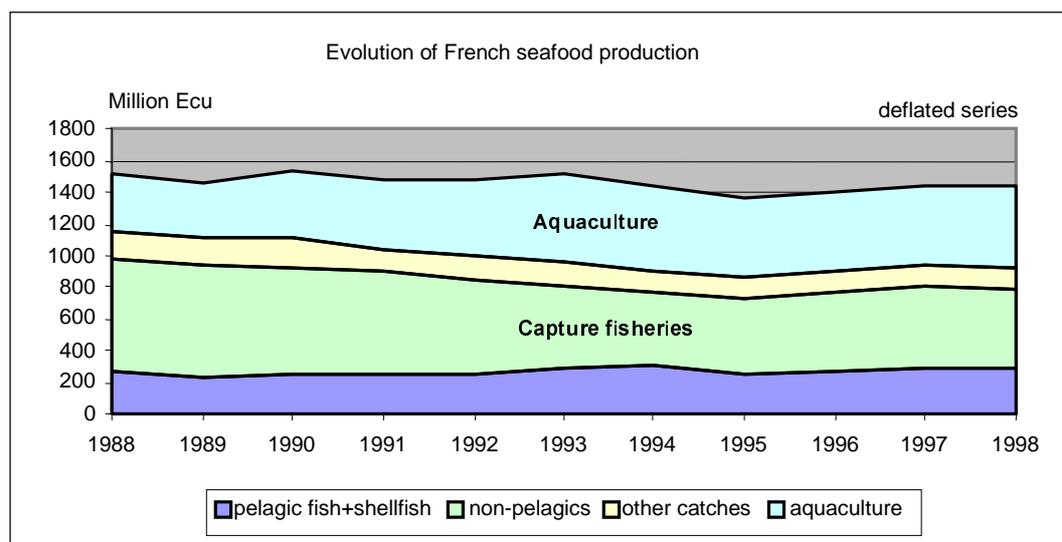
Fig. 10. Evolution of the French seafood production in value (source: CNPMEM/FIOM/IFREMER).

Finally, the origin of the total French seafood production has been modified over the last ten years with the increasing potential of aquaculture, notably within the field of fish farming. For the overall categories of species, the production share of aquaculture has been extended from a quarter to a third in value, according to the available data. The contribution of aquaculture has remained relatively stable in the case of shellfish production (above 80%) and non-existent for pelagic fish, crustaceans and cephalopods. The most significant evolution concerned the non-pelagic fish category (including salmonids) for which the farming sector provided 28% of the total gross production in 1998, versus 12% in 1988.

Evolution of the non-pelagic fish production from both fisheries and aquaculture

By focusing the analysis on the domestic supply for the fresh fish market (Table 1), the main feature of the last decade concerns the increasing weight of the fresh water *Trout* farming, which reached a 19% market share in 1998 (versus 10% in 1988) and the relegation of the *Hake* from the first position to the 5th, far behind the second species in term of value. The decrease of the annual turn over of *Hake* not only derived from the drop of landings, but also from the declining price of this species, following on the devaluation of several European currencies, the decrease of the size catches, and the competition of salmon on the fresh fish market, especially through the supermarket chains. More generally speaking, the significant losses affecting the *Gadidae species* capture was pointed out as a noteworthy trend, which led to the decrease of the overall groundfish domestic supply. In other respects, the development of marine fish production from aquaculture levelled off as early as the mid 90s.

Table 1.   Classification of the 10 main species among non-pelagic fish production (in value) (source CNPMEM/FIOM)

	Value 98 million Ecu	Market share 98 (%)	Market share 88 (%)	Rank in 88
Trout	128	19	10	1
Sole	77	11	9	3
Anglerfish	62	9	8	5
Seabass	50	7	6	6
Hake	38	6	10	1
Cod	40	6	9	4
Whiting	25	4	5	8
Saithe	30	4	5	7
Ling	18	3	4	9
Ray	14	2	3	10
Others	208	32	34	

Total imports-exports of aquatic food

Statistics from the French customs data have been used to examine the main trends in foreign trade. Over the 1988-1998 period, the French seafood foreign trade remained active, in spite of a lesser growth rate of the volume of both imports and exports, with respect to the previous decade. The steady demand of aquatic products encouraged the import sector, where the data flow topped to 840,000 t in 1998 (versus 620,000 in 1988). Although the French exports increased concomitantly, the deficit showed an irregular upward trend, fluctuating around 380-420,000 t over the period, except in 1998 where the recovery of seafood imports led to a substantial rise of the deficit up to 490,000 t.

Main trends in volume and value

The first artefact affecting the evolution of French foreign trade is related to the unit of volume of exchanged products. The basic customs data, measured in net weight, are unable to assess the real rate of seafood growth trade, computing both whole fish and shellfish and processed products, such as fish fillets or other preserved and value added aquatic products. This may be improved by the conversion of the initial series in "equivalent landed weight", so long as detailed nomenclature exists and reliable yield ratio are used.

In Fig. 11, landed weight figures have been obtained by applying yield ratio to fresh, frozen and smoked fillets fish data, to frozen shellfish (notably scallops and mussels), which obviously give only approximate data, but at least provide a better assessment of the French deficit of aquatic food.
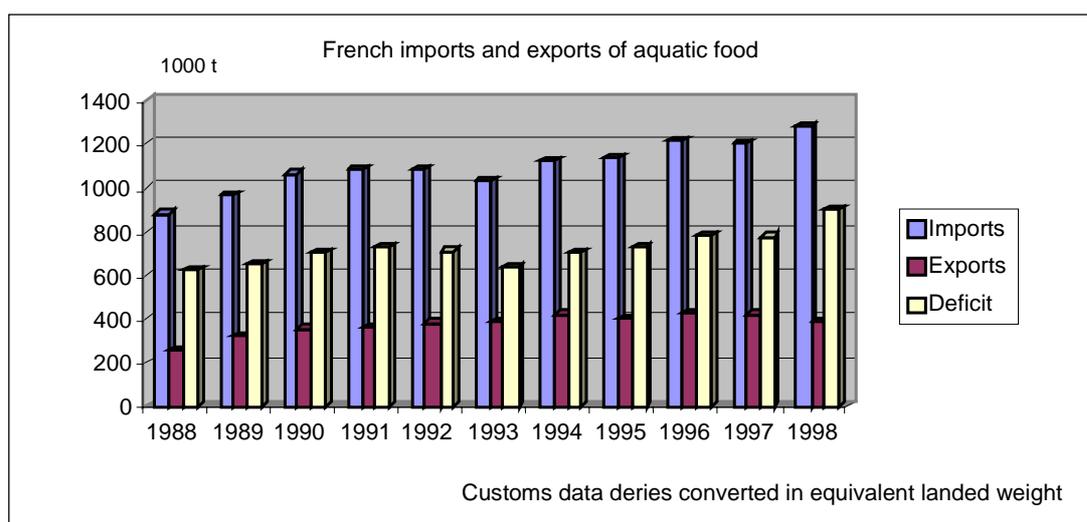
Fig. 11. Evolution of the French foreign trade of seafood products in volume (source: FIOM/French customs).

According to this redressed data series, the imports reached nearly 1.4 million t in 1998, which corresponds to 1.5 times the domestic production, and is 3 times more than aquatic food exports. The foreign trade deficit in 1998 was nearly 900,000 t, versus 620,000 in 1988.

The second influential factor is the change that occurred in the customs data registration in 1993, which reduced the coverage of foreign trade by increasing the value of the transactions bound by declaration. The resulted break in the foreign trade data series was significant, with an unexpected fall of import statistics in 1993, without assurance that the previous trend had been recovered at the end of the period.

Concerning the value of the series (Fig. 12), this statistical bias is also noteworthy, but the observed trough of seafood imports in 1993 and 1994, also resulted from the drop of transaction prices following on the devaluation of currencies. Consequently, the value of the deficit only slightly raised over the 1988-1997 period, from 1.5 to 1.7 billion Ecu (+8% in monetary terms), that shows a

meaningful slowing up of the seafood balance sheet which had reached a 40% growth rate during the eighties. The sudden augmentation of the deficit in 1998, up to 2 billion Ecu is all the more remarkable.
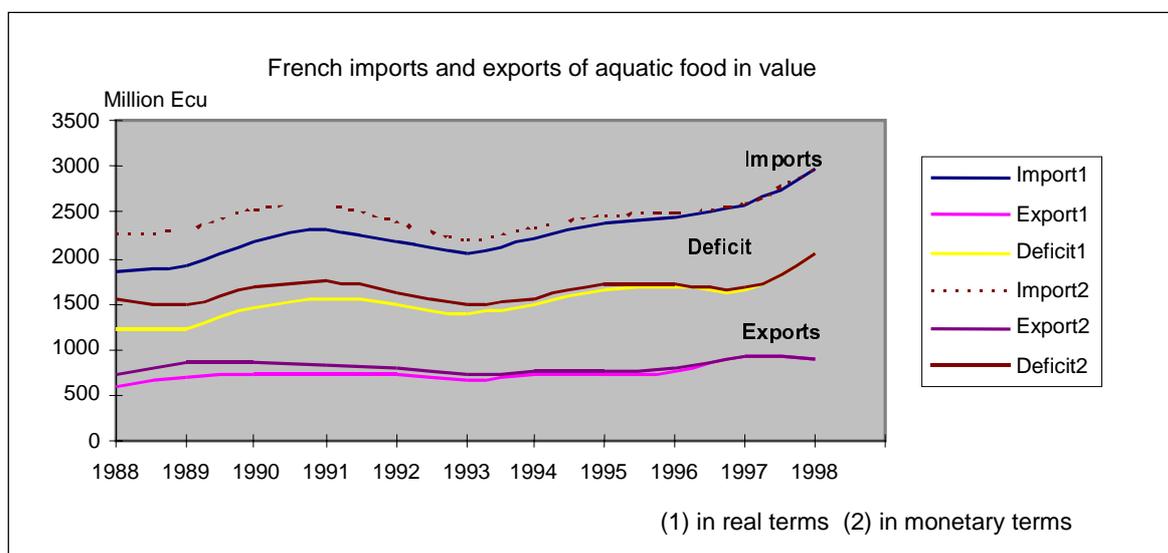

Fig. 12. Evolution of the French foreign trade of seafood products in value (source: FIOM/French customs).

The breakdown of the seafood foreign trade (Fig. 13) illustrates the importance of the crustaceans deficit, in value, followed by non-pelagic fish and salmonids. A significant share of the French deficit of aquatic food was from then on balanced by cultivated species, *Shrimp*s and *Salmon*. Independently of the 1993 statistical artifact, the evolution of the seafood trade in value is lessened by the price crisis from 1992. This year saw a significant fall in foreign expenses, especially for non-pelagic fish and crustacean, in spite of a stable balance sheet in quantity. On the other hand, the significant rise of the deficit in 1998 showed a marked progression of the expenses related to *Tropical tuna*, *Shrimps* and white fish.

Breakdown of the imports and exports by species in 1998 (Fig. 14)

The French seafood market can be analysed through two separate chains, the chilled aquatic food and the processed products chain. The supply of the domestic chilled seafood market depends on both national production and imports (UK, Norway, etc.) whereas the French landings are sold in France or abroad (mainly European countries such as Spain, Italy, Germany, etc.). On the other hand, the French processing industry is almost exclusively provided by imports; the development or diversification of commodity flows, such as *Salmon*, frozen *Alaska pollock*, *Hake* or other white fish, having counterbalanced progressively the deficiency of the traditional inputs (*Herring, Cod, Saithe* or others overexploited *Gadidae* species) used by curing and freezing activities. The canning industry is apart, and the foreign trade of tuna is above all influenced by the overseas localization of the French draw net fleets and of the main plants. This appears through the foreign trade data by crossed flows of tuna: exports of catches from South-East Atlantic and Indian Oceans to supply local or European plants, and in return, imports of tinned tuna towards the French market (leading to an excess balance in volume and a debit balance in value).

Then, the analysis of customs data per species is restricted by the degree in detail of the items, the evolution of combined nomenclature, and the accuracy of information listed in the import/export declarations. In the case of imports, two items of aggregated sea fish (fillets and whole) come in respectively 4th and 6th position. The ability to further examine the composition of fish exports is even more limited, with aggregate whole sea fish items falling into third position in terms of value.

Breakdown of the French seafood deficit by category of products

Million Ecu
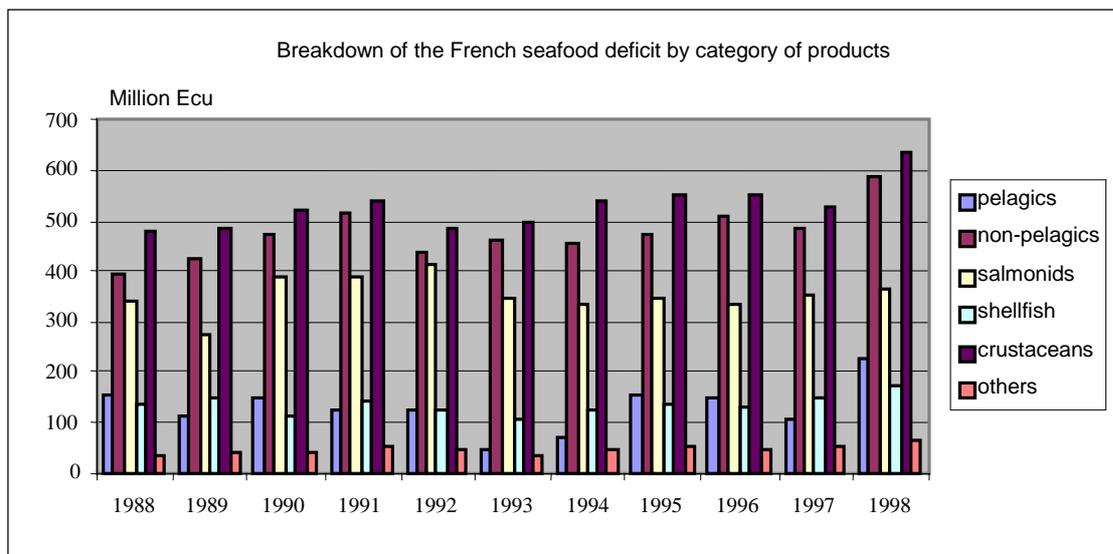
Fig. 13.   Evolution of the structure of the French seafood deficit (in monetary terms) (source: FIOM/French customs).

Breakdown of French exports in 1998

Breakdown of French Imports in 1998 (value)
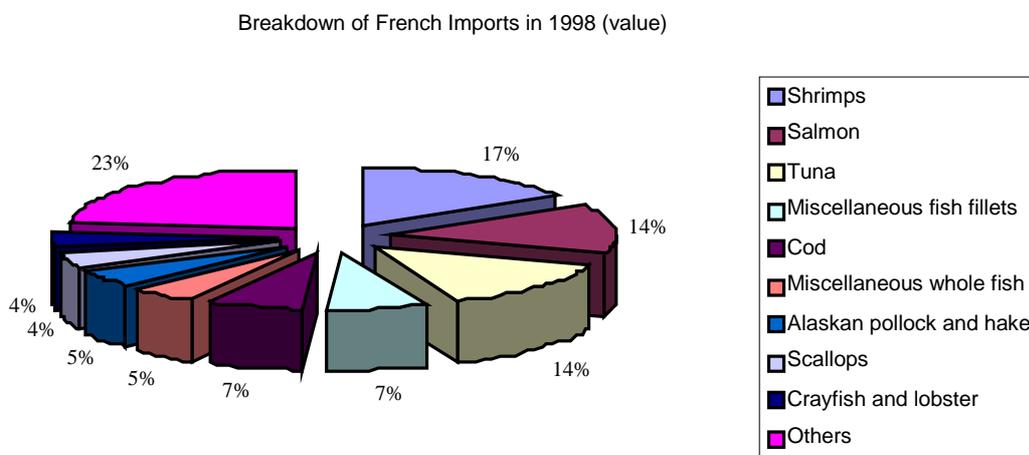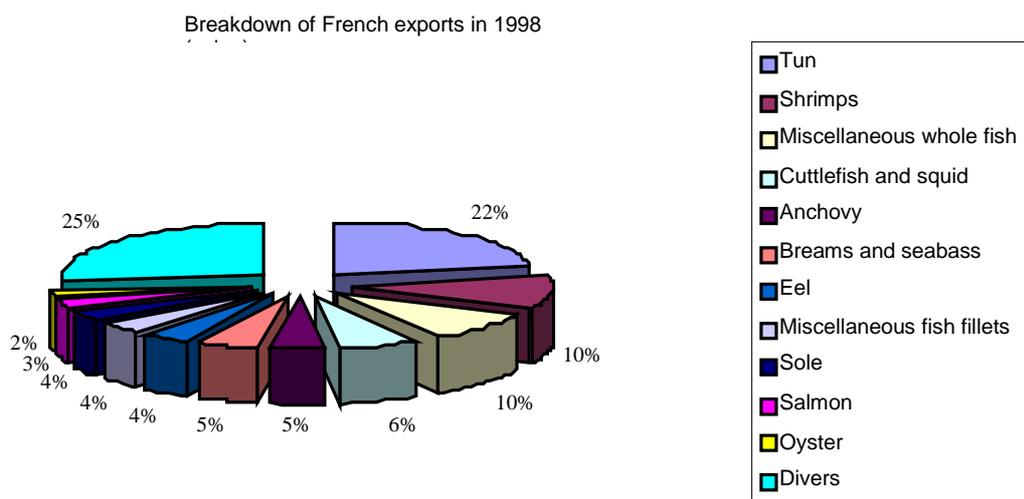
Fig. 14.   Structure of French exports and imports of aquatic food in value in 1998 (source: FIOM/French customs).

Above all, it would appear more relevant to carry out the analysis of the aquatic food trade by category of species or by type of preservation, according to the scope the of study. Otherwise the aggregate items could be modified, which would then take into account both exploitation (production) and marketing issues.

Apparent consumption of aquatic food

The use of landed weight data to determine the volume of consumption only slightly affects the general breakdown of aquatic food supply destined to the domestic market.

In contrast however, this type of evaluation underlines the main trends of French consumption, taking into account the growth of imports of material for the processing industry (mainly blocks of frozen fillets) which continued over the 1988-1998 period (Fig. 15). It provides also a slightly higher rate of evolution for the different categories, and among the most significant, the two-fold rise in salmonid consumption and the rising supply of shellfish and crustacean (+35%). Finally, the increasing rate of the total apparent consumption reached 20% (against 10% with net weight quantities), and the yearly individual seafood consumption was redressed by at least 6 kg, leading to an annual average per capita levelling off 28 kg since 1994. The yearly apparent consumption of aquatic food which recorded a new progression in 1998, was at the time sharing out among fish for two thirds (nearly 18 kg per capita), and shellfish (10 kg per capita) (Fig. 16). These two constituents are important to dissociate, as such they refer to different food use and habits.
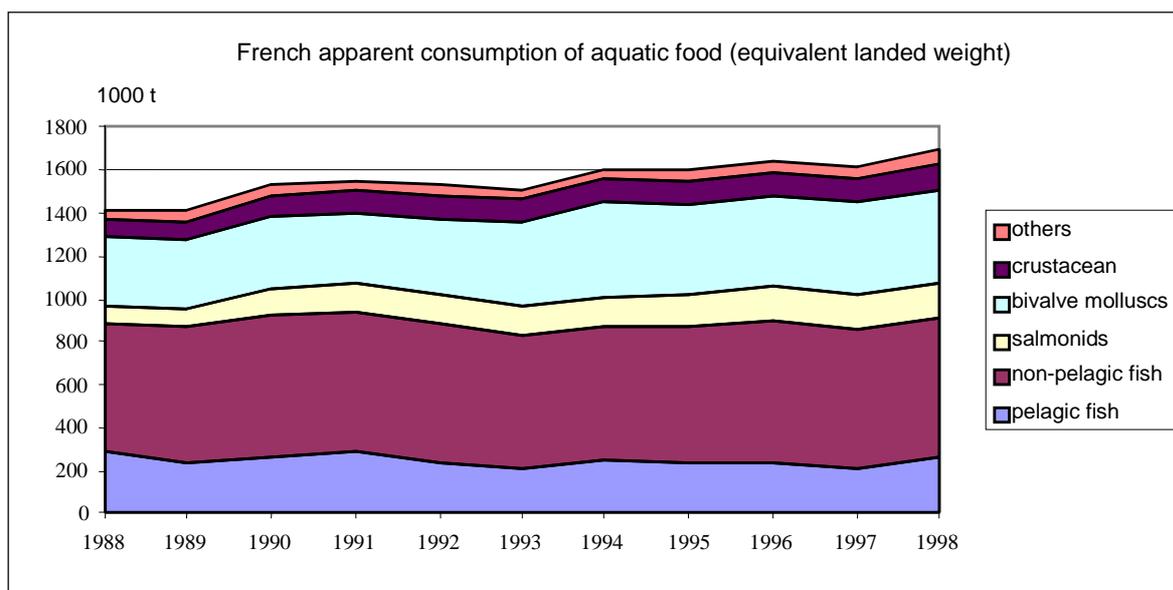
Fig. 15.   Evolution of the French apparent consumption of aquatic food in volume (source: CNPMEM/FIOM/IFREMER).

To conclude this global assessment by the balance sheet method, we must bear in mind that the results are strongly influenced by the reliability of primary and processed data. At the production stage, the main source of doubt is related to the farmed bivalve mollusc database. Then, as far as fisheries captures are concerned, the shortcomings of the national statistical system refer to non-auction sales, whose under-evaluation depends on the type of sales (regular contracts, direct sales, season) and on the scale of production of fishing units which resort to such practices. Other statistical bias have been reported concerning the assessment of foreign seafood trade: statistical break in customs data series and empirical methodology to estimate the data flows in landed weight.

On the other hand, further analysis of seafood supply per species should be restricted, taking into account the lack of accuracy of import and export data. The rough breakdown of the French seafood consumption is shown in Table 2 and classified according to several criteria, notably the size of the market, the scale of price, the self supply rate and the main outlets.
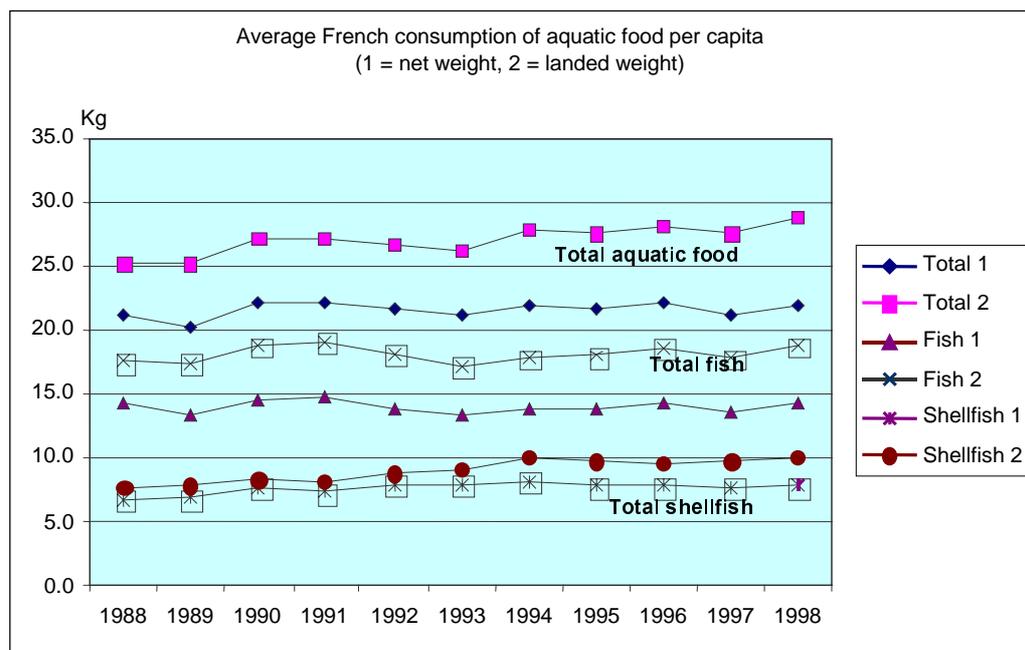
Fig. 16.   Evolution of the average apparent consumption of aquatic food per capita in France (source: CNPMEM/FIOM/IFREMER).

These figures demonstrate again the leading role of new aquacultured species and of white fish for both the fresh market and the processing industry. Considering the approximation related to the apparent consumption data estimations, the evaluation of the market size per product is just presented in indicative terms in order to distinguish mass markets and specialized markets. Information about the French self supply rates per group of species (production/apparent consumption) is also meaningful to examine the seafood dependence toward foreign trade, for both products showing a deficit or an excess balance. This frame only provides a first approach of the seafood market analysis, suggesting factors of market segmentation. At the same time, deficient access to disaggregated data restricts the marketing interest of such an approach, providing little detailed information to tackle product differentiation issues within the prospected field of chilled marine fish.

Table 2.   Classification of the main species in the French seafood market in 1998 (according to estimated apparent consumption data in landed weight)

Market size per species or category of products	Self supply rate (%)	Main outlets[†]	Average price[††] (Ecu/kg)
Superior to 100,000 t			
Mussel	44	FM	1.1
Oyster	103	FM	1.7
Cod	15	PI, FM	2.3
Salmon	1	PI, FM	*3.9*
50 to 100,000 t			
Alaskan pollock	0	PI	*2.1*
Scallop	15	PI, FM	2.5
Tropical tuna	117	CA	1.1
"Argentin" hake and "Cap" hake	0	PI	*2.2*
Shrimps	1	FM, PI	*6.6*
Saithe	40	FM, PI	1.4
Sardine	40	CA, FM	0.6

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Table 2 (cont.). Classification of the main species in the French seafood market in 1998 (according to estimated apparent consumption data in landed weight)

Market size per species or category of products	Self supply rate (%)	Main outlets[†]	Average price[††] (Ecu/kg)
25 to 50,000 t			
Trout	111	FM	2.9
Mackerel	57	CA, PI, FM	0.6
Anglerfish	54	FM	4.2
Herring	82	PI	0.3
Whiting	82	FM	1.1
10 to 25,000 t			
Crabs	10	FM	1.9
Redfish	12	FM	1.8
Squid	31	PI	4.6
Anchovy	180	EXPORT, FM, PI	0.9
Norway lobster	42	FM	6.7
Sharks	61	FM	2.5
Lings	71	FM	1.9
Buccin	100	FM	1.0
European hake	87	FM	3.9
Ray	NA	FM	1.8
Less than 10,000 t			
Haddock	53	FM, PI	1.6
Bluefin tuna	72	FM	3.0
Sole	94	FM	9.6
Carp	96	FM	1.1
Lobster	4	FM	17.3
Seabass	139	FM	8.3
Albacore	47	FM	2.4
Cuttlefish	200	EXPORT, FM, PI	1.8
Breams	108	FM	3.7
Megrim	172	FM	3.1
Turbot	NA	FM	11.9

[†]FM: fresh market; PI: processing industry; CA: cannery industry.
[††]Average price at the first hand sale or import price in italic.

National seafood market information

After a short presentation of the main operators in the French seafood market, we are going to review the main available data concerning the final seafood consumption and the characteristics of the demand. The SECODIP consumer panel survey is the main source of quantitative data that exists concerning French seafood consumption, and the only one available for the analysis on the distribution channels and consumer profiles. As such, this on-going survey will constitute the main core of our investigation, and we will pay particular attention to the scope and limits of the results issued from it. Furthermore, the recourse to available data from other panel surveys (distribution survey, catering survey) will allow us to complete the assessment and the approach of demand factors, by examining another consumption segment (especially away from home consumption) and highlighting other methodological issues.

Description of the national aquatic food market

There are about forty auctions located around the French coastline with a hinterland of buyers. The growth of import flows over the last twenty years has strengthened the trading and processing role of some port sites, such as Boulogne in the North of France (about 300,000 t traded against 60,000 t of capture), Lorient and Concarneau in Brittany. The traditional pattern of seafood distribution has been modified consequently, with an initial tendency to shorten the supply chain for aquatic food, leading in fact to substitute new intermediaries for former operators.

In the fresh seafood market, the fish merchants remains essential as the first time buyer and the first processor of landings. The enforcement of European sanitary regulations forced this sector to modernise its premises and, following the fishing crisis, helped the surviving companies to face international competition. About 320 fish merchants are registered in France where they play a financial, trading and first processing role (filleting, pre-packaging, etc.).

The activity of wholesalers has been the most affected by the evolution of the seafood market. These operators are no longer compulsory intermediaries in distributing fish and shellfish (about 6% of total flows in quantity in 1998). The declining share of the largest wholesale market place of Rungis is directly connected to the expansion of supermarket chains, which set up their own commercial links with foreign producers/exporters (notably within the field of aquaculture products), with French fish merchants and even shellfish producers. On the other hand, the development of cash and carries must also be noted, as wholesalers in dealing with restaurants and caterers.

So, at the last but one stage of the aquatic food distribution, central purchasing offices of large retailers have became the dominant operator, this means a growing integration of import and wholesale activities by the supermarket chains. A single case of overall vertical integration is represented by a leading supermarket chain which invested in his own fishing ship, fish trade, smoking and canning plants, etc. Other supermarket chains have generally opted for more simple ways to guaranty the fish supplying, by contracting directly with producers or delegating delivery constraints or quality policy costs upstream.

Concerning the processing sector, importers are the main intermediary of the seafood chain. In a study published by the FIOM in 1995, the economic analysis of flows within the French seafood chain led to the following evaluations: the rate of import for supplying the fish processing industry amounted to nearly 100% in the case of frozen breaded fish or ready meals, and to 80% for plain frozen fish. The dependence of the cannery industry on foreign commodities is a little weaker, between 60% and 90% (not including tinned tuna).

Characteristics of the demand for seafood consumption

Home consumption and the catering sector

The catering sector is divided into collective and commercial restaurants. The first category concerns public institutions (schools, sector of work, hospitals, the army, prisons, etc.), the second one covering commercial catering chains (including fast food and travelling sector) and independent restaurants. A recent study carried out by the GIRA (Consultants) in 1999, estimated that seafood consumption away from home amounted to 27% of overall final domestic consumption. Given the approximation related to such an assessment (in particular the difficulty in sampling independent restaurants), the current share of the catering sector may be considered as stable over the last years. Actually, the previous estimation from the SECODIP "restaurant" survey carried out in 1992, also gave an evaluation of 27% market share for the catering sector (non including fast food chains at that time).

Table 3 recapitulates the share of the catering sector in global consumption per category presented in the GIRA study.

Table 3. Share of the catering sector in global consumption (estimations based on 1998 data) (source: GIRA, 1999)

	Fresh fish	Frozen fish	Chilled processed seafood	Molluscs	Crustaceans	Tinned seafood
Market share of the catering sector (% of French consumption in quantities)	26	49	11	31	25	9

The interpretation of these results is strictly dependent on the limits of the catering sector, as defined in the successive surveys. Because household consumption data from the SECODIP

consumer panel survey theoretically do not take into account seafood purchases dedicated to out of home consumption (snacking, nibbling, packed-lunch, etc. at the office, in the street, on the move), the estimation of away from home consumption cannot be directly transposed from the results of "catering" surveys. Considering the current evolution of the way of life and trends in consumer behaviour, it will be necessary, either to extend the scope of the catering survey, or to adopt a less restrictive definition of home consumption, in order to fill the existing gap in the survey of the whole final consumption. Finally, this gap is worth highlighting in that it could represent an increasing share of the domestic seafood demand, more particularly for certain market segments.

Structure of the household seafood consumption

Some methodological aspects

Panel surveys are tools which are set up in order to measure the main trends in seafood markets, through the evolution of household purchases (Consumer Panel Survey) or through the evolution of supermarket sales (Distribution Panel Survey). Whereas the CPS provides additional information on the breakdown of distribution circuits and about consumer profiles, the DPS is more "marketing" orientated, delivering information to the processing firms to keep track of their sales and of the impact of their different promotional operations.

In France, the "consumer" approach has been privileged from the outset. To have an almost complete view of the French home consumption of seafood, the private company SECODIP has been commissioned for many years[1] to set up consumer panel surveys which are divided into three CPS, covering respectively the markets of chilled seafood, frozen seafood and canned seafood. The extent of the survey, as well as the detail of the product itemisation, have improved progressively. The latest market to be involved in the study was, in 1991, the emergent segment of chilled processed seafood (delicatessen). Moreover, at the same period, another company specialised in DPS, the Nielsen company, was entrusted with the survey of supermarket sales of the cured fish and deli seafood products, by request of the processing industry which needed additional marketing information.

From the methodological point of view, the SECODIP consumer panel survey functioned in a very steady and stable manner till 1995. The structure and size of the sample (around 4500 households) and the way the purchases were recorded (weekly questionnaire on paper) hardly changed. Then, in 1996, the introduction of home-scanner methodology and the concomitant extension of the sample to single male households[2], involved a significant break in the SECODIP results, which severely restricts the comparison between the former and the current data. The technological change which was initially justified by the ambit to rationalise the whole registration sequence and to improve the quality and the detail of the results, finally raised some problems in the field of fresh fish and shellfish markets. Actually, it appeared at this juncture, that the monitoring of fresh raw products was more complex and perhaps less suitable for the scanning tool, for different reasons:

(i) The large number of species and the lack of standardisation in fishery terms, which can lead to confusion among the buyers.

(ii) A higher risk of forgetting to record isolated purchase from specialised retailers, such as fishmongers or open and covered markets, while these channels still represent a significant outlet for fresh aquatic fish and shellfish (unlike the processed and branded seafood products).

Therefore, the evolution of the distribution channels over a decade, reflects the impact of the technical and methodological change instigated by SECODIP, with an unexpected growth rate of the large retailers' market share between 1995 and 1996 (Fig. 17). The gap that followed the switch of the SECODIP panel may be partly explained by the enhanced registration of convenient seafood purchased in supermarket chains and, in contrast, the under-declaration of fresh fish and shellfish purchases in specialised channels. The setting up of the new panel "Consoscan" also resulted in a fall in coverage of the overall home consumption as concerns the fresh unprocessed fish and shellfish, probably by diminishing the previous coverage of the most "traditional" demand segment. This especially applies to the bivalve mollusc market, the current results showing a marked drop in the

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[1] The fresh fish market was the first field investigated by SECODIP in 1978.
[2] This latter adjustment was necessary to cover the increasing category of single male who reached 2.7 millions households in 1998, versus 1.5 million in 1980.

purchases of oysters. Finally, this example shows the impact of some methodological factors on the CPS results. The change in the registration method and in sample composition, globally affected the measure of the total home consumption, and even the structure of the household purchases, leading to a new breakdown in the distribution circuits and a new balance between the different categories of purchasers.
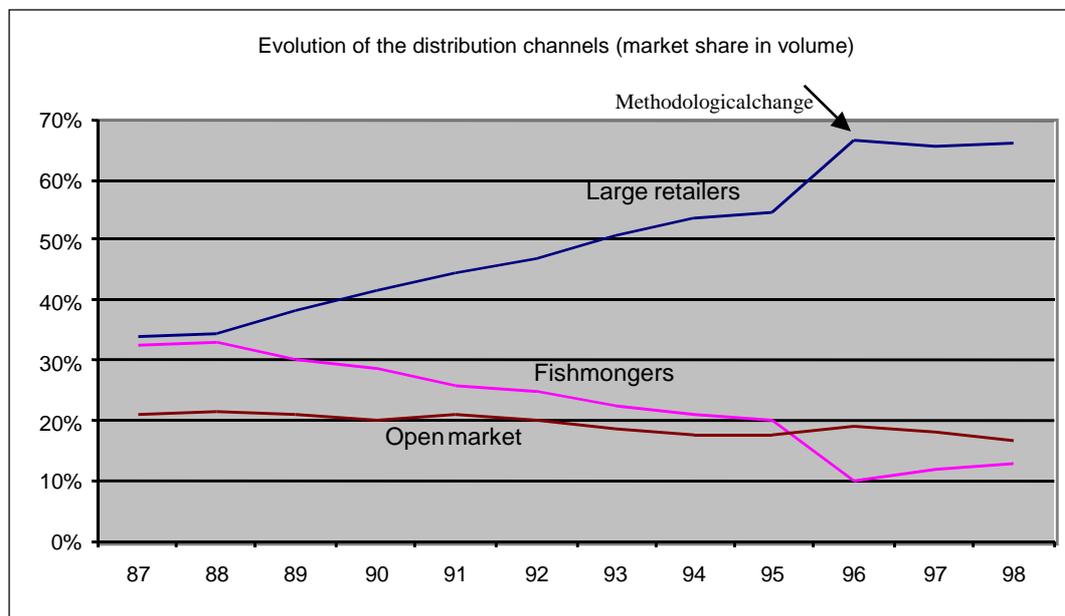

Fig. 17.   Evolution of the retail distribution circuits for fresh and chilled seafood. Source: SECODIP consumer panel surveys.

Assessment of the coverage rate of CPS data

The difficulties raised by the assessment of the data resulting from CPS are significant. In absolute value, the assessment of the exact coverage of household purchases data extrapolated to the whole population, comes up against the lack of statistics available for the processing industry production, and the current inability to evaluate the sharing out of the raw aquatic products (from both domestic production and imports) among the final consumption and processing industry outlets.

In relative value, some elements of assessment may be provided by the comparison between the results from CPS and DPS. Figure 18 shows the shared area covered by these two panel surveys, while estimating the extra home consumption covered by the CSP thanks to the registration of purchases in specialised retailers.

As far as fresh unprocessed seafood market is concerned, the share of "traditional" retailers remains significant, and the CPS offers the best approach from the home consumption survey point of view. On the other hand, concerning chilled value-added products, we can consider that the extent of the results of the DPS is almost identical to the CPS', and even higher if both taking into account: (i) the extra-field covered by the DPS; and (ii) the statistical coverage rate of the CPS (rate of sampling worth 1/2900).

The comparison between DPS and CPS results proposed by SECODIP (from 1999 data in volume) have to be interpreted accordingly, which means only as an indicator of the CPS ability to fit the market structure:

(i) Cured fish: the total extrapolated household purchases correspond to 95% of the total supermarket sales.

(ii) Delicatessen: the total extrapolated household purchases correspond to 84% of the total supermarket sales.

Extra-field by DPS (supermarket sales to non-household or non dedicated to home consumption)	Common field covered by CPS and DPS (purchases/sales related to supermarket >400 m^2)		Extra-field by CPS (household purchases in "specialised" stores or directly with producers)
I N D E T E R M I N A T E	FRESH FISH & SHELLFISH		38% of the total purchases
	CURED FISH		9% of the total purchases
	CHILLED DELI SEAFOOD PRODUCTS		2% of the total purchases

Fig. 18. Elements of characterisation of consumer and distribution panel surveys (source: FIOM/ SECODIP 1998 data).

The lesser "equivalence" between the two data sources on the latter market segment, mainly illustrates the shortcomings of the itemisation surveyed through the CPS. It also points out the lack of reactivity of CPS with regard to the emergence of new products in the more innovative segment of seafood market.

Some results about the reference market for aquaculture

Despite the differential of coverage of the main seafood markets by the CPS, it is interesting to present the compilation of the home consumption of fresh unprocessed, chilled value-added, frozen and canned aquatic food. The results used for such an evaluation come from the purchase registrations of the panel extrapolated to the whole population of households. Even if we have to assume that the current SECODIP panel survey tends to under-evaluate the fresh unprocessed aquatic food consumption in comparison with other chilled seafood, the main characteristics of the French home consumption are emphasized in Fig. 19. With the development of new value added products, the prevalence of fresh or chilled seafood market, above all in value share, constitutes a striking feature of the French seafood consumption.
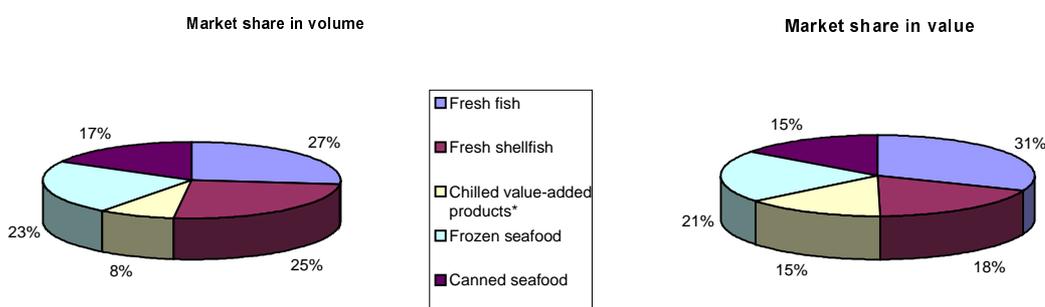
Fig. 19. Breakdown of seafood household purchases in 1998 (in volume and value) (source: FIOM/SECODIP, 1998 data).

In species terms, Salmon and trout are the main farmed fish bought by French households,

according to the SECODIP panel data. But the share of aquaculture species is above all significant for the retail markets of fresh unprocessed fish (around 22% in value) or cured fish (75% in value). In the case of frozen fish, salmon plays a minor role (4% of the total frozen seafood in value in 1998), and moreover comes from fisheries in a large part. Finally, concerning the deli-seafood products, the impact of aquaculture products remains undetermined, as the identification of species is not the key for the SECODIP itemisation.

From this brief overview of the position of aquaculture products within the home seafood consumption, the prevalence of the chilled outlets is dominant, for both raw and processed products. Consequently we will focus on the market of chilled aquatic food, such as the current reference market for aquaculture in France.

Table 4 shows the difference of the structure of household purchases according to the distribution channels, divided into two aggregated circuits (large retailers, specialised retailers). In the field of fresh fish, the supremacy of the large retailers in the commercialisation of farmed fish (imported salmon or domestic trout) is marked. As concerns salmon and trout, the share of supermarkets within the whole retail market exceeds 80%. This situation reflects the higher dependence of the multiples towards aquaculture products, and, inversely, the lower distribution of farmed fish through the specialised stores, which offers a wider range of fish species. In the field of shellfish, the supermarket chains also remain in the leader position, due to their large potential of distribution. Shrimps and mussels have been playing a great part in the growth of shellfish sales for large retailers, which currently makes up the majority of the household purchases (respectively 83% and 66% in 1998). On the other hand, the superiority of the Multiples regarding the oyster commercialisation is less marked. Such a position refers to the specific attributes of oyster, e.g. a traditional, regional, festive and seasonal food, a late comer in the large distribution channels, and which still remains the concern of "specialists".

Table 4. Market shares of fresh farmed fish and shellfish according to the commercialisation circuits (SECODIP, 1998 data)

Household purchases (total 1998)	Large retailers			Market share/product		Specialised retailers			Market share/product	
	Tonnes	Value (million €)	Retail price (€/kg)	Volume (%)	Value (%)	Tonnes	Value (million €)	Retail price (€/kg)	Volume (%)	Value (%)
Total fresh fish	*93712*	*766*	*8.17*	*100*	*100*	*48377*	*454*	*9.38*	*100*	*100*
Salmon	18238	150	8.21	19	20	3681	39	10.54	8	9
Trout	8632	56	6.46	9	7	2362	18	7.58	5	4
Seabass[†]	775	9	11.55	1	1	594	8	12.80	1	2
Total fresh shellfish	*82369*	*445*	*5.40*	*100*	*100*	*52228*	*279*	*5.33*	*100*	*100*
Shrimps[†]	10484	125	11.88	13	28	2140	41	19.03	4	15
Oyster	20858	94	4.51	25	21	18291	79	4.33	35	28
Mussel[†]	30240	65	2.15	37	15	15696	40	0.00	30	14

[†]From both aquaculture and fisheries.

Finally, the distribution of aquaculture products, is mainly supplied by the Multiples. Thanks to the development of salmon and shrimps import circuits, they have contributed to encourage the home consumption of seafood and have in fact pointed the market to a more standardised form, based on "new" species from intensive farming.

Further analysis of seafood demand

Percentage of purchaser households and average level of consumption

To forward the analysis of the household demand for aquatic food, it is interesting to investigate the SECODIP data in a more detailed way. Two variables determining the total annual household purchases are examined initially: (i) the percentage of purchaser households, also denominated "penetration ratio"; and (ii) the yearly average level of consumption per household.

As for the aggregated items of fresh fish, smoked fish and frozen fish, the penetration ratio is over

70% (Table 5), that means a similar acceptance of fish among the French consumer whatever its preservation mode may be. However the difference between fresh whole fish and fresh cuts has to be pointed out, as the potential of customers for fresh whole fish is barely higher than half the population, a proportion akin to fresh crustacean or fresh bivalve ratios.

Table 5. Variables determining the home consumption of fish and shellfish (SECODIP, 1998)

Products/species	Purchaser household (%)	Level of consumption		Purchase ratio in multiples		Products/species	Purchaser household (%)	Level of consumption		Purchase ratio in multiples	
		kg	€	Volume (%)	Value (%)			kg	€	Volume (%)	Value (%)
Fresh fish	*78*	*7.6*	*65.6*	*66*	*63*	Fresh cod	36	1.7	15.8	66	64
Prepacked	34	1.7	16.2	91	92	Fresh whiting	33	1.5	12.6	63	61
Whole fish	52	5.1	35.7	57	52	Fresh trout	29	1.6	10.8	79	76
Fish cuts	72	4.7	45.6	73	69	Smoked herring	29	0.7	4.7		
Smoked fish	*73*	*1.2*	*19.3*	*91*	*92*	Spreadable seafood	28	0.4	4.6		
Frozen fish	*71*	*3.8*	*23.0*	*76*	*69*	Fresh oyster	27	6.1	26.9	53	54
Fresh crustaceans	*53*	*2.4*	*26.2*	*67*	*67*	Fresh saithe, pollock	27	1.7	11.8	68	60
Fresh bivalves	*53*	*8.0*	*29.0*	*59*	*56*	Fresh sole	16	1.5	20.5	48	46
Smoked salmon	62	0.9	17.7	95	94	Salted and dried cod	14	1.2	11.42	80	78
Shrimps and prawns	49	1.3	16.4	73	66	Fresh anglerfish	13	1.6	21.7	66	61
Surimi	42	1.26	11.22	98	98	Smoked trout	13	0.33	7.06		
Fresh salmon	41	2.2	19.2	83	79	Fresh hake	10	1.8	17.5	46	43
Fresh mussels	39	4.9	11.3	66	62	Fresh scallops	9	2.5	20.3	35	46
						Fresh seabass	4	1.5	17.6	57	54

In decreasing order of value, the most common consumption includes smoked salmon (purchased by 62% of the households), shrimps (49%), surimi, salmon and mussels (around 40% each one), cod (36%). With the steady growth of the French salmon processing industry over the nineties, the smoked salmon has evolved from a festive and luxury product to a mass market one; it currently represents the most widely bought aquatic product by French households. The same evolution can be transposed, with a time lag, for fresh salmon and shrimps, which ten years ago were considered as niche markets as well. It is noteworthy that from now on fresh salmon exceeds fresh cod and fresh whiting, in both penetration ratio and average level of consumption per household. Accordingly, salmon has gained a notoriety which was beforehand attributed to the previously mentioned white fish.

Then, as far as the percentage of purchaser per species is diminishing, the consumption concerns more "traditional" products (such as smoked herring), festive or luxury products (sole, scallops, etc.), regional specialities (salted cod) or even niche markets, such as seabass (only 4% of purchaser households). In the case of oyster, the analysis of demand factors, emphasizes once again the specific features of this typical French food, which gives rise to significant yearly purchases dedicated to home consumption, but from a limited part of the population (27%, versus 39% for mussels) with respect to the volume of the domestic production.

The purchase ratio in multiples provides an additional indicator of the standardisation of the consumption. Compared to an average market share of 66% in volume on the fresh fish market, it appears that the distribution of farmed fish such as salmon and trout over-rely on the supermarkets chains, with respectively 83% and 79% of their purchases coming from multiples. In contrast, the purchase of species associated with a more selected demand, are more often effected in specialised stores.

The following step in the analysis of the variables of demand for aquatic food, consists in examining in detail the behaviour of the purchaser household all the year long, in order to provide measures of the purchase frequency, and of the quantity and expenses per act of purchasing among the consumer population. This additional variables available through SECODIP should enable us to go thoroughly into the factors driving seafood consumption (frequency, expenses level), in addition to seasonal trends.

Market segmentation of farmed and wild fish on the fresh retail market

The present analysis of price segmentation lies in aggregated SECODIP data for the total retailers.

Actually, the differential analysis of price according to the purchasing places comes up against the current deficiency of identification of fresh aquatic products in both multiples and even specialised fishmongers. The lack of harmonisation of the labelling, in terms of quality grades, of origin differentiation (fishing/farming) and even of species denomination, could induce a statistical bias when comparing one item price from one store to another. Therefore, we will restrict the price analysis to the most reliable characteristics of the purchase, e.g. the species identification. In order to define relevant markets of reference, the price analysis of fresh fish is carried out according to three segments: the whole fish, the cuts of fish (fillets, slices, steaks, etc.) and the pre-packed fresh fish, mainly comprising cuts packed in store.

The demand for fresh whole fish is characterised by the diversity of species. However, the scope of the results and the knowledge about the totality of species contributing to fish consumption is limited by the existence of a significant share of unspecified recordings, which amount to 15% of the total household purchases. The possible confusion about denomination is also apparent through the species regrouping we had to effect ("saithe/pollock" and "seabream" items both aggregate distinct species) and emphasizes some difficulties raised by the survey of unbranded and non standardised products.

Figure 20 shows the extent of the price range of fresh whole fish, from 3 to 13 €/kg, likely to target a wide population of consumers, from the economic point of view. Small pelagic fish aim at the cheapest segment with an aggregate market share of 17% in volume, but concern a seasonal consumption. The bulk of the regular demand is related to lower middle price species (5.5-6.5 €/kg) including salmon, whiting and trout, as regards identified whole fish. Beyond this price level, the home consumption relies on scattered purchases of many species, each one non exceeding a 4% market share, excepted for hake (5%), monkfish (5%) and sole (8%). From the 1998 SECODIP data, the market segment for top price whole fish (over 10 €/kg) seems to be close to 20%, in volume, comprising both largely appreciated species like sole, and more regional fish such as hake. Seabass, for which data do not distinguish between the farming and fishing origin, still held a niche market in this context, with a price positioned at the top of the range on the French retail market of fresh fish.
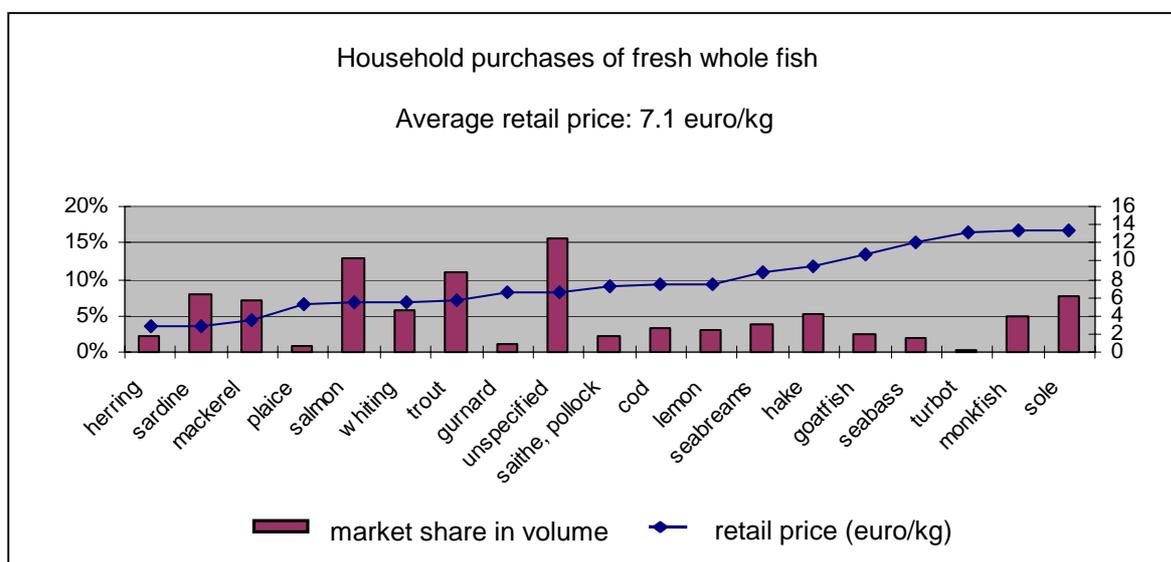

Fig. 20. Segmentation of the French retail market of fresh whole fish (source: SECODIP, 1998 data).

In other respects, the demand for more convenient fresh fish (cuts, pre-packed fish) concerns a smaller range of species (Fig. 21). Salmon, cod, saithe/pollock and whiting concentrate around 55% of the whole purchases as concerns these two segments. While focusing in pre-packed fish, the trend is even more pronounced, with a range of products more restricted and, concomitantly, a target market for farmed salmon and trout superior than 30% in volume.

In fact the main features of cuts fish purchases find themselves in the demand for pre-packed fresh

fish, seeing that this latter category mainly comprises fillets or slices. Although the extra service offered by multiples in packing seafood in advance, fundamentally does not change the basic attributes of the product, in terms of quality and price, we can consider that this covers the most standardised and regular aquatic food. After having surged up in the mid-nineties, the pre-packed fish have been levelling off quickly, and from now on are stabilised around 10% of the whole fish purchases. May be, the slowing down of demand for this products reflects the limited level of convenience associated to packaging, and the limits of extra or substitution consumption to be expected. Nevertheless, beyond this global remark, it is apparent that the pre-packaging is in keeping with the general trend of fish consumption, although we are not in a position to measure its real impact.
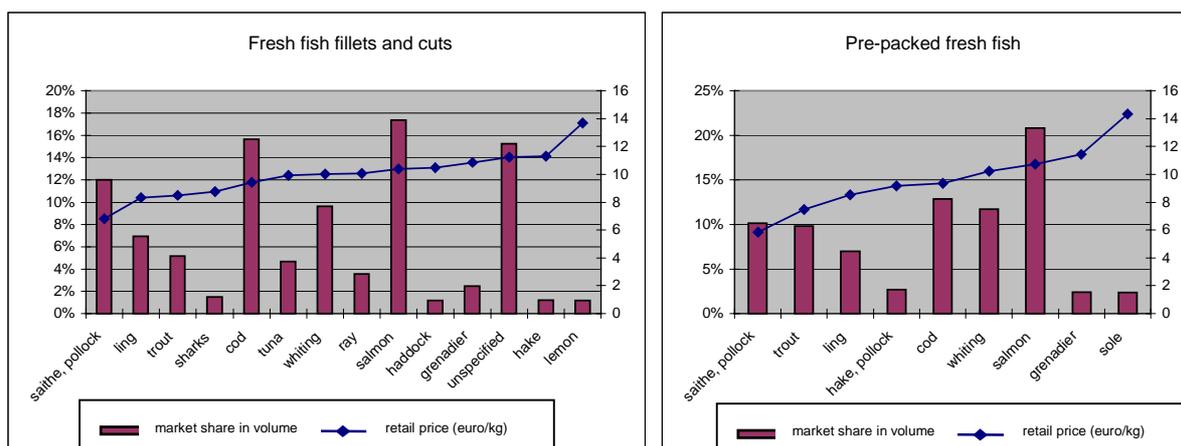

Fig. 21.   Segmentation of the French retail market of fresh cuts of fish and of pre-packed fish (source: SECODIP, 1998 data).

The retail prices of fresh fish cuts market only varies by twice as much. At the lower limits of the price scale, the cheapest fish correspond to the fillets of saithe, which market share amounts to 12% in volume. Then, the core of the market concerns middle price species (9.5-10.5 €/kg), while the up market products are very few and concern small quantities. Accordingly, the scale of prices of most fish cuts is very narrow, and over half the purchases in volume aims at competitive price species. Among the main species involved in the fish cuts segment, it noteworthy that the price positioning of salmon is a little higher than cod's, unlike the price hierarchy for whole fish.

Finally, the main conclusions we can draw for this first overview of fresh seafood market, are to confirm the success of farmed salmon, which succeeded in a decade to assert itself in French fresh fish market and to gain the leading position, hold by cod beforehand. Initially launched on whole fish market, the salmon progressively has been investing the market segment of fish cuts, as and when retail prices was falling. Nowadays, the purchases of salmon cuts represents, converted in equivalent whole fish, more or less 80% of the total fresh salmon dedicated to home consumption. The example of differentiation of products (slices, fillets, steaks, etc.) conducted in the case of salmon, has been then reproduced by trout farming industry, which from a traditional market of portion trout, started to evolve towards the production of larger trout to be filleted in order to invest the most dynamic segment of fresh fish. Beyond these two related examples, from the species point of view, other similar case of aquaculture diversification has not been experienced yet with a similar extent. Within the declining whole fish market, at the top of the range, the price positioning of seabass is now intermediary between sole and hake, but its market share still remains too low to provide to fish consumption a similar potential of diversification.

General characteristics of the population

The aim of this section is to review the available information from national census or other reliable and updated sources in order to relate consumer habits and preferences with regard to general characteristics of the population. At this stage of the work, further analysis have not been considered

within the report per country. On the other hand, this type of information will serve the purpose of European synthesis, seeing that its main objective is to describe the main features of European population, in economic, demographic and sociological terms.

General demographic data

At the last national census (1999), the French population was 60 millions. The estimated figures amounted to 57.8 millions in 1997, that is to say 15.6% of the overall European Union. The projections of population drawn up by the French institute of economic statistics (INSEE) shows that the French population will continue to rise, at least until 2020, whatever the hypothesis of reproduction rate selected.

In 1995, 24.6% of the people who made up the French population were less than 20 years old, while other 15.6% were over 65 years, according to the INSEE statistics per age group. The increasing share of the older people affects, in its turn, the composition of the households. Amongst the 23 million French households, 29.2% are represented by a single person (Table 6).

Table 6. Breakdown of French households by class (%) in 1995 (source: INSEE)

1 person	2 persons	3 persons	4 persons	5 and more
29.2%	31.8%	16.8%	14.2%	8%

The main evolutions occurred from the mid-seventies and reflect the increasing role of single person households and of single parent households (Table 7):

Table 7. Role of single households and of single parent households (source: INSEE)

	Single male	Single female	Single parent
1975	7.4%	14.8%	3.0%
1997	11.8%	18.2%	6.8%

The growth of single male households undoubtedly influences the food consumption, in terms of purchase behaviour and eating practices. However, beyond the new structure of families, the leading factor which influences consumer motivation from several aspects (purchasing places, time for cooking, etc.) is the employment rate for women. Its growth, which was initiated in the sixties, is still present. Within the age group 25-50 years, women at work represented 79% in 1998, against 74% in 1990. Nowadays, the share of women in the total French population at work, is approaching parity (45.5%).

General economic data

The evolution of the standard of living and of average household income induced significant changes in family budgets. In industrialized countries the income share devoted to food has been generally falling whereas the expenses related to housing, health and leisure time activity have been growing. In spite of the slowing down of this trend since 1980, the average food share in the family budget still decreased from 22.3% in 1980 to 18.2% in 1997, according to the INSEE publication on household consumption for all goods and services. It is interesting to note that the food item includes canteen expenses, but, on the other hand the budget dedicated to restaurants is considered as a "leisure" item.

As the average budget allocation has been modifying with the general growth in the standard of living, the current income disparities are leading to different consumption patterns. Food expenditure represents a higher budget proportionally in low income households and is based on staple foods, excluding higher price products. Seafood products and some meat (beef, veal, etc.) which are ranked

in this category, have known divergent evolutions (Table 8). While a general upward trend was observed for seafood throughout the seventies, the eighties and till the beginning of the nineties, a fall in beef consumption was registered as early as 1980. Economic factors alone, is unable to explain these different trends, even if the competition of poultry and pork is partly responsible for the beef downtrend. With regards to meat and fish, health and dietetic concerns have been expressed for many years, far before the recent event of the BSE syndrome, and also contributed to the decrease in red meat demand.

The results from OFIVAL, the national body in charge of meat market organization, provides quantitative information on the total yearly consumption per capita for the main category of meat thanks to apparent consumption evaluations.

On the other hand, the INSEE surveys provide figures about the average breakdown of food expenditures per household (e.g. not including restaurant consumption) (Table 9). According to this national statistic source, the share of meat on the total food budget lost 4.5 points from 1980 to 1996, and represented no more than 26.6% at the end of the period. In the same time, seafood expenditures gained only 1 point and have not increased since the nineties. This evolution has to be related with the stagnation of seafood supply in a French market showing a structural deficit, and with the current increasing prices.

Table 8. Comparison between aquatic food and meat consumption per capita in 1997

	kg/year	General trends	Information source
Seafood consumption per head	26.7	Increase/stagnant	Seafood balance sheet
Meat consumption per head			
Beef	26.7	Decrease	OFIVAL
Pork	35.4	Stagnant	OFIVAL
Poultry	23.9	Increase	OFIVAL
Others	5.7	Decrease	OFIVAL

Table 9. Breakdown of food household expenditures (%) (source: INSEE)

	1970	1980	1990	1994	1995	1996
Food[†]	100	100	100	100	100	100
Seafood	3.7	4.1	5.0	5.1	5.0	5.1
All meat	23.5	23.1	19.9	18.2	18.0	17.8
Beef	*11.9*	*11.2*	*9.4*	*8.5*	*8.5*	*7.8*
Delicatessen, preserved meat	6.7	7.2	8.5	8.8	8.7	8.8

[†]Series not including tobacco.

List of the acronyms used in the report

DPMA, Direction des Pêches Maritimes et de l'Aquaculture (fisheries and aquaculture authorities).
DPMCM, former DPMA.
OFIMER, Office d'Intervention de la Filière des Produits de la Mer (instutitional body in charge of seafood market).
FIOM, former OFIMER.
CNPMEM, Comité National des Pêches et des Élevages Marins (national board of fisheries and aquaculture).
CIPA, Comité Interprofessionnel des Produits d'Aquaculture (inter-professional comitee for aquaculture products).
SCEES, Service Central des Enquêtes et Études Statistiques (central department of surveys and statistical studies).
INSEE, Institut National des Statistiques et des Etudes Economiques (national institute of statistics and economic studies).