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# FUTURE PROSPECTS FOR FISH AND FISHERY PRODUCTS

## 4. Fish consumption in the European Union in 2015 and 2030

## Part 1. European overview

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# FUTURE PROSPECTS FOR FISH AND FISHERY PRODUCTS
# 4. Fish consumption in the European Union in 2015 and 2030
# Part 1. European Overview

by
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## PREPARATION OF THIS DOCUMENT

At the end of the 1990s, the FAO Fisheries Department (now Fisheries and Aquaculture Department) initiated a project aimed at projecting world fish consumption by 2015/2020. A number of component studies were initiated. They included geographically limited studies (North America, Europe, Japan, China) and a review of analytical work undertaken on fish consumption and demand for fish. However, it was not feasible to integrate these studies because of difficulties encountered in reconciling assumptions and methodologies. It has therefore been decided to publish the completed component studies.

The present study *Fish consumption in the European Union in 2015 and 2030. Part 1. European overview* is the fourth of a series of papers (still in preparation) intended to be published under the main title *Future prospects for fish and fishery products*. This document was written by Mr Pierre Failler in December 2003 and will be followed by its companion study *Fish consumption in the European Union in 2015 and 2030. Part 2. Country projections* by the same author.

These two studies are published in the series titled FAO Fisheries Circulars and are available on the FAO Web site only.

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## ABSTRACT

This report presents the major results for fish consumption (consumption per capita and apparent consumption), production (captures, aquaculture and commodities) and fish trade (exports and imports) estimations and projections for 28 countries in Europe from 1989 to 2030.

The projections show an increase in the demand for seafood products to 2030. The average per capita consumption by the 28 countries will move from 22 kg/caput/year in 1998 to 24 kg/caput/year in 2030. The two additional kilograms per capita signify that the net supply will have to increase by 1.6 million tonnes (Mt) (respectively 1.1 Mt for the 2 extra kilos per person and 550 000 tonnes due to the 22 million population growth over the period). Aquaculture growth will not be able to meet the increasing demand; therefore, imports are projected to rise to 11 Mt (+15 percent from 1998), increasing the dependency of Europe on the rest of the world for its fish and fish products.

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## FOREWORD

In 2000, when this study was launched, the European Union was made up of 15 Member States: Germany, Austria, Belgium, Denmark, Spain, Finland, France, Greece, Italy, Ireland, Luxembourg, Netherlands, Portugal, United Kingdom of Great Britain and Northern Ireland, and Sweden. At that time, the prospects for European Union (EU) enlargement in the coming years was of concern to several countries that were due to join, some of which were likely to become EU Members in 2004. The first wave would likely consist of Cyprus, the Czech Republic, Estonia, Hungary, and Poland. The second wave, in 2008, would add seven others: Bulgaria, Lithuania, Latvia, Malta, Slovakia, Slovenia and Romania. In addition to these countries, Norway, a Member State of the European Economic Area[1] (EEA) might become a Member of the European Union before 2010. On the whole, within the framework of this work, there were 13 additional countries that could be considered future Members of the European Union alongside the 15 States already Members in 2000.

The choice and timing of membership of the EU for these countries has been made according to the prospects indicated by the European Commission at the end of 2000. However, they do not constitute anything like a formal engagement on behalf of the Commission or of any other institution like FAO. The present work, and in fact the membership or not of certain countries, remains an exercise in futurology with all the risks that that comprises. Thus, certain countries not mentioned in this work may just as easily become Members whereas others pre-identified may not yet be Members in 2030[2].

The possible date of adhesion does not affect the presentation of the results since data and results are presented for the set of 28 countries from 1989 to 2030 (except for some countries when data starts in 1991 or 1992).

The term EU-15 in the text refers to the European Union in its current 15-member form. EUR-21 and EUR-28 refer to the possible 21-member and thereafter 28-member union of the future, following the adhesion of first six new countries (EUR-6 NC) and then a further seven (EUR-7 NC). The terminology “Europe” was selected in the place of “European Union” in order to avoid any misunderstandings on the political direction of the term.

[1] Together with Liechtenstein and Iceland. The EEA and the EU are bound through several agreements and cooperations generally relating to trade, environmental protection, social security, education, research and public statistics.

[2] In fact, at the time this work is going to print, the enlargement process concerns 10 countries that will join the EU in May 2004. The countries are Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia.

# EXECUTIVE SUMMARY

## Introduction

The progressive enlargement of Europe since its creation in 1957 by the Treaty of Rome means that the European Union (EU) in 2003 is one of most important markets for aquatic products in the world, with 370 million consumers among the 15 Member States and a potential market of more than 480 million with the inclusion of future Member States. Over the last decade, fisheries production has been characterized by stagnation in landings but strong growth in aquaculture production. There is strong intraregional trade in products because of the wide range of tastes between the Member States. In addition, the European Union has become the largest importer of aquatic products alongside Japan and the United States of America.

In 2000, the prospects for European Union enlargement in the coming years were of concern to several countries that were due to join, some of which were likely to become Members in 2004. The first wave would likely consist of Cyprus, the Czech Republic, Estonia, Hungary, and Poland. The second wave, in 2008, would add seven others: Bulgaria, Lithuania, Latvia, Malta, Slovakia, Slovenia, and Romania. In addition to these countries Norway, a Member State of the European Economic Area[3] (EEA) might become a Member of the European Union before 2010. On the whole, within the framework of this work, there are 13 additional countries that could be considered future Members of the European Union alongside the 15 States already Members in 2000. Within this framework of the size of the EU is thus: 15 Member States in 2000 (EU-15), 21 in 2005 (EUR-21) and 28 in 2010 (EUR-28). The process of EU enlargement after 2010 is not taken in the account because of the absence of other countries within the process of negotiation[4] at the time of the realization of this study.

The summary presents the major results for fish consumption (consumption per capita and apparent consumption), production (captures and aquaculture and commodities) and fish trade (exports and imports). This study uses commodity production instead of capture and aquaculture production to define the net supply[5] (using the common imports and exports categories). Estimation of future demand is done through the analysis of the past and recent trends of the commodities consumption and also based on experts' knowledge and literature review. Price and household revenues information are integrated into the consumer's present and future preferences. The aim of the model used in this study is to project up to 2030 the future net supply and the subsequent fish consumption per capita. To achieve this, a simple model was built. This model was applied to define both food use and non-food use consumption. It was also applied at a country level to define for each group of commodities the net supply.

[3] Together with Liechtenstein and Iceland. The EEA and the EU are bound through several agreements and cooperations generally relating to trade, environmental protection, social security, education, research and public statistics.

[4] Among other petitioning countries, Turkey does not currently fulfil the adherence criteria.

[5] For a more detailed methodology, see the Methodology Chapter hereafter.

**Fish consumption per capita 1989–2030**

Consumption per capita represents the total apparent consumption divided by the number of inhabitants of a country. Consumption can be within the home or outside, mainly through the catering. The consumption per capita is an indicator of the overall consumption, but it does not reflect internal changes in fish consumption. For example, in Spain, the consumption per capita is decreasing due to the diminishment of frozen fish while the consumption of prepared/preserved is going up. Compared to the consumption in 1998, the trends for the period 2005-2030 will be as follow for the EUR-28 countries:

- Increasing: Austria, Belgium-Luxembourg, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, United Kingdom, Czech Republic, Hungary, Poland, Slovenia, Bulgaria, Latvia, Lithuania, Malta, Romania and Slovakia.
- Decreasing: Ireland, Portugal, Spain, Sweden, Cyprus, Estonia and Norway.

General consumption trends for the EU-15 countries reflect an increase in consumption of seafood products. This rise is supported by a rise in consumption of convenience products as consumers have less and less time to spare for meal preparation. Frozen products tend to be on a downward trend whilst the consumption of fresh fish stagnates or decreases. The rising share of supermarkets in the retail of seafood products also increases their availability, which leads to increased consumption. Healthy eating, triggered by various food crises (e.g. BSE, dioxin, etc.) is another determinant of the positive trend of seafood consumption.

As a rule, former communist countries of this group see their consumption per capita increase (except Estonia), mostly thanks to improvement of their economic situation. Consumption shifts away from traditional freshwater species towards marine products. Within marine products, frozen fish consumption tends to increase slower than during the period 1989-1998 and small pelagic species are increasingly being replaced by higher value species such as diadromous, large pelagic or demersal fish. Cyprus's consumption pattern follows more the pattern of Mediterranean countries such as Spain or Portugal, which also experience a decrease in consumption per capita.

Improvement of economic conditions is the main force behind the increased consumption per capita in the former communist countries of the EUR-7 NC group. Frozen fish still represents the bulk of fish consumption but the variety of species in this group increases with small pelagic species losing ground to demersal or other more exotic species such as crustaceans, molluscs or cephalopods. Freshwater fish are gradually replaced by marine species, as the latter are often easier to prepare, offer a wider variety of taste and are made increasingly available thanks to the spread of supermarkets throughout these countries. Baltic countries are the main consumers within the group, while Slovakia, Romania and Bulgaria remain small seafood consumers due to a lack of seafood tradition. Maltese and Norwegian consumption reflect the southern and northern EU-15 patterns respectively.

**Table ES-1: Consumption per capita for all EUR-28 countries from 1989 to 2030**

(kg/capita/year)

| | 1989 | 1994 | 1998 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|---|---|
| Austria | 9 | 12 | 11 | 11 | 11 | 12 | 12 | 12 | 13 |
| Belgium-Luxembourg | 21 | 23 | 22 | 22 | 22 | 23 | 23 | 23 | 24 |
| Denmark | 20 | 25 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| Finland | 33 | 34 | 34 | 34 | 35 | 35 | 36 | 36 | 37 |
| France | 30 | 30 | 32 | 32 | 32 | 32 | 32 | 33 | 33 |
| Germany | 11 | 13 | 15 | 15 | 15 | 16 | 16 | 17 | 18 |
| Greece | 20 | 26 | 26 | 26 | 26 | 26 | 27 | 27 | 27 |
| Ireland | 22 | 19 | 21 | 21 | 21 | 21 | 21 | 21 | 20 |
| Italy | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| Netherlands | 14 | 16 | 15 | 15 | 15 | 15 | 15 | 16 | 16 |
| Portugal | 59 | 60 | 61 | 60 | 59 | 59 | 58 | 58 | 57 |
| Spain | 39 | 40 | 41 | 40 | 39 | 39 | 39 | 39 | 39 |
| Sweden | 22 | 27 | 29 | 28 | 28 | 27 | 27 | 27 | 27 |
| United Kingdom | 22 | 20 | 24 | 24 | 24 | 25 | 25 | 25 | 25 |
| **EU-15 average** | **23** | **24** | **25** | **26** | **26** | **26** | **26** | **27** | **27** |
| Cyprus | 18 | 20 | 25 | 25 | 24 | 24 | 23 | 23 | 23 |
| Czech Republic | | 9 | 9 | 10 | 10 | 11 | 11 | 12 | 13 |
| Estonia | | 37 | 15 | 14 | 14 | 14 | 14 | 14 | 14 |
| Hungary | | 4 | 4 | 5 | 5 | 5 | 5 | 6 | 6 |
| Poland | 15 | 13 | 11 | 12 | 13 | 13 | 14 | 15 | 16 |
| Slovenia | | 6 | 7 | 7 | 7 | 8 | 8 | 8 | 9 |
| **EUR-6 NC average** | **15** | **11** | **10** | **10** | **11** | **12** | **12** | **13** | **14** |
| Bulgaria | | 2 | 4 | 5 | 5 | 6 | 6 | 7 | 7 |
| Latvia | | 43 | 37 | 37 | 37 | 38 | 38 | 38 | 39 |
| Lithuania | | 21 | 15 | 17 | 19 | 21 | 23 | 25 | 27 |
| Malta | 23 | 22 | 29 | 30 | 31 | 32 | 33 | 34 | 36 |
| Norway | 45 | 47 | 46 | 46 | 45 | 45 | 45 | 45 | 45 |
| Romania | 9 | 3 | 3 | 3 | 4 | 4 | 4 | 5 | 5 |
| Slovakia | | 7 | 5 | 6 | 6 | 7 | 7 | 8 | 8 |
| **EUR-7 NC average** | **42** | **37** | **40** | **11** | **11** | **12** | **12** | **13** | **13** |
| **EUR-28 average** | **22** | **21** | **22** | **22** | **22** | **23** | **23** | **24** | **24** |

Source: database[6]

[6] The data for all the tables and figures in this report come from the database built from the various data collected from the agricultural and fishery bodies of the 28 countries and international organization like the EC, FAO and

Species consumed in 2030 will be more or less the same as today since all the important stocks of fish in the world are already exploited. Some marine species may be produced by aquaculture, for example cod or other demersal species, but it will be more a shift in the production system than an introduction of new species. Deep-sea fishing, where a lot of hopes resided, has already shown its limitations.

Overall, the main group of species consumed in 2030 will be the same as in 1998. Furthermore, these groups will compose about the same share of the total species consumed. Demersal marine fish such as cod, Alaska pollock and hake will dominate white fish consumption. Groundfish will represent about 40 percent of the total fish consumed in EUR-28 (taking into account other marine fish, which are mainly demersal fish used as raw material in prepared commodities). EUR-28 consumers will eat about 9 kg/c/yr* of demersal fish in 2030. Tuna and small pelagic species will account respectively for 15 and 14 percent, (compared to 14 and 14 percent in 1998) which corresponds to a consumption rate of 3.6 and 3.4 kg/c/yr in 2030. The majority of tuna and small pelagic species consumed will be either canned, or in the latter's case in Northern European countries, pickled.

Crustaceans, cephalopods and molluscs will represent respectively 7, 4 and 7 percent of the total species consumed in 2030 (about the same share as in 1998), which will be a consumption of about 1.7 kg/c/yr of shrimp, crab and lobster, 1 kg/c/yr of squids, cuttlefish and octopus, and another 1.7 kg/c/yr of mussels, oysters, scallops, and other molluscs. The consumption of these three groups of species will increase over the period respectively by 25, 17, and 17 percent.

The consumption of freshwater and diadromous fish will increase by 6 and 12 percent from 1998 to 2030. The annual consumption per capita of carp, eel, perch and pike will be around 400 kg/c/yr, and of salmon and trout about 1.7 kg/c/yr. Landlocked European countries will continue to consume freshwater fish but more in the form of prepared dishes rather than fresh and whole as before. Salmon and trout will pursuit their market penetration but Norwegian and Scottish fish farmers will have to change their strategy, based up to now on comparative price advantages compared to white fish, because of a selling price that corresponds nearly to the cost of production, indicating that there is no room for further price reduction (Asche *et al.*, 1994; Asche and Sebulonsen, 1998; Asche *et al.*, 2002). Fish farmers will have to innovate in order to add some further value to their product.

**Net supply of fish for human consumption 1989–2030**

Net supply of fish represents what is left from the addition of the production and the imports less the exports. From 1989 to 2030 the apparent consumption of fish by the EUR-28, or net supply of fish, will move from 9.3 Mt to 12.2 Mt over the period 1998-2030, the net supply of fish commodities for human consumption at the EUR-28 level will show three tendencies:

- Cured and fresh/chilled fish will remain more or less stable;
- Crustaceans, molluscs and other prepared aquatic products, filleted and prepared/preserved fish, molluscs, crustaceans and cephalopods will increase;
- Frozen fish will decrease.

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OECD.

*The word "capita" is abbreviated "c" to facilitate reading.

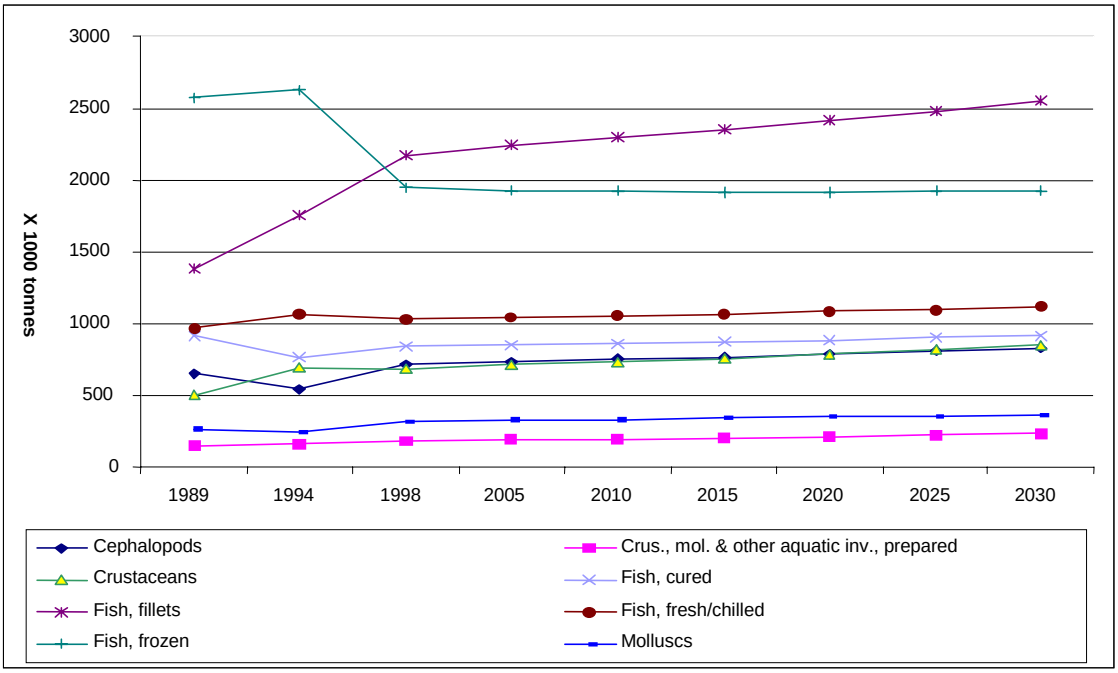


**Figure ES-1: Net supply of fish for human consumption by the EU-15 countries from 1989 to 2030**

Regarding groups of species, the overall tendency will be an increase of all major groups of species. Demersal species will benefit the most, in terms of volume, from this augmentation since they enter into the composition of ready to eat dishes and fish fillets that are subject to an important augmentation (see Appendix, Tables 6.2 and 6.3).

The increase of the net supply will be possible because of: 1-the rise of imports from third countries (mainly Asia, Africa and South America); and 2-the increase of the aquaculture production in some countries (Norway, UK, Greece, Spain).

## Production: captures, aquaculture and commodities 1989-2030

### *Captures and aquaculture*

Overall, at the EUR-28 level capture production is more or less stable over the period 1989-1998. The current difficulties of maintaining the level of exploitation of the main stocks argue in favour of a stabilisation of capture fish catches over the next 30 years, while aquaculture will experience an overall increase, although some species will encounter some decrease in terms of farm production (mainly inland freshwater species). So, capture will stay at around 10 Mt, the 1994–98 average, and aquaculture will increase from 1.8 Mt in 1998 to 2.5 Mt in 2030, which represents a global production of fish of 13 Mt in 2030.

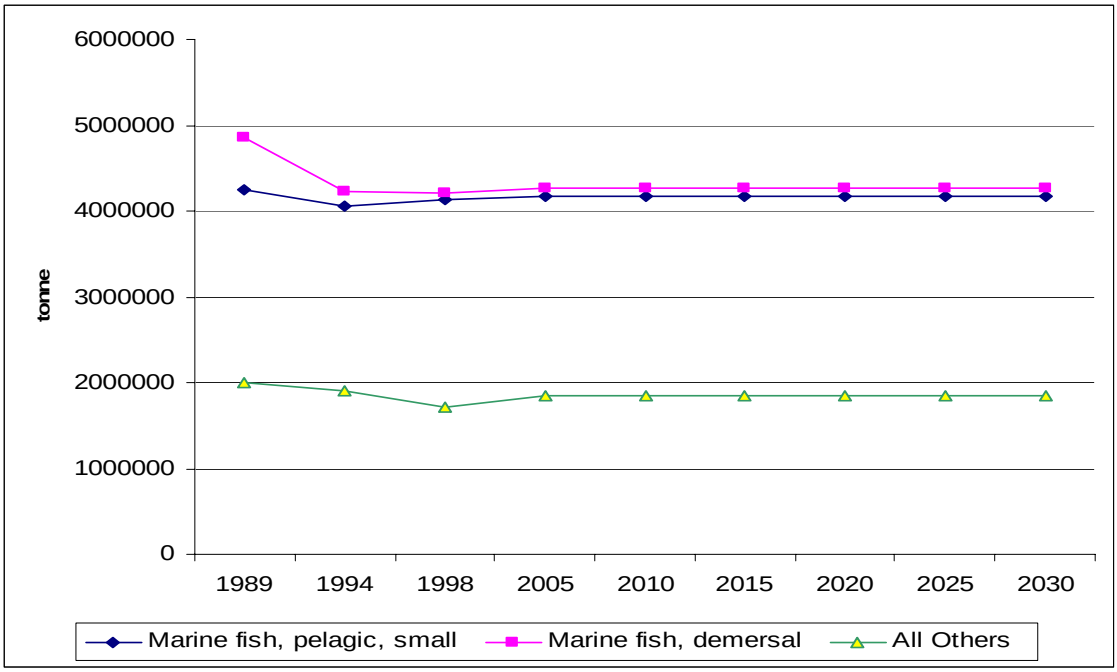


**Figure ES-2: Captures by FAO groups of species from 1989 to 1998**

Some countries, like Norway or UK, are making a significant contribution to the growth, with salmon production for example. At a lower level, southern European countries like Greece, Italy and Spain should also contribute to the augmentation of the aquaculture volume until 2030, with the production of sea bream and sea bass.

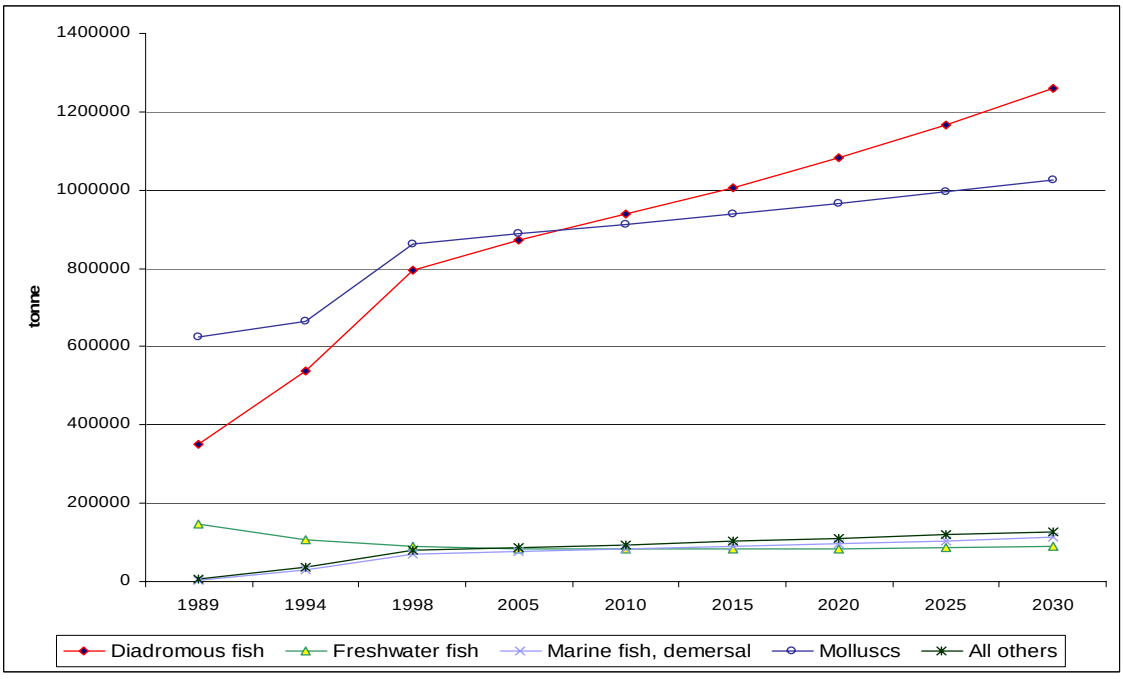


**Figure ES-3: Aquaculture production by FAO groups of species from 1989 to 2030**

The total production of capture and aquaculture should increase from more than 12 Mt in 1998 to nearly 13 Mt in 2030. Countries that will benefit the most from the total production are the ones in which aquaculture will go up. Diadromous species and molluscs are the two

main groups of species that will underlie the growth of the total production until 2030 (see Appendix, Table 6.4).

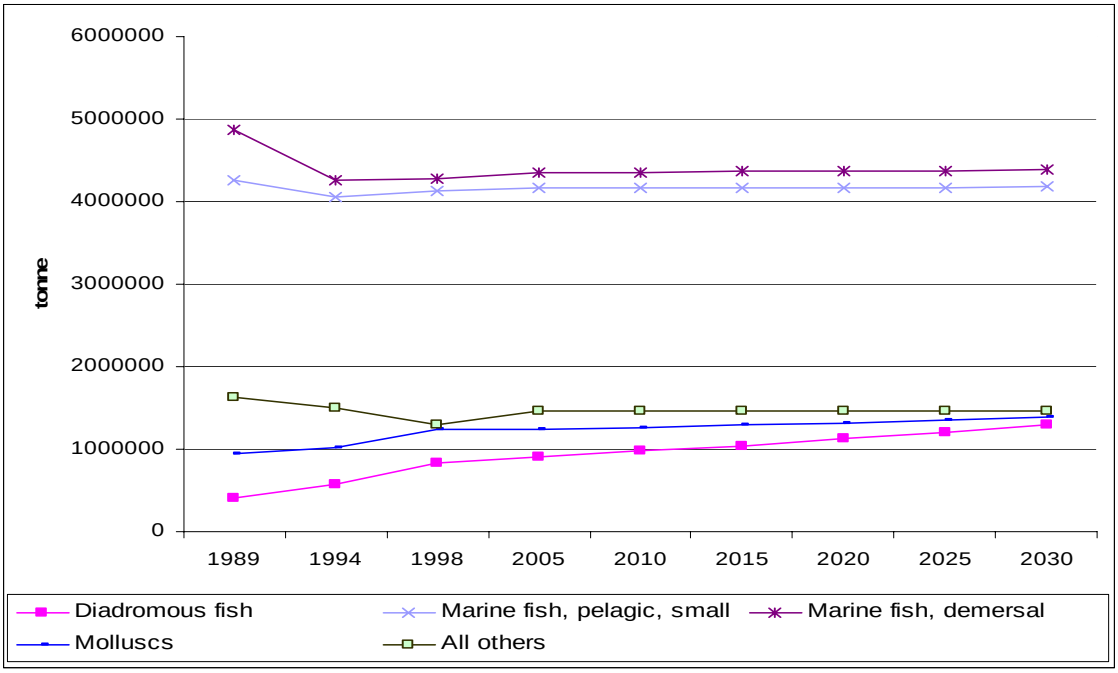


**Figure ES-4: Total production by FAO groups of species from 1989 to 2030**

### *Commodity production*[7]

The commodity production of the EUR-28 was about 8 Mt in 1989 and 9 Mt in 1998. The EU-15 countries, particularly France, Germany, Italy, Spain and UK, are the main producer of fish products in EUR-28 with 6.7 Mt in 1998. Norway on its own has produced on average 1.6 Mt since 1995. The collapse of the Eastern Europe coastal and distant water fleet had an impact on commodity production in 1998 since the reorganization of industry was just starting, notably beginning with the process of joining the EU.

The relative stability of the EU-15 during the last decade contrasts with the important increase of the Norwegian production of salmon, small pelagic and demersal species. The increasing difficulties in obtaining traditional processed species and the decline of the EU fleet are the main factors that have affected the ashore industry. In 1999, the non-renewing of the fishing agreement with Morocco[8] created a new crisis for the Spanish industry that was dependent on its distant water fleet to provide 400 000 t of demersal species (hake mainly), shrimp, tuna and cephalopods (through the European fishing agreements).

[7] Commodity production is the production of fish (processed or fresh/chilled) for human consumption and of fish reduction for animal feed. At a country level, there is no "bridge" between capture and aquaculture production and commodity production since: 1) the production of commodities is based on both national capture and aquaculture production and imports (and the national production of raw material can be exported) and 2) the capture production is used for human food production or fish reduction. For small pelagic species like herring or sprat it is impossible from the capture statistics to know if the production will be used for human consumption or fishmeal. For these reasons, the tables of commodity production cannot be compared to the tables that show the capture and aquaculture production.

[8] Slightly compensated by the increasing number of vessels in Mauritania for cephalopods (Failler, 2002).

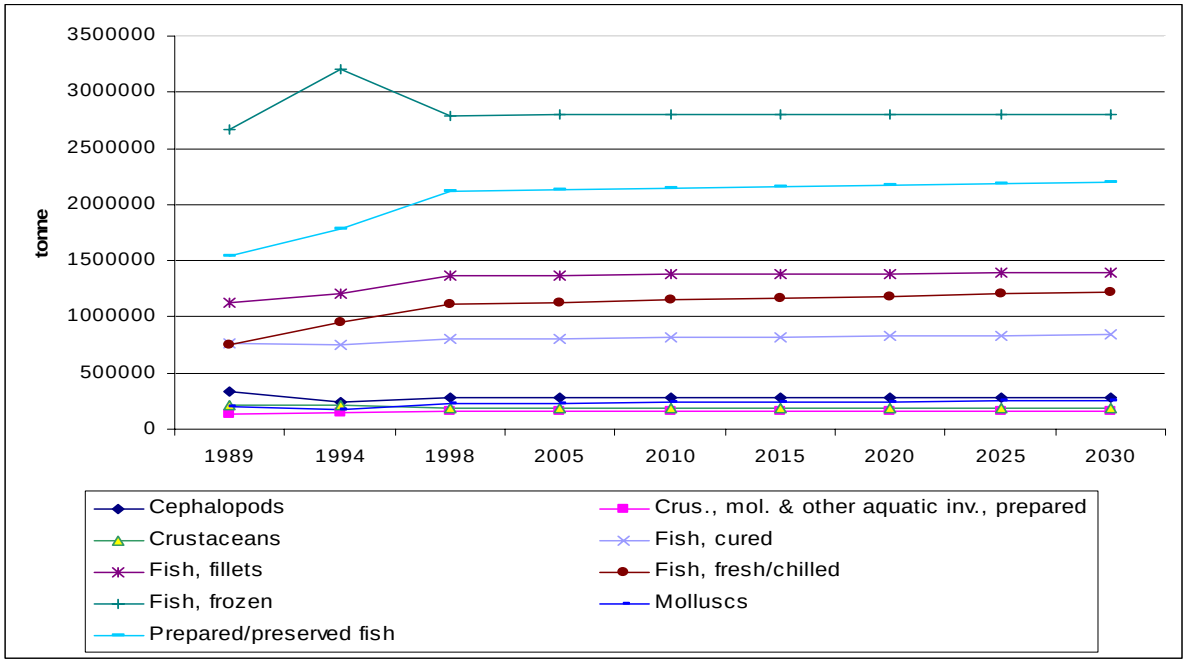


**Figure ES-5: Commodity production by OECD groups of commodities from 1989 to 2030**

In the light of these assumptions, commodity production will stay stable over the next three decades due to the fact that capture production will stay at the 1998 level and imports will fill the gap between the increasing demand and the national or EU supply. There is here an implicit hypothesis that raw material imports will not be used by the EUR-28 processing industry to increase their production quantities. One of the main reasons for this is that third countries (especially Asian ones) increasingly export to Europe more and more elaborated products. Only the group of Africa-Caribbean-Pacific (ACP) countries will continue to export unprocessed fish to the EU due to their barrier and tariff preferences (that end in 2008) (Failler and Dieng, 2001).

Commodity production follows the total production pattern in the sense that its evolution depends mainly on the aquaculture trends. EUR-28 production will go up by 3 percent reaching 9.3 Mt in 2030. The main part of the growth can be attributed to cured and preserved/prepared commodities in relation with the processing of aquaculture species (see Appendix, Tables 6.5 and 6.6).

### *Non food use production*

Non-food use production is essentially the manufacture of fishmeal and fish oil as an ingredient of feed for livestock and carnivorous aquaculture species. In the EU, the main producer is Denmark, which exports 90 percent of its production (1.3 Mt on average during the period 1989-98) to Norway and other EU countries. Norway is simultaneously producer (1 Mt on average), consumer (1.3 Mt on average) since the aquaculture production of salmon requires a substantial amount of small pelagic meal to feed it, and exporter (0.5 Mt on average) (Anon., 2001i). Overall, the production of fish oil and fishmeal has been quite stable during the period 1989-1998 at around 3.3 Mt for the EUR-28 and 2.0 Mt for the EU-15. Consequently, projections for 2030 give a production which stagnates at 3.3 Mt for the EUR-28 and imports also stagnate at around 3 Mt Because production is maintained at its former level (1998), exports will also remain the same until 2030 (2.3 Mt).

## Foreign trade

Foreign trade during the 1990s was characterized by strong growth in exports, together with more moderate growth in imports as intra-regional trade continued to increase. In the future, it is likely that increased consumption, linked with declining national resources, will lead to Europe's growing dependence on foreign suppliers. Since EUR-28 production will not be sufficient to cover the needs of the 500 million inhabitants in 2030, imports of raw material and commodities will help to fill the gap between EUR-28 production (less exports) and EUR-28 consumer demand.

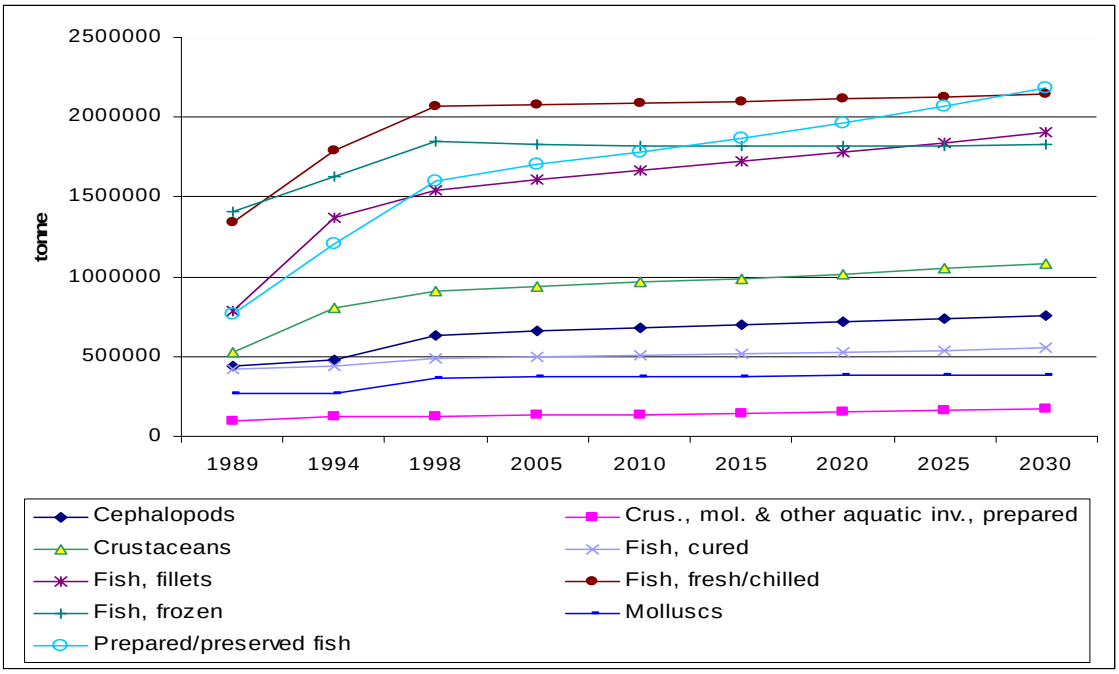


**Figure ES-6: Imports by OECD groups of commodities from 1989 to 2030**

Imports will rise for prepared products made from crustacean, molluscs and other aquatic invertebrates and fish. EU industry will face serious competition from abroad because a large part of the products imported will be ready for consumption and will not need further processing as is the case in 2003 (see Appendix, Tables 6.7 and 6.8).

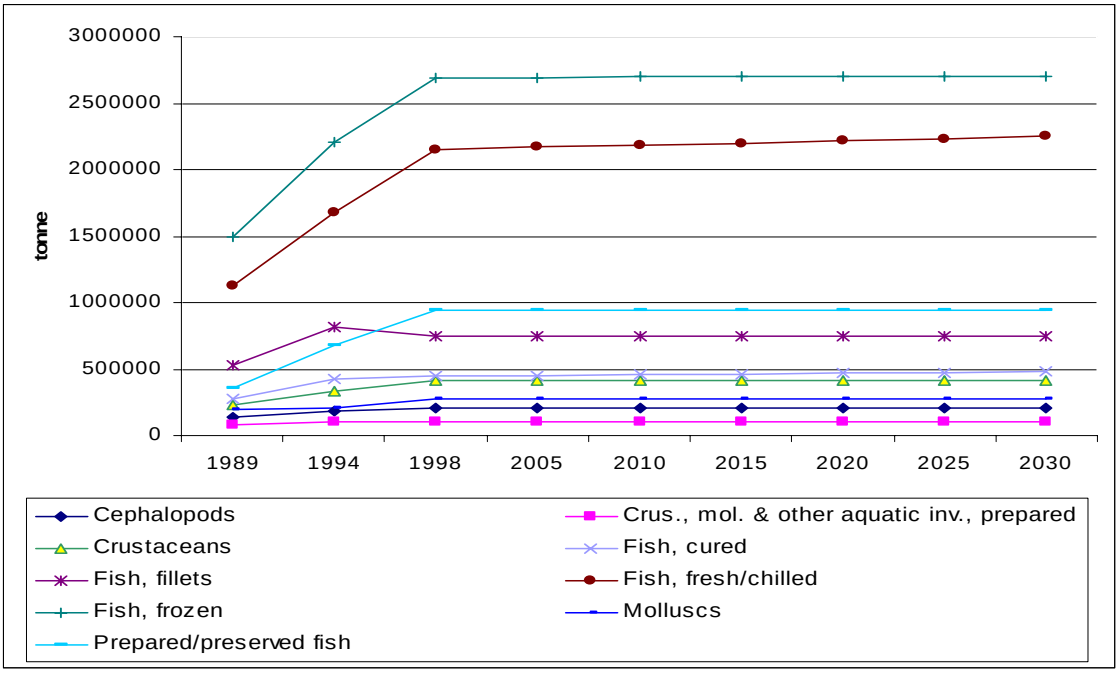


**Figure ES-7: Exports by OECD groups of commodities from 1989 to 2030**

The main exports will involve demersal and small pelagic species, and to a lesser extent tunas, crustaceans and marine fish in general. As mentioned earlier, exports will be stable over the next 30 years. Export levels will be affected only where there is aquaculture production surplus at a country level. Cured and fresh/chilled fish from the aquaculture production of salmon, trout, sea bass and sea bream will increase while other types of commodities will remain stable (see Appendix, Tables 6.9 and 6.10).

## Intra-European trade

The main trade flows within the EU-15 are directed north to south. As the major centres of primary production, the UK, Denmark and the Netherlands export large quantities of primary and processed products to southern states within the EU-15 where consumption rates and demand are particularly high. France performs a similar function but often acts as an intermediary, importing products from northern European countries such as the UK and Denmark, processing them and exporting them to southern European customers such as Spain or Italy. Trade flows between the southern EU-15 countries are less significant, the most important being exports of tuna products from Spain to Italy. Whereas trade between EU-15 and non-EU states may reflect political links and historic trade flows, new trading relationships that have evolved within the EU-15 may reflect contemporary trends in production, processing and demand between states.

Several key bilateral trading links have evolved in this way over the last decade. In general, analysis of bilateral trade within the EU-15 in the 1990s shows France, Spain and, to a lesser extent, Italy to be the major recipients of products from the major exporters in the EU-15 (France, Spain, the UK and Norway). Overall, intra-EU trade represents 60 percent of total EU-15 trade, which means that only 40 percent of what is exported or imported is going out of or coming into the EU-15 (Boude and Guillotreau, 1992). The intra-country trade within the former Soviet countries is also important and accounts for more than 80 percent of their trade flows. The trade route from the Baltic States and, at a lower level, from Poland to Russia

is still the one that drains 80 percent of the products. For the coming years, intra-EU trade will significantly increase as:

- Norway will provide the majority of the intra-EUR-28 trade in salmon (Asche *et al*., 1998);

- New Eastern countries will absorb an increasing part of the processing products made in the former EU-15;

- The Far Eastern market, mainly with Russia and newly independents states, will be channelled through the states that were part of the former USSR and that have borders with it. This kind of trade should result in the addition of little value added to the products since it will be mainly some straight transportation process without processing (or depending on the labour and tax advantages it could result in some delocalisation of the processing activities toward the Eastern countries).

The development of intra-EUR-28 trade will depend mainly on the possible reduction of marginal costs resulting from the development of new infrastructures and communications between new and old member states.

**Discussion and conclusion**

The projected future fish consumption is based on assumptions derived from past trends, literature review and expert consultation. An important number of assumptions were made for projecting consumption, captures, aquaculture, commodity production, imports and exports of commodities. For captures, it is likely that European vessels will face zero growth in production up to 2030. Recent regulations by the European Commission on cod and haddock in the North Sea have confirmed the high level of stock exploitation and the difficulties for some stock rebuilding in the short or mid term. Aquaculture is growing at some substantial rates for salmon, sea bass and sea bream, but environmental constraints, coastal zone occupation choices by the civil society, and health regulations will not allow fish farming to continue its exponential trends in the future.

The European fish processing industry will face a major challenge in the near future with imports from developing countries of competitively processed fish that are of a high standard of quality and safety. Considering that the European industry will be more and more dependent on third countries for its supply of raw material, it is likely that apart from the regrouping of companies under some consortium umbrella, the fishing industry will suffer from this competition and consequently decline. Imports from third countries will also benefit from the progressive elimination of trade barriers and the disappearance of preferences accorded to ACP countries (ECDPM, 2001). For Asian countries this should lead to a reinforcement of their competitive position in the world market.

The question of supplying of the growing European market is not raised in the report as a constraint to the increasing consumption of different products. The main reason for this is that the average fish price in European markets is slightly higher than the international price (except in Japan) and the one that occurs in other high-demand countries like USA. Consequently, there will have to be a shift in trade products from other countries to Europe. That already happens with African countries that are part of the ACP group. North West African countries have experienced a decline of their net supply in demersal fish over the last ten years to the profit of European countries, mainly Spain, France and Italy. There is still

some potential for further export growth from these countries but with the subsequent negative impact for their fish supply.

Fish prices trends are mentioned in the report but are not used to adjust the level of supply with that demand. The main reason for this is that the price series over the period 1989-1998 do not show any major changes and deflated international prices for the main species since 1950 have been stable. The second reason for not taking price as an adjustor is that aquaculture production is holding down the price of groundfish species: salmon prices are increasingly taking on the role of price reference for the other aquaculture and wild species. In other words, farmed species are playing the role of price regulator with a tendency to go down each time there is an improvement in feeding technology. This leads salmon producers, for example, from time to time to dump their products on the European market.

The projections show an increase in the demand for seafood products to 2030. The average per capita consumption by the EUR-28 will move form 22 kg/c/yr in 1998 to 24 kg/c/yr. The two additional kilograms per capita signify that the net supply will have to increase by 1.6 Mt (respectively 1.1 Mt for the 2 extra kg per person and 550 000 tonnes due to the 22 M extra inhabitants). Aquaculture growth will not be able to meet the increasing demand so imports will rise up to 11 Mt (+15 percent from 1998), increasing the dependency of Europe on the rest of the world.

The adhesion of new countries to the current EU-15 will increase the intra-European trade: firstly because a large part of the external European trade is currently between Western countries and Eastern and Northern countries; secondly because of a delocalisation of Western processing plants to former Soviet Union countries like Poland or the Baltic States, and thirdly because of a reduction of the re-exports between Western countries. The last point will lead to the suppression of some established fish distribution chains in order to cut down costs, which are more or less transaction costs. Overall, there will be some direct connection between world producers and the European processing industry.

The increasing demand of ready to eat products will be observed everywhere in Europe in 2030 but with a more marked trend in the EU-15 because of the high purchase power. Changes in consumption are mainly changes in commodities rather than species: the same species will be consumed in 2030 but in a different form. Eastern countries will progressively catch up and conform to the consumption pattern of the EU-15 countries. The improvement of their economy and changing consumption habits will slowly allow Eastern countries to develop a demand driven market rather than the current supply driven one. But behind the apparent standardization of consumption, regional differences will still exist: a Spanish consumer will not have the same consumption pattern as a Swedish or a Romanian one. National preferences will be exacerbated through the net supply of commodities that respect historical tastes and habits but also integrate modern living conditions.

## Executive Summary Appendix

**Table ESA-1: Food use net supply by FAO groups of species from 1989 to 2030**

(X 1000 tonnes live weight)

| FAO Group of species | 1989 | 1994 | 1998 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | % 98-30 |
|---|---|---|---|---|---|---|---|---|---|---|
| Freshwater fish | 39 | 98 | 150 | 152 | 152 | 154 | 156 | 157 | 159 | 6.0 |
| Diadromous fish | 474 | 592 | 723 | 736 | 747 | 760 | 773 | 788 | 804 | 11.2 |
| Marine fish, pelagic, tunas | 1418 | 1403 | 1617 | 1641 | 1659 | 1682 | 1706 | 1733 | 1762 | 9.0 |
| Marine fish, pelagic, small | 1527 | 1887 | 1512 | 1553 | 1589 | 1629 | 1675 | 1727 | 1784 | 18.0 |
| Marine fish, demersal | 2141 | 2352 | 2529 | 2584 | 2628 | 2676 | 2728 | 2785 | 2844 | 12.5 |
| Marine fish, others | 2182 | 2194 | 2235 | 2298 | 2348 | 2403 | 2463 | 2529 | 2602 | 16.4 |
| Crustaceans | 524 | 718 | 715 | 746 | 769 | 796 | 825 | 856 | 892 | 24.8 |
| Molluscs | 374 | 359 | 443 | 457 | 467 | 479 | 492 | 507 | 521 | 17.6 |
| Cephalopods | 649 | 539 | 710 | 735 | 753 | 771 | 791 | 812 | 833 | 17.3 |
| Aquatic animals | 15 | 14 | 21 | 22 | 24 | 25 | 27 | 29 | 31 | 46.9 |
| **Total EUR-28** | **9342** | **10158** | **10655** | **10923** | **11139** | **11376** | **11636** | **11920** | **12230** | **14.8** |

Source: database

**Table ESA-2: Food use net supply by OECD groups of commodities from 1989 to 2030**

(X 1000 tonnes live weight)

| OECD group of commodities | 1989 | 1994 | 1998 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | % 98-30 |
|---|---|---|---|---|---|---|---|---|---|---|
| Cephalopods | 649 | 539 | 710 | 735 | 753 | 771 | 791 | 812 | 833 | 17.3 |
| Crus., mol. & other aquatic inv.,prepared | 149 | 161 | 181 | 189 | 196 | 204 | 212 | 221 | 231 | 27.6 |
| Crustaceans | 503 | 689 | 681 | 710 | 733 | 758 | 786 | 818 | 851 | 25.0 |
| Fish, cured | 914 | 771 | 842 | 853 | 862 | 873 | 886 | 899 | 915 | 8.7 |
| Fish, fillets | 1385 | 1757 | 2165 | 2240 | 2296 | 2356 | 2418 | 2483 | 2551 | 17.8 |
| Fish, fresh/chilled | 967 | 1067 | 1031 | 1044 | 1055 | 1067 | 1081 | 1098 | 1117 | 8.3 |
| Fish, frozen | 2571 | 2632 | 1950 | 1930 | 1921 | 1917 | 1917 | 1922 | 1928 | 1.1 |
| Molluscs | 262 | 240 | 319 | 326 | 333 | 339 | 346 | 353 | 362 | 13.5 |
| Prepared/preserved fish | 1941 | 2301 | 2778 | 2897 | 2990 | 3090 | 3197 | 3315 | 3442 | 23.9 |
| **Total EUR-28** | **9342** | **10158** | **10655** | **10923** | **11139** | **11376** | **11636** | **11920** | **12230** | **14.8** |

Source: database

**Table ESA-3: Total production by country from 1989 to 2030**

(tonnes)

| Country | 1989 | 1994 | 1998 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|---|---|
| Austria | 5000 | 3491 | 3312 | 2516 | 2139 | 1867 | 1675 | 1545 | 1461 |
| Belgium | 40368 | 35100 | 31679 | 33203 | 33190 | 33190 | 33202 | 33225 | 33258 |
| Denmark | 1929355 | 1920642 | 1599567 | 1835414 | 1837862 | 1840453 | 1843197 | 1846101 | 1849177 |
| Finland | 169015 | 180951 | 197328 | 188878 | 187844 | 186890 | 186009 | 185198 | 184451 |
| France | 940408 | 983912 | 877113 | 939243 | 946709 | 954902 | 963777 | 973311 | 983491 |
| Germany | 407776 | 272502 | 333597 | 312964 | 313809 | 315372 | 317484 | 320027 | 322923 |
| Greece | 140132 | 224142 | 188153 | 228941 | 233271 | 237941 | 242975 | 248401 | 254253 |
| Ireland | 241098 | 355997 | 401165 | 405477 | 408903 | 412630 | 416686 | 421102 | 425912 |
| Italy | 551924 | 604652 | 567225 | 622515 | 629115 | 636245 | 643914 | 652144 | 660965 |
| Netherlands | 530162 | 529549 | 656662 | 577053 | 581199 | 585529 | 590052 | 594781 | 599727 |
| Portugal | 339564 | 274243 | 236283 | 256689 | 256589 | 256762 | 257151 | 257719 | 258451 |
| Spain | 1526134 | 1270206 | 1422528 | 1452214 | 1462823 | 1474079 | 1486011 | 1498687 | 1512215 |
| Sweden | 257778 | 394257 | 416398 | 391218 | 390971 | 390774 | 390623 | 390518 | 390456 |
| United Kingdom | 914939 | 970186 | 1065322 | 1046347 | 1053201 | 1060505 | 1068287 | 1076581 | 1085419 |
| **Total EU-15** | **7993653** | **8019830** | **7996331** | **8292672** | **8337626** | **8387138** | **8441043** | **8499339** | **8562159** |
| Cyprus | 2642 | 3085 | 3668 | 3966 | 4143 | 4350 | 4592 | 4878 | 5218 |
| Czech Republic | na | 22604 | 21179 | 23525 | 25585 | 27859 | 30370 | 33143 | 36204 |
| Estonia | 406162 | 124505 | 121854 | 122845 | 122845 | 122845 | 122845 | 122845 | 122845 |
| Hungary | 35471 | 18202 | 17391 | 14861 | 13610 | 12806 | 12311 | 12031 | 11902 |
| Poland | 564483 | 460229 | 276757 | 391508 | 391147 | 390884 | 390719 | 390653 | 390686 |
| Slovenia | na | 3084 | 3061 | 3269 | 3375 | 3491 | 3620 | 3762 | 3920 |
| Total EUR-6 NC | 1008758 | 631709 | 443910 | 559975 | 560705 | 562236 | 564458 | 567312 | 570775 |
| Bulgaria | 102829 | 12505 | 14958 | 13915 | 14451 | 15101 | 15890 | 16848 | 18014 |
| Latvia | 551506 | 138727 | 102742 | 128014 | 128014 | 128014 | 128014 | 128014 | 128014 |
| Lithuania | 421270 | 51024 | 22283 | 39757 | 39757 | 39757 | 39757 | 39757 | 39757 |
| Malta | 916 | 1793 | 2907 | 3109 | 3342 | 3600 | 3884 | 4198 | 4544 |
| Norway | 2105337 | 2787949 | 3448641 | 3310400 | 3356241 | 3406716 | 3462303 | 3523524 | 3590959 |
| Romania | 224635 | 42615 | 18428 | 30920 | 30989 | 31066 | 31152 | 31249 | 31356 |
| Slovakia | na | 3477 | 1984 | 2268 | 2344 | 2428 | 2520 | 2623 | 2736 |
| **Total EUR-7 NC** | **3406493** | **3038090** | **3611943** | **3528383** | **3575138** | **3626682** | **3683520** | **3746212** | **3815379** |
| **Total EUR-28** | **12408904** | **11689629** | **12052184** | **12381030** | **12473469** | **12576056** | **12689021** | **12812864** | **12948314** |

Source: database

**Table ESA-4: Food use production by OECD groups of commodities from 2005 to 2030**

(tonnes live weight)

| OECD gp | 1989 | 1994 | 1998 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|---|---|
| Cephalopods | 340285 | 243970 | 284430 | 284430 | 284430 | 284430 | 284430 | 284430 | 284430 |
| Crus., mol.& other aquatic inv., prepared | 134218 | 143191 | 161274 | 161760 | 162112 | 162469 | 162831 | 163197 | 163569 |
| Crustaceans | 209425 | 213407 | 183723 | 183724 | 183725 | 183726 | 183727 | 183728 | 183729 |
| Fish, cured | 766757 | 753697 | 803002 | 810592 | 816287 | 822202 | 828338 | 834693 | 841271 |
| Fish, fillets | 1129771 | 1201520 | 1366362 | 1372579 | 1377143 | 1381814 | 1386594 | 1391486 | 1396494 |
| Fish, fresh/chilled | 753297 | 946780 | 1110220 | 1132643 | 1149149 | 1166074 | 1183433 | 1201234 | 1219493 |
| Fish, frozen | 2662294 | 3209251 | 2794765 | 2797011 | 2798630 | 2800262 | 2801906 | 2803563 | 2805232 |
| Molluscs | 196657 | 175357 | 229200 | 234493 | 238390 | 242388 | 246487 | 250692 | 255005 |
| Prepared/preserved fish | 1536251 | 1779058 | 2120646 | 2137266 | 2149321 | 2161533 | 2173901 | 2186431 | 2199122 |
| **Total FU Production EUR-28** | **7728956** | **8666231** | **9053621** | **9114498** | **9159187** | **9204897** | **9251646** | **9299454** | **9348344** |

Source: database

**Table ESA-5: Food use production by FAO groups of species and OECD group of commodities from 1989 to 2030**

(tonnes live weight)

| Gp Species | 1989 | 1994 | 1998 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|---|---|
| Freshwater fish | 11349 | 56979 | 59978 | 59413 | 59100 | 58851 | 58655 | 58505 | 58394 |
| Diadromous fish | 354781 | 416707 | 671968 | 684828 | 694331 | 704107 | 714164 | 724509 | 735152 |
| Marine fish, pelagic, tunas | 1032920 | 988626 | 1087170 | 1097419 | 1104853 | 1112383 | 1120009 | 1127734 | 1135558 |
| Marine fish, pelagic, small | 2052831 | 2820195 | 2963254 | 2972392 | 2979120 | 2986026 | 2993116 | 3000400 | 3007887 |
| Marine fish, demersal | 1376121 | 1305924 | 1233348 | 1239150 | 1243386 | 1247700 | 1252093 | 1256567 | 1261125 |
| Marine fish, others | 2020370 | 2301874 | 2179278 | 2196889 | 2209739 | 2222818 | 2236134 | 2249692 | 2263497 |
| Crustaceans | 243654 | 247857 | 222917 | 222919 | 222920 | 222920 | 222921 | 222922 | 222923 |
| Molluscs | 293110 | 281768 | 348566 | 354288 | 358496 | 362806 | 367223 | 371749 | 376386 |
| Cephalopods | 340285 | 243970 | 284430 | 284430 | 284430 | 284430 | 284430 | 284430 | 284430 |
| Aquatic animals | 3537 | 2331 | 2713 | 2770 | 2812 | 2856 | 2900 | 2946 | 2993 |
| **Total FU Production EUR-28** | **7728956** | **8666231** | **9053621** | **9114498** | **9159187** | **9204897** | **9251646** | **9299454** | **9348344** |

Source: database

**Table ESA-6: Food use imports by FAO groups of species from 1989 to 2030**

(tonnes live weight)

| Gp Species | 1989 | 1994 | 1998 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | % 98-30 |
|---|---|---|---|---|---|---|---|---|---|---|
| Freshwater fish | 38835 | 94231 | 163421 | 165188 | 166641 | 168263 | 170062 | 172051 | 174245 | 6.6 |
| Diadromous fish | 379925 | 632090 | 823965 | 832194 | 839482 | 847969 | 857696 | 868719 | 881116 | 6.9 |
| Marine fish, pelagic, tunas | 571923 | 710222 | 906275 | 920010 | 932351 | 946824 | 963466 | 982329 | 1003483 | 10.7 |
| Marine fish, pelagic, small | 992131 | 1609487 | 1742240 | 1788278 | 1826557 | 1869721 | 1918174 | 1972395 | 2032940 | 16.7 |
| Marine fish, demersal | 1914687 | 2603574 | 2870923 | 2929607 | 2976048 | 3026350 | 3080617 | 3138976 | 3201577 | 11.5 |
| Marine fish, others | 814233 | 786789 | 1037038 | 1083098 | 1120853 | 1163148 | 1210496 | 1263483 | 1322781 | 27.6 |
| Crustaceans | 535746 | 822194 | 932923 | 963222 | 987475 | 1014142 | 1043453 | 1075666 | 1111063 | 19.1 |
| Molluscs | 334392 | 356328 | 432136 | 441628 | 449216 | 457560 | 466740 | 476846 | 487981 | 12.9 |
| Cephalopods | 441598 | 476067 | 634519 | 658756 | 676847 | 695616 | 715091 | 735301 | 756277 | 19.2 |
| Aquatic animals | 17626 | 24634 | 34099 | 35972 | 37437 | 39020 | 40733 | 42588 | 44599 | 30.8 |
| **Total FU Imports EUR-28** | **6041095** | **8115616** | **9577539** | **9817953** | **10012909** | **10228612** | **10466526** | **10728352** | **11016063** | **15.0** |

Source: database

**Table ESA-7: Food use imports by OECD groups of commodities from 1989 to 2030**

(tonnes live weight)

| OECD gp | 1989 | 1994 | 1998 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | % 98-30 |
|---|---|---|---|---|---|---|---|---|---|---|
| Cephalopods | 441598 | 476067 | 634519 | 658756 | 676847 | 695616 | 715091 | 735301 | 756277 | 19.2 |
| Crus., mol. & other aquatic inv., prepared | 96162 | 124760 | 122476 | 130816 | 137525 | 144936 | 153128 | 162189 | 172215 | 40.6 |
| Crustaceans | 527308 | 807376 | 911427 | 940889 | 964441 | 990306 | 1018697 | 1049857 | 1084049 | 18.9 |
| Fish, cured | 419055 | 442609 | 486030 | 496237 | 504753 | 514421 | 525380 | 537787 | 551820 | 13.5 |
| Fish, fillets | 784977 | 1366850 | 1544890 | 1613693 | 1665773 | 1720459 | 1777907 | 1838283 | 1901769 | 23.1 |
| Fish, fresh/chilled | 1336267 | 1795306 | 2067885 | 2079591 | 2089762 | 2101576 | 2115170 | 2130703 | 2148360 | 3.9 |
| Fish, frozen | 1405893 | 1627389 | 1845032 | 1826726 | 1818934 | 1815342 | 1815824 | 1820287 | 1828675 | 0.9 |
| Molluscs | 264295 | 271019 | 365255 | 369116 | 372163 | 375482 | 379100 | 383054 | 387378 | 6.1 |
| Prepared/preserved fish | 765543 | 1204239 | 1600026 | 1702127 | 1782711 | 1870475 | 1966229 | 2070892 | 2185517 | 36.6 |
| **Total FU Imports EUR-28** | **6041095** | **8115616** | **9577539** | **9817953** | **10012909** | **10228612** | **10466526** | **10728352** | **11016063** | **15.0** |

Source: database

**Table ESA-8: Food use exports by FAO groups of species from 1989 to 2030**

(tonnes live weight)

| Gp Species | 1989 | 1994 | 1998 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | % 98-30 |
|---|---|---|---|---|---|---|---|---|---|---|
| Freshwater fish | 11473 | 52706 | 73154 | 73181 | 73201 | 73221 | 73242 | 73263 | 73284 | 0.2 |
| Diadromous fish | 261736 | 457029 | 772018 | 780312 | 786369 | 792538 | 798822 | 805224 | 811747 | 5.1 |
| Marine fish, pelagic, tunas | 186383 | 294551 | 377069 | 377120 | 377157 | 377196 | 377235 | 377276 | 377317 | 0.1 |
| Marine fish, pelagic, small | 1518591 | 2542078 | 3194655 | 3207333 | 3216697 | 3226330 | 3236247 | 3246459 | 3256983 | 2.0 |
| Marine fish, demersal | 1149935 | 1557804 | 1575762 | 1584788 | 1591360 | 1598038 | 1604824 | 1611718 | 1618725 | 2.7 |
| Marine fish, others | 653481 | 894757 | 981142 | 981888 | 982438 | 982999 | 983574 | 984162 | 984766 | 0.4 |
| Crustaceans | 254851 | 352155 | 439926 | 440373 | 440698 | 441029 | 441364 | 441704 | 442049 | 0.5 |
| Molluscs | 253541 | 279364 | 337566 | 338823 | 339743 | 340682 | 341640 | 342618 | 343617 | 1.8 |
| Cephalopods | 132274 | 180578 | 208392 | 208392 | 208392 | 208392 | 208392 | 208392 | 208392 | 0.0 |
| Aquatic animals | 6110 | 12430 | 16134 | 16244 | 16327 | 16413 | 16503 | 16597 | 16695 | 3.5 |
| **Total FU Exports EUR-28** | **4428373** | **6623451** | **7975816** | **8008455** | **8032381** | **8056836** | **8081841** | **8107413** | **8133575** | **2.0** |

Source: database

**Table ESA-9: Food use exports by OECD groups of commodities from 1989 to 2030**

(tonnes live weight)

| OECD gp | 1989 | 1994 | 1998 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | % 98-30 |
|---|---|---|---|---|---|---|---|---|---|---|
| Cephalopods | 132274 | 180578 | 208392 | 208392 | 208392 | 208392 | 208392 | 208392 | 208392 | 0.0 |
| Crus., mol. & other aquatic inv., prepared | 81456 | 106634 | 103323 | 103665 | 103923 | 104192 | 104475 | 104771 | 105081 | 1.7 |
| Crustaceans | 233508 | 331276 | 414502 | 414949 | 415274 | 415604 | 415939 | 416279 | 416625 | 0.5 |
| Fish, cured | 271528 | 425476 | 447344 | 453487 | 458045 | 462757 | 467633 | 472681 | 477915 | 6.8 |
| Fish, fillets | 528479 | 811664 | 746524 | 746524 | 746524 | 746524 | 746524 | 746524 | 746524 | 0.0 |
| Fish, fresh/chilled | 1122663 | 1675661 | 2146729 | 2168416 | 2184232 | 2200324 | 2216700 | 2233362 | 2250318 | 4.8 |
| Fish, frozen | 1498183 | 2203935 | 2690676 | 2693669 | 2695892 | 2698188 | 2700560 | 2703009 | 2705539 | 0.6 |
| Molluscs | 199537 | 206038 | 275801 | 276827 | 277572 | 278327 | 279093 | 279869 | 280656 | 1.8 |
| Prepared/preserved fish | 360746 | 682189 | 942529 | 942529 | 942529 | 942529 | 942529 | 942529 | 942529 | 0.0 |
| **Total FU Exports EUR-28** | **4428373** | **6623451** | **7975816** | **8008455** | **8032381** | **8056836** | **8081841** | **8107413** | **8133575** | **2.0** |

Source: database

# 1 INTRODUCTION

## 1.1 Objectives

The FAO is currently preparing a document called *Agriculture Horizon 2015/2030.* This work aims to describe the current situation of agriculture, sylviculture and fisheries at the time horizons of 2015 and 2030. In this document, a chapter will present what fisheries and aquaculture could be, taking into account plausible evolutions for landings and production, and trends in consumption. In order to write this chapter, the FAO Fisheries Department is undertaking studies of long-term projections for fish consumption in China, Japan, North America and Europe.

In this report, current demand, supply and consumption of major seafood products and species in Europe are analysed for the period 1989-1998 in order to define trends and a basis for assumptions up to 2030. Then, future characteristics of fish consumption are presented for the period 2005-2030.

## 1.2 Scope of the study

The enlargement of the European Union is taken into account in this study (for a history of the European Union construction, refer to Annex 1). The map below presents the evolution of the enlargement process that seems reasonable to envisage today. The first six countries most likely to be part of the EU before 2005 are Cyprus, the Czech Republic, Estonia, Hungary, Poland, and Slovenia. The second group of countries that could reasonably join the EU before 2010 is Bulgaria, Latvia, Lithuania, Malta, Romania and Slovakia. In addition to these countries, it seemed appropriate to consider Norway becoming a member state before 2010 even if this Scandinavian country has not currently initiated a process of adhesion.

Within the framework of this study the size of the EU is thus: 15 Member States in 2000 (EU-15), 21 in 2005 (EUR-21), and 28 in 2010 (EUR-28). The process of EU enlargement after 2010 is not taken in the account because of the absence of other countries within the process of negotiation[9] at the time of the realization of this study.

## 1.3 Novelty of the method

The method developed here has never been used in previous attempts to measure the current and future per capita fish consumption. The novelty of the method used here is the creation of a link between the two traditional methods used to assess present and past fish consumption[10]. The first method derives the human fish consumption from the net supply, which is itself the sum of production (capture + aquaculture) and imports less exports. It is a supply side consumption function that expresses the consumption in terms of quantities of fish by species group. The second method, in contrast, is a demand side consumption function that assesses the fish consumption through some consumption panels and focuses on consumption habits and changes. The consumption is here expressed in terms of fish commodities rather than species.

[9] Among other petitioning countries, Turkey does not currently fulfil the adherence criteria.
[10] A third method is used to estimate future fish consumption (see the Methodology chapter).

The first method is used for the purpose of food security and other macro policies and the second one for the industry and marketing sectors. Up to now no one has attempted to link the two methods due to important data requirements and data standardization. The work presented hereafter developed a new approach to define fish consumption both from the supply and demand sides and express consumption both in terms of species and commodities.

### 1.4 Contents of the report

The report is organized in three main sections. The methodology section explains in detail how the projections were made. The results section shows the projections for consumption, net supply, capture, aquaculture, imports and exports up to 2030. The last section discusses the conclusions.

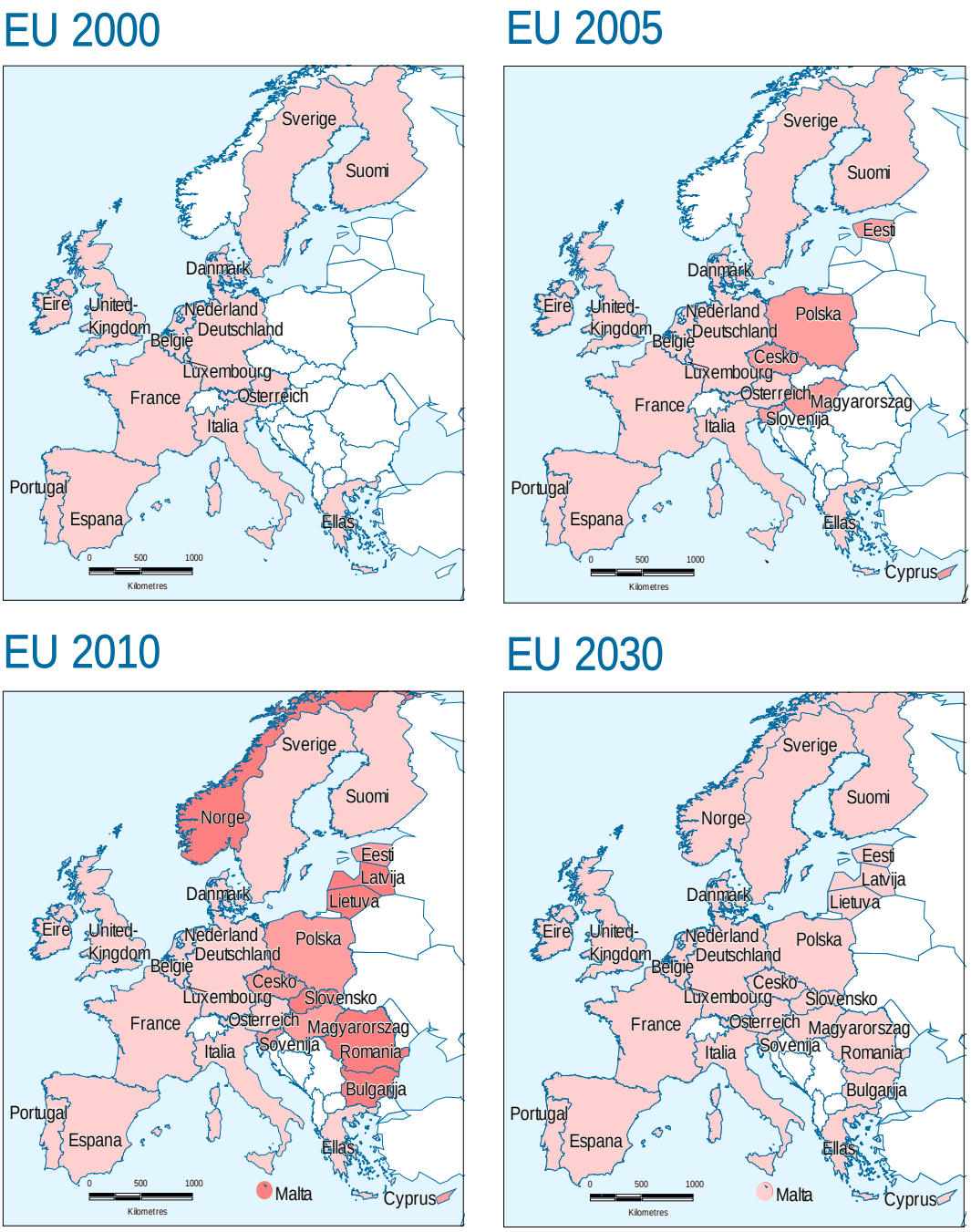


**Figure 1-1: Enlargement of the European Union**

# 2 METHODOLOGY

## 2.1 Traditional methods

Two methods are traditionally used to assess the past and present consumption of fish in a country[11]. A third one is mainly used to address the evaluation of the future fish consumption.

The first method was used by the FAO to provide provided current fish consumption (net supply and consumption per capita) in its publication *Fish and fishery products apparent consumption* (FAO, 1999a). For this standard method, human fish consumption per capita for a country is derived from the net supply divided by the number of inhabitants:

*Fish consumption per capita = Net supply / Number of inhabitants*

Net supply corresponds to production (captures + aquaculture), to which imports and stock adjustments[12] are added, and exports and non-food uses (all fish not used for human consumption) subtracted[13]:

*Net supply = Captures + Aquaculture + Imports – Exports + Δ stocks – Non food uses*

This method makes it possible to follow the evolution in the demand for fish in a given country on a yearly basis. It requires only data relating to production, the fish trade, and in certain cases, fish stocks. The simplicity of this method means that calculating consumption is possible in nearly all of the countries in the world, as long as data for production and trade are available. Its principle use lies in measuring to what extent animal protein requirements are being met in developing countries.

The second standard method assesses human fish consumption from consumer panels[14]. It is based on sampling methods where the population is stratified in order to define consumer choices depending on revenue, age, and location. Results are extrapolations from samplings. The main objectives of these surveys are to provide industry and retailing sectors with information related to types of commodities consumed, place of consumption (in or outside the home), place of purchase (supermarkets versus retailers), changes in consumers' preferences, etc. (Broomfield, 1999). They are also designed and implemented to identify market opportunities for new products.

- The third method is used to estimate the future fish consumption in a country. This method is based on an estimation of the supply and demand and the utilization of a clearing price mechanism to close the model[15]. The future supply is defined by past trends of captures and aquaculture production and consists of a projection of these past tends into the future. The future demand is mainly derived from projections of the GDP per capita where fish consumption is a function of the household income (for a

[11] For a detailed presentation of methods, see http://www.fao.org/es/ess/consweb.htm

[12] Due to the low level of stock (mainly frozen fish) of the EUR-28 countries, the stock variation component has not been used in this study.

[13] In this equation, all the variables are expressed in live weight. It is thus necessary as a preliminary to convert imports and exports in net weight into live weight.

[14] See Papageorgiou and Girard (2000) for a presentation of some consumer panel surveys in Europe.

[15] See Chang *et al.* (2002), Anon. (1999a), Ye (1999), Wijkström (1999) and De Negris (2002) for an application of this method.

socio-economic presentation, refer to Annex 3). Trade variations are the result of adjustment of supply and demand through the price elasticity mechanism.

## 2.2 Difficulties with these traditional methods

The utilization of the first method to assess the present consumption leads to three major difficulties:

- Changes in fish consumption are mainly changes in the type and form of commodities rather than changes in the species[16] themselves, but this method does not give consumption results in terms of commodities, nor groups of commodities. It is therefore difficult to assess consumption and define a trend without knowing the type of commodities involved in it.
- Industry changes are also modifications of the type and form of commodities. Industry aims are to produce commodities and for that purpose it can use different types of fish depending on their availability. Again, the method doesn't address the production of commodities, which is a better indicator of seafood production in a country than production from captures or aquaculture because it represents what is effectively supplied to the market for human consumption[17].
- Production data from captures and aquaculture are expressed in live weight while imports and exports are expressed in net weight. In many cases, after applying conversion factors, some groups of species show a negative net supply, which in reality is impossible.

The second method, the consumer panel surveys, doesn't address the question of supply. It focuses on consumption and the type of commodities without any interest in knowing where the fish is processed and where it comes from. There is also the question of whether the sampling results adequately reflect national consumption patterns.

The third method, used to estimate future consumption, reveals four main difficulties.

- Regarding projections and future fish consumption, it is common in economics to define levels of both supply and demand and try to match them with price changes due to their certain elasticity (Robinson, 1982 and 1984; De Negris, 2002). This method can be applied at a country level where price information is available. It can also be implemented at a supra-national level where prices show some evidence of a homogeneous market. Unfortunately, Europe does not show a high level of homogeneity in its fish markets. Furthermore, inside countries like Spain or Italy, regional expressions of preferences for fish lead to intra-national market segmentation. Because of this, and also the absence of price co-integration for the main species, it is difficult to make some price aggregation at the EU level and to define at the same geographical scale price elasticities regarding demand and revenues[18] (Boude *et al*., 1997; Guillotreau, 1994a, 1994b and 1997; Zabala, 1998; Peredy *et al.*, 2000).
- The second point is that the price of fish depends mainly on the final form of the commodity: a whole salmon is five times less expensive than salmon fillets and 10 times less than a smoked salmon. Furthermore, aggregated prices are irrelevant in analysing a consumer market when there is a change in the composition of the

[16] Except maybe for Salmon in Europe in the 1980.
[17] In opposition to what is for non-food use purposes.
[18] Important differences in revenues between North and South, West and East Europe are also against the utilization of revenue price elasticities.

consumption. This is particularly true for the future member states that will face a significant increase of their purchasing power and will therefore orient their fish consumption toward fresh/chilled and frozen marine fish and prepared/preserved commodities.

- A third difficulty with this method is that it is only based on past trends with the assumption that the future is contained in the past and will follow the same pattern. Little or no information from the most recent trends, which is not visible in the "species" time series, is taken into account; neither are the forecasts of important elements that are outside the range of observed values. This leads to an overestimation of the growth rate since the constraints to growth are omitted or not well defined. Based on markets experts and an extensive review of professional and academic articles, the present study has defined both trend patterns and growth constraints.
- The last difficulty relates to the utilization of the GDP to estimate the demand function for fish. It is true that on average developed countries eat more fish than developing countries and in this case GDP per capita can be one basis for the consumption function. But, at the European level, for instance, inhabitants of Spain and Portugal have a lower GDP per capita than those of France and Germany although the former eat nearly twice as much fish as the latter.

## 2.3 Presentation of the method of the study

The shortcomings of the first two methods (as discussed above) in giving a complete picture of consumption from production to consumer, through processing and trade, have been addressed in the method used in this report by establishing links at the country level between consumers' choices and industry production. This study uses commodity production instead of capture and aquaculture production to define the net supply (using the common imports and exports categories). Estimation of future demand is done through the analysis of the past and recent trends of the commodities consumption and also based on experts' knowledge and literature review. Price and household revenues information are integrated into the consumer's present and future preferences (Refer to Annex 3 for socio-economic overview of the European countries).

The results are presented for each country in the second part of this report. The first part of the report presents the consolidated results that are the sum of the individual country results. Overall, the results obtained for the consumption per capita using production of commodities instead of production from captures are quite similar or slightly above. By knowing that commodity production doesn't adequately account for fresh fish production that doesn't undergo any change, it is possible that fish consumption is underestimated in countries where fresh fish is of significant importance.

### *2.3.1 Architecture of the model*

The aim of the model used in this study is to project up to 2030 the future net supply and the subsequent fish consumption per capita. To achieve this, a simple model was built. This model was applied to define both food use and non-food use consumption. It was also applied at a country level to define for each group of commodities the net supply (see below the list of commodities). The following sequence of steps highlights how the model works.

1- Estimation of the past and present (1989-1998) fish consumption (FC) for each group of commodities. The equations below are quite similar to the ones that are traditionally used with the FAO method, except that the components and results are in units of commodities

instead of units of species. Fish consumption per capita of the commodity group i, where i = 1… n, is based on:

$$FC_i\,(t) = NS_i\,(t) / Population\,(t) \qquad \forall i$$

where $NS_i$ represents the net supply at time t for commodity group i and is defined as follows*:*

$$NS_i\,(t) = Prod_i\,(t) + Im_i\,(t) - Ex_i\,(t) \qquad \forall i$$

where $Prod_i\,(t)$ represents the production of commodity group i at time t, and $Im_i\,(t)$ and $Ex_i\,(t)$ are the imports and exports.

The total consumption TC of all groups of commodities is therefore:

$$TC\,(t) = \Sigma\, NS_i\,(t) / Population\,(t) = \Sigma\,[(Prod_i\,(t) + Im_i\,(t) - Ex_i\,(t)] / Population\,(t)$$

2- Estimation of the future fish consumption:

Per capita future consumption is projected on the basis of: 1- past trends; 2-recent consumption trends identified from consumption surveys and analysis; 3- experts' estimations of fish consumption (mainly fish mongers and fish traders); 4- political and economic events that will affect standards of living (see below for detailed explanations).

Based on the combination of elements that have an impact on future fish consumption, a global growth rate $R_i$ for the period 1999-2030 is subjectively defined for each category of commodities (1 to n). The consumption of commodity group i in 2030 is calculated from:

$$FC_i\,(2030) = FC_i\,(1998)\ x\ (1 + R_i)$$

The annual growth rate $r_i$ is derived from the global growth rate using the geometric average formula:

$$r_i = ln\,[FC_i\,(2030) / FC_i\,(1998)] \qquad \forall i$$

The annual growth rate $r_i$ is used to calculate fish consumption in 2005, 2010, 2015, 2020, 2025 and 2030. For the estimation of the consumption of each commodity group commodities i at the time t + d, where d represents the number of years added to t (1998), the following equation is used:

$$FC_i\,(t + d) = FC_i\,(1998)\ x\ (1 + r_i)^d$$

Based on the fish consumption and the projection for the population at the time t + d, the fish net supply for each commodity group i is defined as:

$$NS_i\,(t+d) = [FC_i\,(t+d)\ x\ Population\,(t+p)]$$

So, for a given country, at time t + d, the total net supply TNS is the sum of the net supply of each commodity group i:

$$TNS\,(t+d) = \Sigma\,[FC_i\,(t+d)]\ x\ Population\,(t+p)$$

At this stage, three main assumptions are introduced. The first one relates to the production of commodities that involves aquaculture products. When there is an increase in aquaculture production:

$$Prod_i\,(t + d) = Prod_i\,(t)\ x\ (1 + ra_i)^d$$

Where the growth rate $ra_i$ of each commodity group i affected by the aquaculture growth is estimated subjectively based on recent trends in the processing of aquaculture species[19]. In practice, 95 percent of commodity production is assumed to remain constant.

The second assumption relates to exports when there is a surplus coming from increased aquaculture that is not absorbed by the national market. In that case:

[19] The surplus of the aquaculture production is channeled into different groups of commodities.

$Ex_i\ (t + d) = Ex_i\ (t)\ x\ (1 + ra\text{-}m_i)^d$

where ra-$m_i$ represents the differential growth rate that results from the increased production of some groups of commodities less their consumption in the country. In practice, 95 percent of exports are assumed to remain constant.

The third assumption relates to imports that are considered to adjust the net supply derived from balancing consumption with production and exports:

$Im_i\ (t + d) = NS_i\ (t+d) - Prod_i\ (t + d) + Ex_i\ (t + d) \qquad \forall i$

When the aquaculture production is stable up to 2030, the equation can be simplified as:

$Im_i\ (t + d) = NS_i\ (t+d) - Prod_i\ (t) + Ex_i\ (t)$

From these two last equations (depending on the status of aquaculture), the import growth rate of each commodity group i can be calculated on the same basis as consumption:

$Im_i\ (2030) = Im_i\ (1998)\ x\ (1 + R_i)$

The annual growth rate $r_i$ is derived from the global growth rate using the geometric average formula:

$r_i = ln\ [Im_i\ (2030) / Im_i\ (1998)]$

The growth rates of consumption, production, imports and exports of commodities, together with the growth rate of aquaculture are provided for each country in Part 2 of this report (country reports).

### *2.3.2 Building the database*

The construction of the database was based on the following steps:

1. Geographical definition of the study that takes into account the enlargement of the European Union, while the temporal definition of the study takes into account the data from the 1989 to1998.
2. Development of a database nomenclature for capture and aquaculture production of species (live weight), and production, imports and exports of commodities (net weight).
3. Development of a table of conversion factors to convert net weight into live weight (from FAO, 1996; Caillard, 1997).
4. Development of a table of commodities/species conversion to express commodities in their original species form (or group of species).
5. Definition of primary and secondary data to be collected, based on the hierarchy we assigned to the different components and flows implicated (see figure Annex 2).
6. Requests to the organizations responsible for compiling and distributing the national and European statistics.
7. Progressive standardization of the data as they were delivered (harmonization according to the FAO nomenclature for Species and OECD nomenclature for products).

**Table 2-1: OECD and FAO nomenclatures used**

| OECD nomenclature (commodities classification) | FAO nomenclature (species classification) |
|---|---|
| Crus., mol. & other aquatic inv., prepared | Freshwater fish |
| Crus., mol. & other aquatic inv., prepared | Diadromous fish |
| Crustaceans | Marine fish, pelagic, tunas |
| Fish, cured | Marine fish, pelagic, small |
| Fish, fillets | Marine fish, demersal |
| Fish, fresh/chilled | Marine fish, others |
| Fish, frozen | Crustaceans |
| Molluscs | Molluscs |
| Prepared/preserved fish | Cephalopods |
| Fish/marine mammal, fat, oil | Aquatic animals |
| Flour, meal unfit for human consumption | Aquatic mammals |

8. Separation of what is intended for human consumption from that which is intended for other uses such as animal food or for aquaculture (fish flours and oils) with the following difficulty: certain species, and in particular the small pelagic ones, are sometimes intended for human consumption and sometimes for the manufacture of flours and oils, which results in a certain imprecision in the use of certain species and thus of equivalences between the products and the species.
9. Analysis of the global coherence of the results obtained and of their feasibility/realism.

### *2.3.3 Deriving assumptions about future trends/projections*

The assumed growth rates for each commodity group within each country were derived using the following steps:

1. Relevant literature was found and studied in order to establish a foundation for projections about future consumption of seafood, its production (capture fisheries and aquaculture) and related international trade.
2. Enquiries were undertaken with the main participants in the commerce of fish and fish products in Europe (wholesalers and institutes that study food consumption).
3. Deriving projections for each of the countries studied (each country assumptions are presented in detail in the part 2 of the report):

    a. The assumed growth rate in consumption is derived from information in existing consumer panel surveys, documentation, interviews and observed trends in net supplies. At the country level, consumption will follow historical patterns for most of the commodities unless there have been recent changes in consumption habits or predicted economic and political changes (e.g., the adhesion to the EU should raise incomes of Eastern countries). In this case the growth is adjusted according to the most likely situation.

    b. Capture fishery production is considered constant, given the stability during the last ten years. Although stocks of some key species are currently at low levels (and hence catches are also at low levels), recovery plans are in place and are expected to return

catches to around the average levels observed over the period of the data used in the analysis (1989-98).

c. Aquaculture production increased considerably during the last ten years and is expected to grow during the coming 30 years. The growth rates assumed for the projections were based on the growth rates observed during the last ten years, with limits - upper and lower - in order to take into account the increasing environmental constraints applying to the European coastline and the difficulties that some aquaculture companies have experienced during the last years.

d. Commodity production, due to the fact that there are still some strong links between capture and processing in most of the European countries (with a few exceptions like German or the Netherlands), is considered to remain constant up to 2030, unless there are some increases in the aquaculture sector.

c. Imports of fish and fish products are considered as responding to meet consumption needs. Thus, when consumption reaches a level that national production cannot assure, imports will increase. The need for aquatic feeds for aquaculture production has also been accounted for. This means for example that the foreseen increase in cultured salmon occurs in parallel with an increase in the imports of fishmeal as the capture of small pelagics is considered to be static/constant.

d. The opposite situation applies to exports. The projections assume that exports will take place when the assumed national fish consumption will not absorb the national production. Re-export trends are not taken into account in the study, and are considered to be constant.

### *2.3.4 Brief discussion of the methodology*

The method employed, which relies on a considerable number of assumptions primarily regarding changes in consumption, is largely based on national trends in fish consumption, and excludes economic factors such as changes in income and price of competing protein sources (e.g. chicken, pork etc). To develop a model that included these factors for each species in each country would have been a considerable task involving substantially more data than were available. Further, the use of such a model would require assumptions regarding future income levels, and the supply of the alternative protein sources for each country and each year. As a result, an even greater number of assumptions would have been required, resulting in potentially greater errors in the projections.

The assumption of constant catches does not affect the estimates of consumption, because it is assumed that any shortfall is made up from imports. If EU stocks do not recover, and European catches remain at low levels, then the model will have underestimated the level of imports. An important assumption, therefore, is that imports will continue to be available, and hence not be subject to reductions due to stock mismanagement. Overexploitation of stocks that supply the imports may result in an overall reduction in the availability of supply, which may in turn constrain consumption. To model such an eventuality would require detailed bioeconomic models of the fisheries that supply the EU. The development of such models was well beyond the scope of this analysis.

The model as it stands can be readily subjected to parameter changes in order to test its sensitivity to the key assumptions or if new information regarding consumption trends arises.

# 3 MAIN RESULTS FOR 2015 AND 2030

Projections relating to the net supply, consumption per capita, imports, exports, production intended for human and non-human consumption are presented below. Tables and figures presented are compiled from national tables (a synthesis table of results is presented in Annex 7). The projections include those countries that may join the European Union.

A presentation of the trends, over the period 1989-1998, related to consumption, production and trade is available in Annex 5.

## 3.1 Consumption 2005–2030

European consumption will be characterized by three important factors over the next 30 years. The first is concerned with changing consumption habits (paralleled by the predominance of supermarkets in the retailing sector), the second deals with ecological concerns, and the third relates to the improvement in the quality of the fish processing industry.

### *3.1.1 Changes in consumption habits and predominance of supermarkets*

Although in terms of volume traditional products continue to be dominant, it is convenience meals and products with sea-fresh appeal that are easy to prepare and eat that are gaining ground. In addition to adapting seafood products to increase their appeal as a normal, easy inclusion in everyday diet, the consumption of seafood in restaurants, hotels and other catering establishments has also increased (Anon., 1990; Backman, 1996).

European consumers are increasingly looking to purchase good quality portion-size fish, boneless, skinless and, if possible, odourless fish fillets, steaks, prawns and other products that are quick and easy to prepare (Richardson, 2002). The profile of the type of product that most retail multiples and their suppliers are aiming to sell in the future is ready-to-cook, partly-cooked or even ready-to-eat dishes with cooking instructions, a serving suggestion and perhaps even a sauce. Although convenience costs money, consumers are increasingly willing (and able) to pay a little extra for that convenience. Time saving, but healthy, nutritious and mess-free dishes are the current trend. Preparing whole fish (and the blood and guts that entails) is a thing of the past.

Most European countries generate well over half of their total seafood turnover through supermarket sales, with the UK, France and Germany selling in excess of 70 percent through retail multiples (Anon., 1999b). Not only do retail multiples rule the domestic seafood market, but through acquisitions, take-overs and mergers, many are now also in a position to command the European market as a single entity. Retail multiples need a steady supply of uniform quality product; it must not be forgotten that their mission is to provide the right product at the right price, week-in and week-out.

### *3.1.2 Organic concerns*

The European demand for organic proteins of all kinds has grown quite dramatically over the last decade. Much of the impetus has come on the back of "food scares", particularly BSE. Indeed, there has been an overall rise in the degree to which consumer choice is dictated by consideration of health benefits, food safety, environmental and animal welfare concerns

(Lappalainen *et al.*, 1998). On all of these counts, organic food scores high. Although consumer attitudes to organic fruit, vegetables, dairy produce and meat are reasonably well documented, there has been less work done on attitudes to organic fish. Such studies as exist indicate that consumers are confused by the concept of "organic" as applied to fish (Cameron *et al.*, 2002).

Much of this confusion stems from the fact that many consumers are unaware that the salmon they buy from the supermarket is farmed. The distinctions between "organic", "natural" and "wild" remain blurred in the shopper's mind. Further potential confusion - for both consumers and producers - arises from the plethora of organic standards within Europe, and the fact that other production standards (e.g. Label Rouge in France) may seem to offer similar guarantees of high quality and good standards of husbandry (International Consumer Research and Testing Ltd. 1995).

At present, organic salmon production contributes a small fraction of the total in both Scotland and Ireland; in Norway, it is practically non-existent, in France it is in its infancy. Producers feel that there is scope for a steady increase in the market for organic fish, and are confident that demand will continue to outstrip supply (Anon., 1998b). However, the switch to organic production is a long, costly and potentially risky business and it is hampered by the drop in productivity needed to meet organic standards (a significant aspect in all organic production practices is the issue of transition from the "traditional" practice to organic production), the high cost of certification and the lack of regulation of private certification bodies (Charles and Paquotte, 1998). If common and transparent standards, based on sound science, are introduced, the future could be bright in some selected markets (EIFAC, 2001).

### *3.1.3 Quality improvement*

Doubts about intensive farming methods have over the recent period resulted in consumers being ready to pay more for quality products. There is a much better chance of getting products accepted by the consumer, even at high prices. People are beginning to realize that the emphasis on very cheap food products cannot continue, creating more opportunities for quality products (Honkanen *et al.*, 1997; Ilbery and Kneafsey, 2000).

This assertion is currently leading the fishing industry to promote worldwide consumption of high quality seafood products at the retail and catering levels. Quality will be the leitmotiv of the processing industry. To achieve this, frank communication and sincere cooperation between boat-owners (upstream industry), packers (midstream industry) and marketers (downstream industry) are the first steps. Better information and a wider range of products free of any chemicals or genetic modification (GM) will satisfy consumers.

The processing industry is setting up some strategy to improve fish quality from capture to the consumers' plate. In return for efforts made toward better quality fish, consumers will pay premium prices for these quality fish - a win-win situation for both parties. Therefore, the mission of the industry should be to ensure good catching practices and uphold a principle that only good quality fish should be delivered to packers, instead of primarily focusing on

limiting the supply of fish, or fixing fish selling prices[20]. From the industry point of view, a quality product is the only key to boosting consumers' consumption of products.

### *3.1.4 Consumption per capita 2005-2030*

Consumption per capita represents the total apparent consumption divided by the number of inhabitants of a country. The consumption can be made at home or outside, mainly through the gathering. The consumption per capita is an indicator of the overall consumption, but it doesn't reflect internal changes in fish consumption. For example, in Spain, the current consumption per capita is decreasing due to the diminution of frozen fish while the consumption of prepared/preserved is going up. Consumption patterns will be as follow for the EUR-28 countries:

- Increasing: Austria, Belgium-Luxembourg, Denmark, Finland, France, Germany, Greece, Italy, Netherlands, United Kingdom, Czech Republic, Hungary, Poland, Slovenia, Bulgaria, Latvia, Lithuania, Malta, Romania and Slovakia;
- Decreasing: Ireland, Portugal, Spain, Sweden, Cyprus, Estonia, and Norway.

[20] Packers should also take initiatives to make sure that the total-quality concept is addressed in all steps of their production processes in order to provide the quality products desired by the market. Packers and marketers/ distributors should work closely together to create higher quality and value-added seafood products, as well as innovations. These premium products should enhance the market demand for seafood products.

**Table 3-1: Consumption per capita for all EUR-28 countries from 2005 to 2030**

(kg/caput/year)

| | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | % 98-30 | # 98-30 |
|---|---|---|---|---|---|---|---|---|---|
| Austria | 11 | 11 | 11 | 12 | 12 | 12 | 13 | 17 | 2 |
| Belgium-Luxembourg | 22 | 22 | 22 | 23 | 23 | 23 | 24 | 9 | 2 |
| Denmark | 24 | 24 | 25 | 26 | 27 | 28 | 29 | 24 | 6 |
| Finland | 34 | 34 | 35 | 35 | 36 | 36 | 37 | 8 | 3 |
| France | 31 | 32 | 32 | 32 | 32 | 33 | 33 | 4 | 1 |
| Germany | 13 | 15 | 15 | 16 | 16 | 17 | 18 | 23 | 3 |
| Greece | 26 | 26 | 26 | 26 | 27 | 27 | 27 | 3 | 1 |
| Ireland | 21 | 21 | 21 | 21 | 21 | 21 | 20 | -5 | -1 |
| Italy | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 24 | 6 |
| Netherlands | 16 | 15 | 15 | 15 | 15 | 16 | 16 | 6 | 1 |
| Portugal | 61 | 60 | 59 | 59 | 58 | 58 | 57 | -7 | -4 |
| Spain | 41 | 40 | 39 | 39 | 39 | 39 | 39 | -5 | -2 |
| Sweden | 27 | 28 | 28 | 27 | 27 | 27 | 27 | -5 | -2 |
| United Kingdom | 22 | 24 | 24 | 25 | 25 | 25 | 25 | 4 | 1 |
| **EU-15 Average** | **24** | **26** | **26** | **26** | **26** | **27** | **27** | **6** | **2** |
| Cyprus | 22 | 25 | 24 | 24 | 23 | 23 | 23 | -10 | -2 |
| Czech Republic | 9 | 10 | 10 | 11 | 11 | 12 | 13 | 42 | 4 |
| Estonia | 21 | 14 | 14 | 14 | 14 | 14 | 14 | -5 | -1 |
| Hungary | 4 | 5 | 5 | 5 | 5 | 6 | 6 | 42 | 2 |
| Poland | 12 | 12 | 13 | 13 | 14 | 15 | 16 | 41 | 5 |
| Slovenia | 7 | 7 | 7 | 8 | 8 | 8 | 9 | 34 | 2 |
| **EUR-6 Nc Average** | **10** | **10** | **11** | **12** | **12** | **13** | **14** | **41** | **4** |
| Bulgaria | 3 | 5 | 5 | 6 | 6 | 7 | 7 | 60 | 3 |
| Latvia | 41 | 37 | 37 | 38 | 38 | 38 | 39 | 4 | 2 |
| Lithuania | 18 | 17 | 19 | 21 | 23 | 25 | 27 | 81 | 12 |
| Malta | 27 | 30 | 31 | 32 | 33 | 34 | 36 | 24 | 7 |
| Norway | 46 | 46 | 45 | 45 | 45 | 45 | 45 | -3 | -1 |
| Romania | 3 | 3 | 4 | 4 | 4 | 5 | 5 | 58 | 2 |
| Slovakia | 7 | 6 | 6 | 7 | 7 | 8 | 8 | 55 | 3 |
| **EUR-7 NC Average** | **11** | **11** | **11** | **12** | **12** | **13** | **13** | **1** | **0** |
| **EUR-28 Average** | **21** | **22** | **22** | **23** | **23** | **24** | **24** | **9** | **2** |

Source: database

The general consumption trend for EU-15 countries shows a rise in the consumption of seafood products (Anon., 1993; GLOBEFISH, 1995; Eurostat, 1998; Laureti, 1999; Anon. 2001h). This increase is largely due to the rise in the consumption of convenience products, reflecting that consumers have less time available for preparing meals. Frozen products trend downward, whilst the consumption of fresh fish is stagnant or decreasing. The growing dominance of supermarkets in the retail of seafood products increases their availability and

hence consumption. In addition, the growing emphasis on healthy eating, triggered in part by various food crises (e.g. BSE, dioxin), is another determinant in the positive seafood consumption trend.

In Austria, main consumption trends between 2005 and 2030 assume an increase in the demand for higher value products and species (for example cephalopods, crustaceans, prepared molluscs, cured fish, fish fillets, frozen fish and molluscs) that will lead to an increase in per capita consumption of around 2 kg/c/yr, reaching 13 kg/c/yr by 2030. Healthy eating and the demand for environmentally friendly products will be the two factors driving Austria's consumption of seafood. A similar trend will be seen in neighbouring Germany, with a shift away from traditional patterns of consumption in favour of products from the fish fillets and prepared/preserved groups. By 2030 annual per capita consumption of seafood products will reach nearly 18 kg/c/yr.

Per capita consumption will also rise in Belgium to reach 24 kg/c/yr by 2030, largely due to an increase in prepared/preserved products that reflect the demand for ready to eat products due to diminished time available for meal preparation. This will also negatively impact consumption of traditionally eaten products such as flatfish and mussels.

The same trend towards "food on the move" products is experienced in the Netherlands with prepared/preserved products and fish fillets on the increase. Another trend towards higher value and more exotic commodities such as cephalopods is seen, bringing the annual consumption per capita up to 16 kg/c/yr in 2030.

The assumption of changes in consumer demand for various commodities in Denmark lead to some redistribution of consumption levels between product groups, with a net increase in the consumption of fish fillets and frozen fish. To a lesser extent, the consumption of prepared molluscs also increases, whilst that of cured fish and fresh crustaceans follows a downward trend. As the net supply will grow by more than 30 percent between 2005 and 2030, but over the same period the population will grow by only 6 percent, the apparent annual per capita consumption will increase from 25 kg/c/yr to nearly 20 kg/c/yr in 2030.

Consumption per capita in Finland will reach 37 kg/c/yr in 2030 due to the Finns' positive attitude to fish, which is considered to be a light foodstuff with a high nutritional value and a reasonable price (Guillotreau and Le Grel, 2001). Most of the increase will be based on increased consumption of prepared crustaceans and molluscs, as well as fresh/chilled fish. Cheap salmon from Norway will continue to increase its market share at the expense of locally produced rainbow trout.

In France, consumers choose crustaceans, molluscs (both fresh and prepared), fresh fish and fish fillets. The apparent per capita consumption of fish and seafood products will increase by 2 kg/c/yr to reach 33 kg/c/yr in 2030.

By 2030, apparent per capita consumption of fish products in Greece will increase slightly from 26kg to 27 kg/c/yr. Sociological changes such as a reduction in the time allowed for, and a shift away from traditional methods of preparing of a meal, together with an increase in the number of women pursuing careers will lead to an increase in the consumption of convenience foods. The same sociological changes impact the consumption pattern amongst Spanish consumers, although in this instance the per capita consumption will fall over the period to 39 kg/c/yr in 2030. In Spain, the decreased demand for products traditionally consumed (fresh fish and unprepared frozen commodities) cannot be offset by an increase in the consumption of convenience products. Portugal also sees its per capita consumption fall, from 61 kg/c/yr in 1998 to 57 kg/c/yr in 2030, largely due to stagnation in the demand for its main product (dried and salted cod) as a result of supply problems.

The demand for prepared/preserved products will also influence Italian seafood consumption, largely because these packaged and labelled goods offer quality and assurance in terms of health. The growing role of supermarkets in the distribution of seafood products (making them more readily available to consumers) will also have a positive influence on Italian per capita consumption, which will increase from 24 kg/c/yr to 29 kg/c/yr by 2030.

The UK seafood market will also be affected by the trend for ready meals and "food on the move" as British consumers seek more convenience food, mostly available in supermarkets, to fit in with their increasingly busy lives. Demand for fresh and frozen fish will consequently decrease, and British consumption per capita will increase by only 1 kg/c/yr to reach 25 kg/c/yr in 2030. Despite some increase in fresh fish consumption, Irish seafood

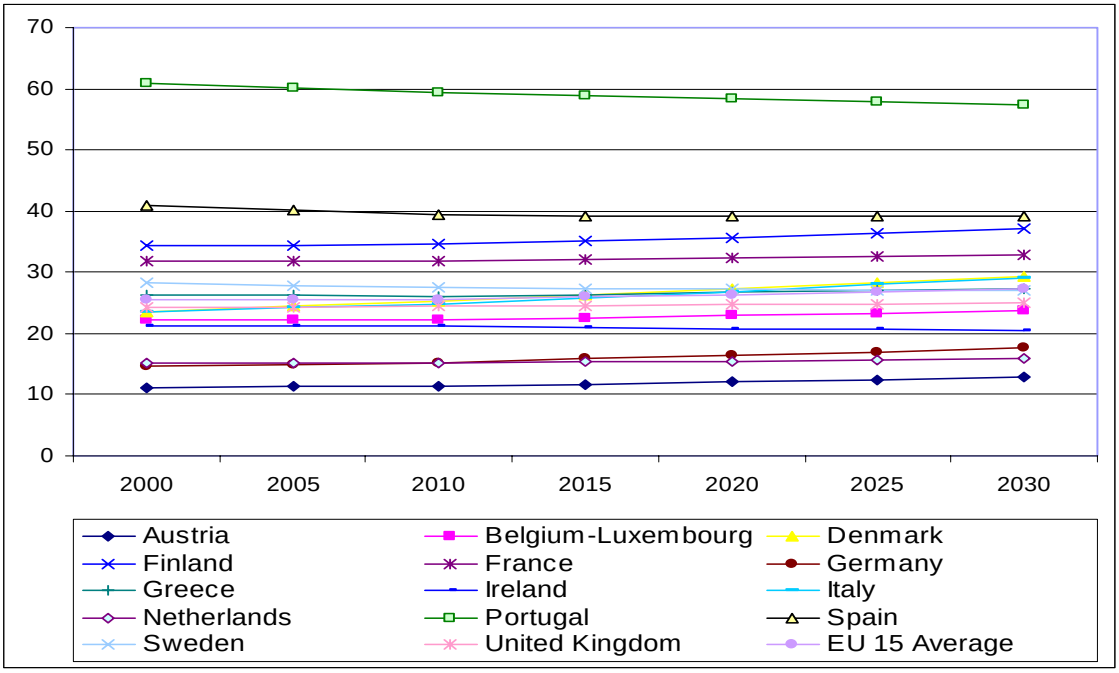


**Figure 3-1: Fish consumption in the EU-15, from 2005 to 2030 (kg/caput/year)**

consumption per capita decreases slightly to 21 kg/c/yr, as consumption is slower than the population growth rate and younger generations appear to have less taste for fish products.

In general, former communist countries within this group (with the exception of Estonia) see an increase in per capita consumption largely thanks to an improvement in their economic situation. Consumption moves away from traditional freshwater species and towards marine products. Of these, the consumption of frozen fish tends to increase more slowly than before, and small pelagic species are increasingly replaced with higher value species such as diadromous fish and large pelagic or demersal species. Consumption patterns in Cyprus are similar to those in other Mediterranean countries such as Spain and Portugal, also experiencing a decrease in per capita consumption.

Per capita consumption in Cyprus will fall to 23 kg/c/yr in 2030, mostly because the net supply will not be able to keep up with rapid population growth. There also appears to be a change in the pattern of consumption, with consumers moving away from fresh fish products (that increase only marginally over the period) and towards prepared/preserved products, which enjoy a dramatic increase. This is a reflection of the changing tastes of younger consumers who are increasingly reluctant to prepare fresh fish themselves and instead turn to convenience products.

As for other former communist countries, the improved economic conditions in the Czech Republic lead to a shift away from cheap frozen products towards higher quality prepared and preserved products and more exotic species such as cephalopods and crustaceans. In terms of species, marine fish are mostly responsible for the increase in consumption to 13 kg/c/yr.

Hungary, another landlocked country, sees a decrease in the consumption of fresh water fish and a move towards marine species. This leads to a shift away from fresh fish and traditional species (largely freshwater species) towards frozen products and prepared/preserved products (e.g., canned large and small pelagic species). Regional economic disparities will gradually disappear, leading to an overall increase in fish consumption of 2 kg/c/yr, from 4kg to 6 kg/c/yr.

In Estonia, the increase in consumption of prepared/preserved products, fresh fish and fish fillets will not be sufficient to offset the decrease in consumption of frozen fish and imported crustaceans, as Estonian consumers will favour quality over quantity. In addition, meat seems to have replaced fish as the primary component of the Estonian diet since the collapse of the centrally planned economic system. Consequently consumption per capita will slightly decrease from above 14 kg/c/yr to below 14 kg/c/yr.

An improvement in the economic situation will also be the main contributing factor to changes in the consumption of fish products in Poland. Consumption per capita will rise from 12 kg to 16 kg/c/yr in tandem with the increasing wealth of the population (Anon., 2001a). Consumers will increasingly target higher value products, such as crustaceans, large pelagic species (tuna) and diadromous fish (trout and salmon).

The demand for convenience products (included in the prepared/preserved products denomination) is driving the increase in fish consumption in Slovenia as the number of single and childless households is on the rise, primarily due to young people waiting longer to have a family, and more women entering the professional job market. Consumption per capita will increase from 7 kg to 9 kg/c/yr by 2030.

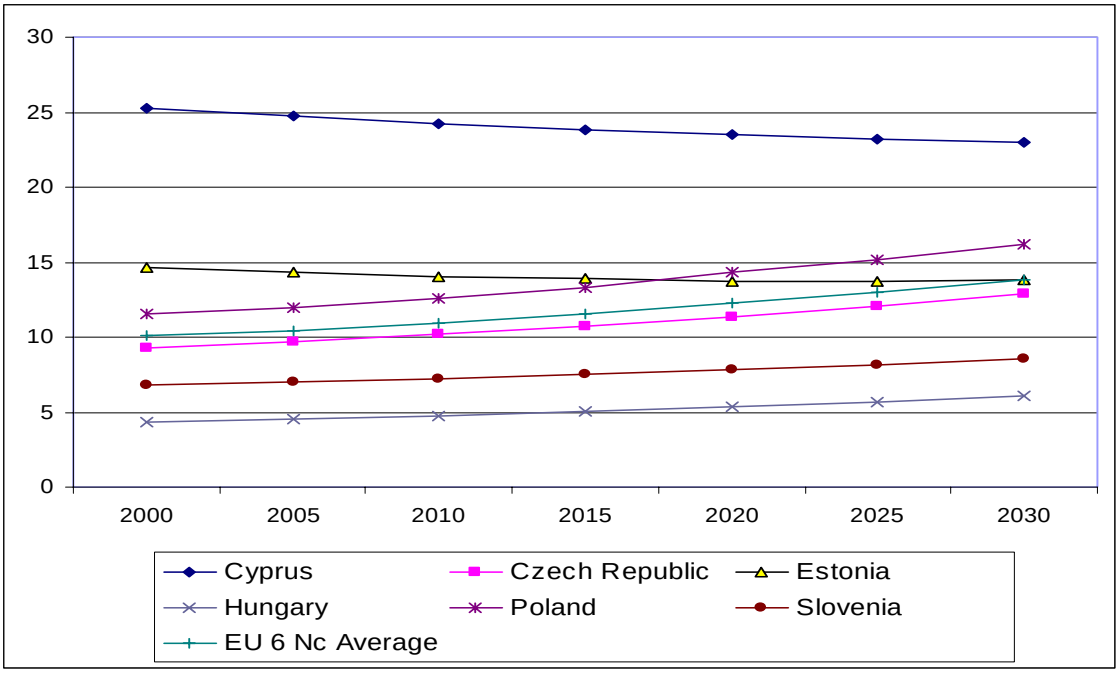


**Figure 3-2: Fish consumption in the EUR-6 NC, from 2005 to 2030 (kg/caput/year)**

The improvement in economic conditions is the main force behind the increased per capita consumption in the former communist countries of the EUR-7 NC group. Frozen fish still accounts for the bulk of fish consumption, but the variety of species in this group increases with small pelagic losing ground to demersal species or other more exotic species such as crustaceans, molluscs and cephalopods. Freshwater fish are gradually replaced by marine species, as the latter are often easier to prepare, offer a wider variety of taste and are made increasingly available thanks to the spread of supermarkets throughout these countries. Baltic countries are the main consumers within the group, while Slovakia, Romania and Bulgaria remain small seafood consumers due to a lack of seafood tradition. Maltese and Norwegian consumption reflect the southern and northern EU-15 pattern respectively.

Improved economic conditions affect Latvia's very high level of seafood consumption, which will reach 39 kg/c/yr by 2030. Commodities that will benefit the most from consumer demand are higher value commodities such as crustaceans, fish fillets and fresh fish that people could not afford before.

By 2030, seafood consumption in Lithuania will have increased dramatically (from 17 to 27 kg/c/yr) because consumption levels were very low during the 1990s for this traditionally fish eating nation. Fresh fish and cephalopod products benefit the most from the increased Lithuanian consumption, reflecting the same trend for higher value commodities as neighbouring Latvia.

Slovakia is becoming a wealthier market and the standard of living and per capita disposable income are high compared to many other European Union accession countries. This will drive consumption per capita up to 8 kg/c/yr by 2030.

The growth in Bulgarian fish consumption can be explained by the abnormally low level of consumption during the 1990s coupled with an expected rise in the standard of living. In addition, the expansion of the range of new products available to Bulgarian consumers

together with the increased availability of seafood products as a result of the spread of supermarkets throughout the country will drive per capita consumption from 5 kg to 7 kg/c/yr in 2030. Although neighbouring Romania will be influenced by the same factors, per capita consumption will reach only 5 kg/c/yr in 2030.

Norwegian per capita consumption of fish will decrease to 45 kg/c/yr, as the net supply increases more slowly than the population and young people are reported to be buying less fish than older generations (OECD, 2003). Fish consumption still remains very high and is reported to be increasing in urban areas where the convenience food and healthy eating sectors are increasingly dynamic.

Malta's per capita consumption will reach 36 kg/c/yr in 2030, largely due to an increase in the consumption of prepared/preserved products (canned salmon and prepared tuna and mackerel) and fresh fish (tuna, dolphinfish and salmonids).

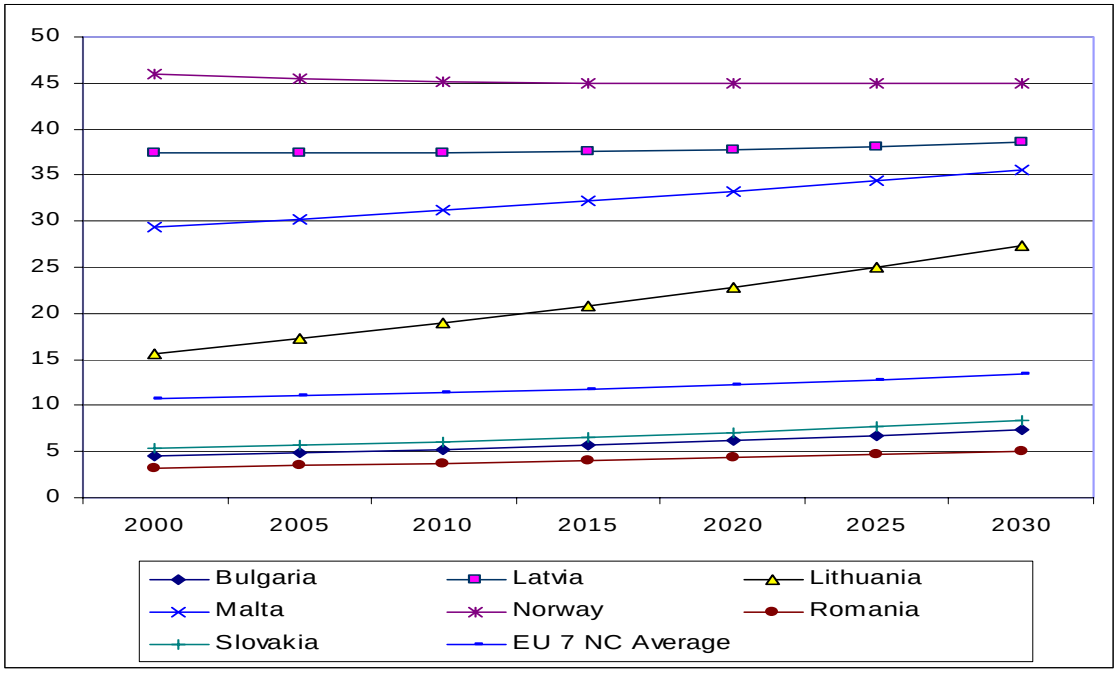


**Figure 3-3: Fish consumption in the EUR-7 NC, from 2005 to 2030 (kg/caput/year)**

### *3.1.5 Main species and commodities consumed 2005–2030*

The species consumed in 2030 will be the same as those consumed in 2005 since all of the important stocks of fish in the world are already exploited. Some marine species, such as cod or other demersals, may be produced by aquaculture but this is only a shift in the means of production, and not the introduction of new species (Sutherland, 1997). Deep-sea fishing, for which many had great hopes, has already demonstrated its limits. In short, any changes over the next 30 years in terms of species will be simply a case of change in market share.

Overall, the main groups of species consumed in 2030 will be the same as those in 1998. Furthermore, these groups will account for the same share of total consumption. Marine demersal fish such as cod, Alaska pollock and hake will be the dominant white fish species. Groundfish will account for about 40 percent of the total consumption of fish in the EUR-28 (taking into account the category "marine fish other", which is mainly demersal fish used as

the raw material for prepared commodities). The EUR-28 consumers will eat about 9 kg/c/yr of demersal fish in 2030, with tuna and small pelagic species accounting for 15 percent and 14

percent respectively (compared to 14 percent each in 1998), which corresponds to a consumption rate of 3.6 and 3.4 kg/c/yr. The majority of the tuna and small pelagic species will be consumed as canned produce. However, in northern European countries the latter will also be consumed pickled.

Of the total species consumed in 2030, crustaceans, cephalopods and molluscs will account for 7 percent, 4 percent and 7 percent by weight respectively (about the same share as in 1998). To break these groups into species, per capita consumption of shrimp, crab and lobster will be 1.7 kg/c/yr, consumption of squid, cuttlefish and octopus will be about 1 kg/c/yr, and consumption of mussels, oysters, scallops and other molluscs will be about 1.7 kg/c/yr. Over the next 30 years, the consumption of crustaceans will increase by 25 percent, with cephalopods and molluscs both increasing by 17 percent.

Between 1998 and 2030, the consumption of freshwater and diadromous fish will increase by 6 percent and 12 percent respectively. The annual per capita consumption of carp, eel, perch and pike will be around 400 kg/c/yr, whilst that of salmon and will be about 1.7 kg/c/yr. Landlocked European countries will continue to consume freshwater fish, but increasingly in the form of prepared dishes and not as fresh, whole fish as before. Salmon and trout will continue their market penetration, but Norwegian and Scottish fish farmers will have to change their strategy (up to now based on the comparative price advantages compared to white fish) because of a selling price that nearly corresponds with the cost of production, indicating that there is no room for further price reduction (Anon., 1994; Asche and Bjondal, 2002). In short, fish farms will have to innovate in order to add further value to their product.

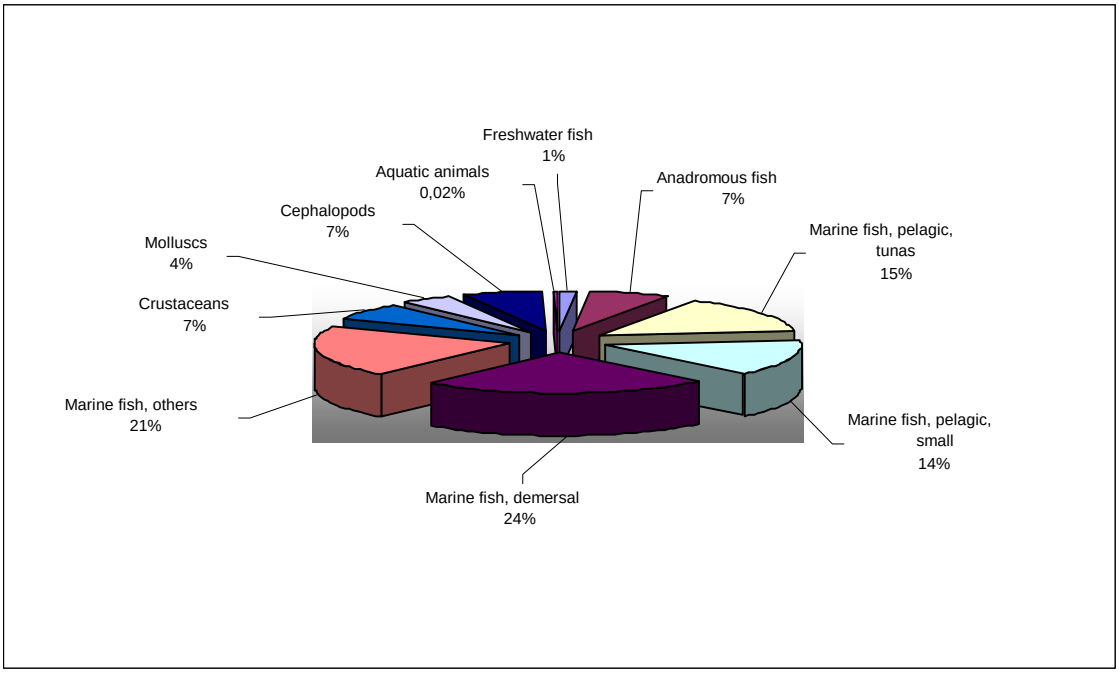


**Figure 3-4: Main FAO group of species consumed by the EUR-28 in 2030**

Over the next 30 years, consumption of commodities will change. Frozen fish commodities (showing a decrease of 1 percent) will lose some market share, falling from 18 percent in 1998 to 16 percent in 2030. The significant loss in the EU-15 will be partially compensated

for by a slight increase in the EUR-6 and EUR-7 NC. Consumers will increasingly lose interest in frozen fish commodities because of the negative appearance of frozen fish when compared to fresh or prepared fish products. The importance of long-term (and safe) conservation of frozen fish will decrease in the face of improvements in the transport and distribution of fresh fish throughout Europe. Nonetheless, the annual per capita consumption of frozen fish will be 3.8 kg/c/yr.

Prepared/preserved fish commodities will significantly increase in order to meet the demand of EUR-28 consumers; the share of total consumption for which they will account going from 25 percent in 1998 to 28 percent in 2030, equivalent to 6.7 kg/c/yr. Among prepared/preserved products, canned tuna, herring, mackerel and European pilchard (the main component of this category in 1998) will remain stable over the next 30 years, whilst ready-to-eat commodities will grow considerably, largely accounting for the overall increase. Prepared crustaceans, molluscs and other invertebrate will follow the same trend as prepared fish, with a growth of about 28 percent between 1998 and 2030. Their share of total consumption will remain the same at 2 percent. In prepared commodity production, the European industry will have to compete with developing countries that have invested heavily in their own industry, with Asian countries such as Thailand and the Philippines leading the way. These countries are now moving from the production of semi-processed to fully processed commodities that can enter directly into the consumption market in developed countries without passing through their plants for the final production process. In short, Europe will no longer have the advantage of adding the final touches to fish commodities; it will have to share it with countries that have numerous advantages over it (cheap running costs, proximity of fishing grounds, etc.).

The improvement of transport infrastructures and the distribution system (notably through supermarkets) will facilitate the movement of fresh products to the interior regions of the EUR-28. Although this category will suffer at the hands of young consumers who prefer ready-to-eat fish products, it will benefit from the growing concern about healthy eating (especially true of marine and organically farmed fish). Overall, fresh fish and fish fillets will increase by 9 percent and 21 percent respectively. Fish fillet commodities will profit from the fact that it is a product that does not require further preparation (apart from cooking) and is free of bones. In 2030, consumption of fish fillets will be 5 kg/c/yr (compared to 4.4 kg/c/yr in 1998) and that of fresh/chilled fish 2.1 kg/c/yr (compared to 2.2 kg/c/yr in 1998).

Cured fish, despite an increase in consumption of 9 percent between 1998 and 2030, will have a reduced share of the commodities that EUR-28 consumers will choose in 2030 (from 8 percent in 1998 to 7 percent in 2030). The increasing consumption of smoked salmon will be counterbalanced by a diminution of traditional smoked carp and eels in Eastern European countries. Consumption of salted and dried cod will also suffer from a lack of interest from young consumers even though the Spanish and Portuguese have consumed large amounts of salted and dried salted cod from Norway for centuries. The market for these products is decreasing because modern consumers feel that the preparation time is too long. The fish has to be desalted for at least one day before it can be prepared. The cod industry in Spain, Portugal and Norway is now developing methods to produce desalted products from wet- and dry-salted cod in order to countervail the decline of the consumption of this traditional product.

Fresh or chilled crustaceans and molluscs will account for 7 percent and 3 percent respectively of the consumption in 2030. The share of the crustacean category in the total

consumption will be increased by 1 point (7 percent in 2030 compared to 6 percent in 1998), and molluscs will remain the same: 3 percent both in 1998 and 2030. That represents a consumption of 1.7 kg/c/yr of crustaceans and 700 kg/c/yr of molluscs. Cephalopods consumption will increase by 17 percent over the period and will account for 7 percent of the total consumption with a level of 1.7 kg/c/yr in 2030.

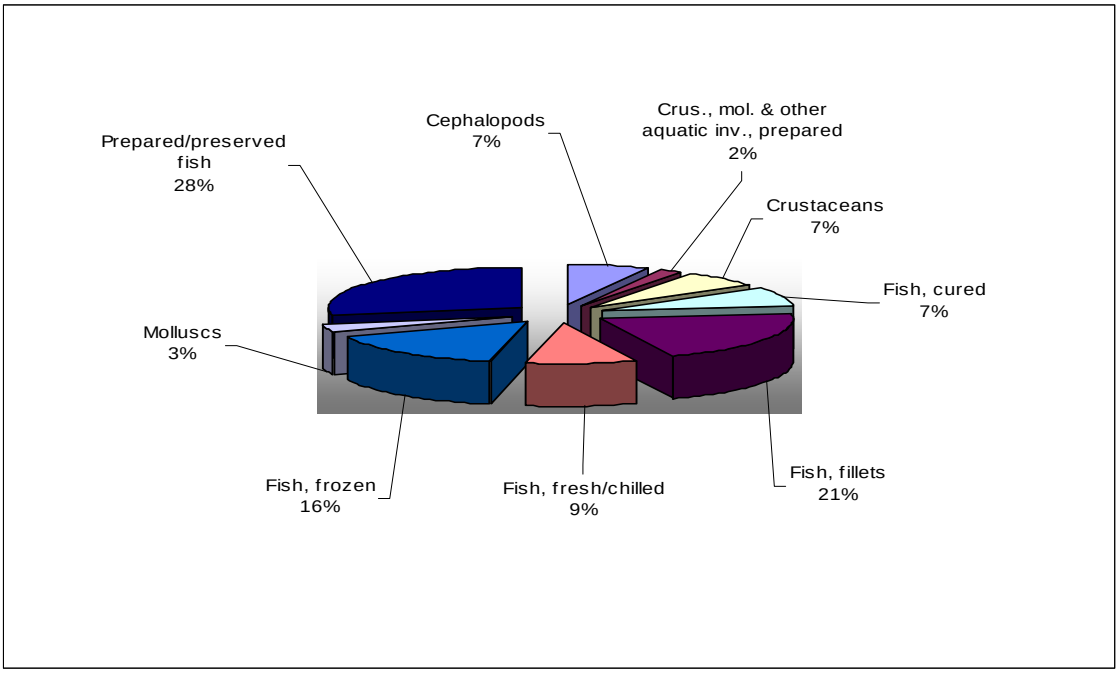


**Figure 3-5: Main OECD group of commodities consumed by the EUR-28 in 2030**

The main species consumed by the EU-15 countries in 2030 will remain mostly the same as the ones in 1998, with only their share of total consumption changing. Species changes will be the result of changes in commodities consumption and in commodities components. The diminishing consumption of certain type of products like dried salted cod will lead to a decrease of cod if it is not compensated for by an increase in the consumption of fresh or prepared cod. Limitation of raw material due to the difficulty of landing of particular species (for example cod or haddock in the EU after the closure of the North Sea fisheries in 2002/2003) will result in changes of the share between species.

In 2030, the ten main species chosen by consumers in the EU-15 countries will be tuna, cod, salmon, shrimp, herring, hake, common squid, Alaska pollock, haddock and skipjack tuna. These species will see an increase of between 2 percent (hake) and 33 percent (Alaska pollock). Of these ten, salmon and shrimp will be the main two species produced by aquaculture, while the rest will largely remain wild species. With groundfish falling under the category “Other species”, which will account for 28 percent of consumption, white fish will continue to dominate patterns of consumption in 2030.

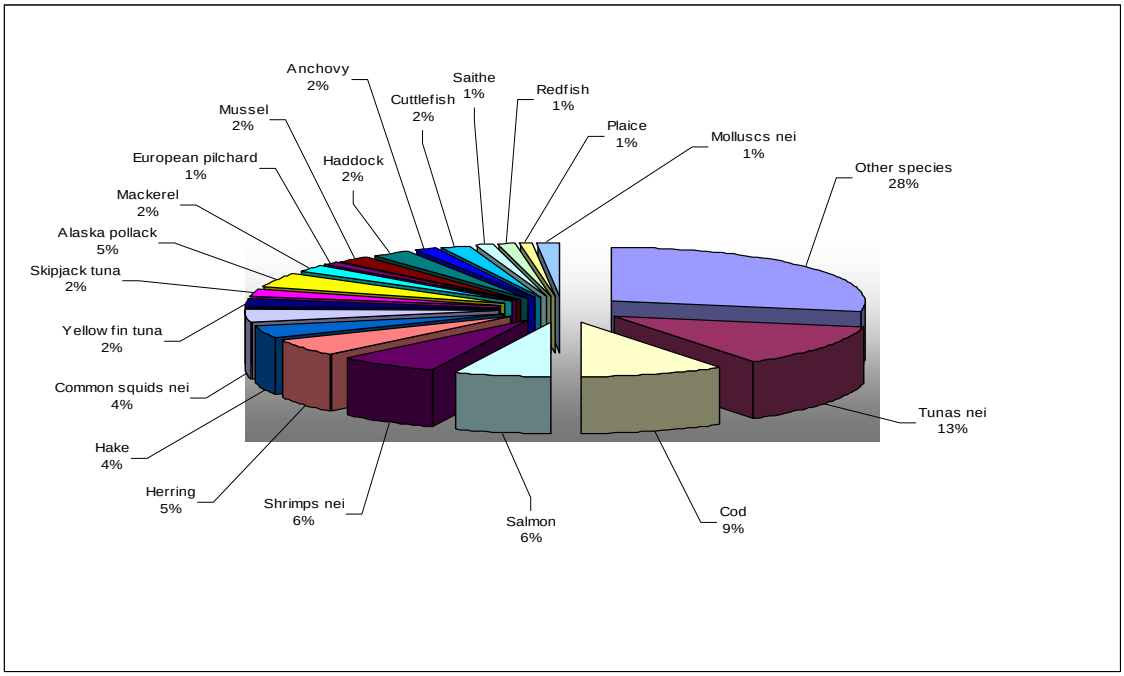


**Figure 3-6: Main species consumed by the EU-15 in 2030**

Consumers in the EUR-6 NC countries will concentrate their purchasing power on nine main species: herring, mackerel, Alaska pollock, hake, sprat, tuna, salmon, carp and cod. Tuna will experience the highest growth rate of 80 percent, largely due to a shift away from traditional cured products made from freshwater fish towards prepared/preserved commodities. The opening of the Eastern European economy to Western Europe and the rest of the world, combined with increased purchasing power will lead to a substantial expansion of the range of products available to EUR-6 NC consumers.

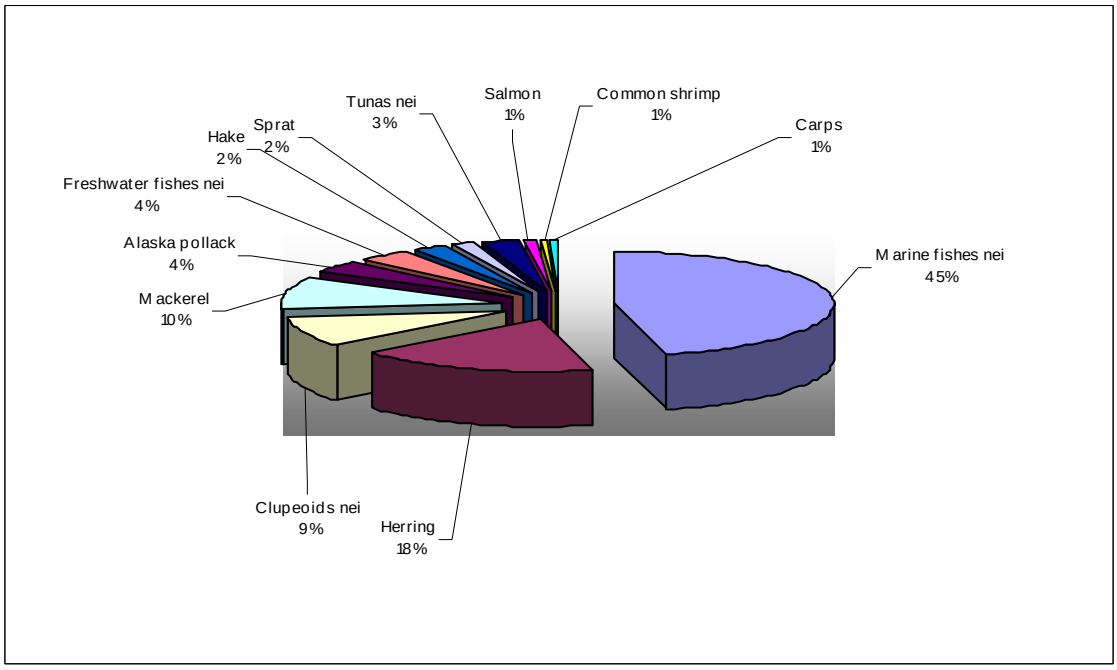


**Figure 3-7: Main species consumed by the EUR-6 NC in 2030 (kg/year/capita)**

The EUR-7 NC countries will largely retain the same consumption profile, but will progressively introduce new products into their markets (Trondsen, 1999). For example,

shrimp and tuna will be increasingly displayed in fishmongers and in supermarkets. However, mackerel, cod, herring, haddock, salmon and various molluscs will continue to be the principle species consumed in 2030. Salmon will see the highest growth rate with an impressive 230 percent between 1998 and 2030. Salmon is increasingly competitive in terms of price compared to wild white fish, and will consequently enter some central European markets where there is a significant niche for this species, be it fresh/chilled or cured.

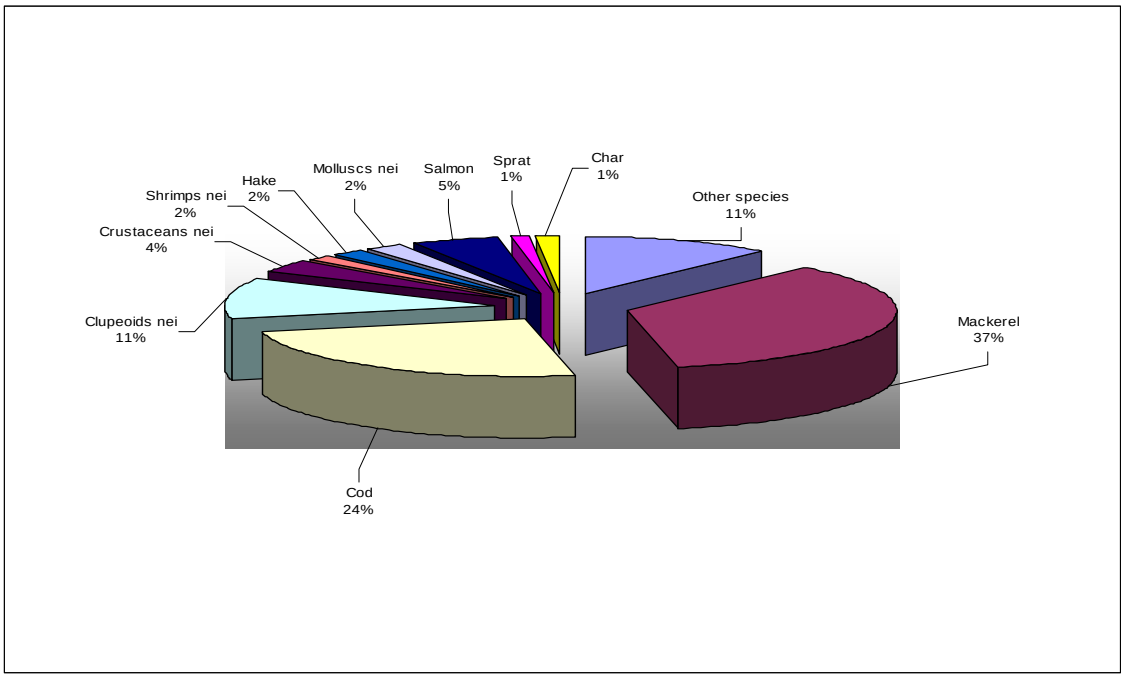


**Figure 3-8: Main species consumed by the EUR-7 NC in 2030 (kg/year/capita)**

Overall, species consumption will remain the same in the EU-15 while it will be more varied in former countries of the soviet bloc. Thus, consumption habits will keep changes within certain limits and will reinforce the importance of prepared products. Species will not be affected by changes but commodities shapes will change significantly giving a new challenge for the EUR-28 industry.

## 3.2 Net supply 2005–2030

The net supply of food use commodities at the European level is the aggregated result of the projection of national consumptions translated into national production, imports and exports of fish for human consumption. As production is more or less stable, except in countries where there may be growth in aquaculture, the evolution of the net supply of fish will largely be a consequence of variations in imports.

Globally, the net supply of fish for human purposes will increase by 2 Mt reaching 12.2 Mt in 2030, whilst non-food use commodities will remain more or less stable for the next three decades at around 4 Mt.

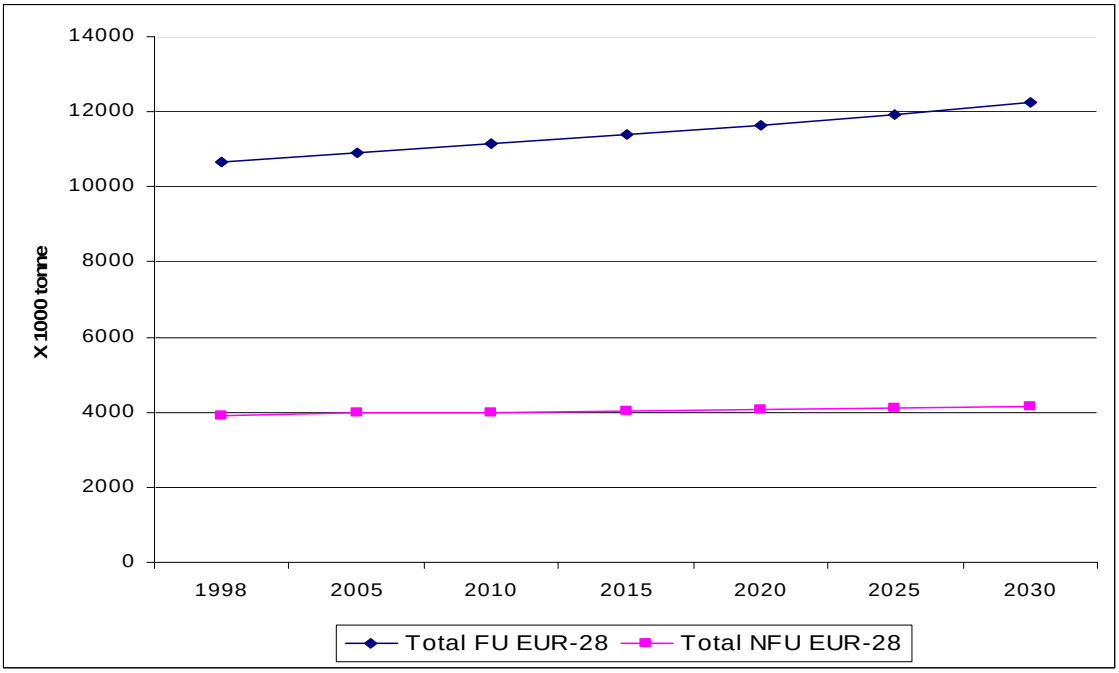


**Figure 3-9: Food use and non-food use by the EUR-28 from 1998 to 2030**

### *3.2.1 Food use net supply 2005–2030*

Population growth in EUR-28 countries is slower than that of the net supply of fish, which indicates that the increase in apparent consumption is not attributable to this factor (see Annex 4 for population growth). The increase in the net supply of fish is largely due to the increase in individual consumption. In other words, people in the EUR-28 will eat more fish in 2030 than they did in 1998 (see next section on consumption for details).

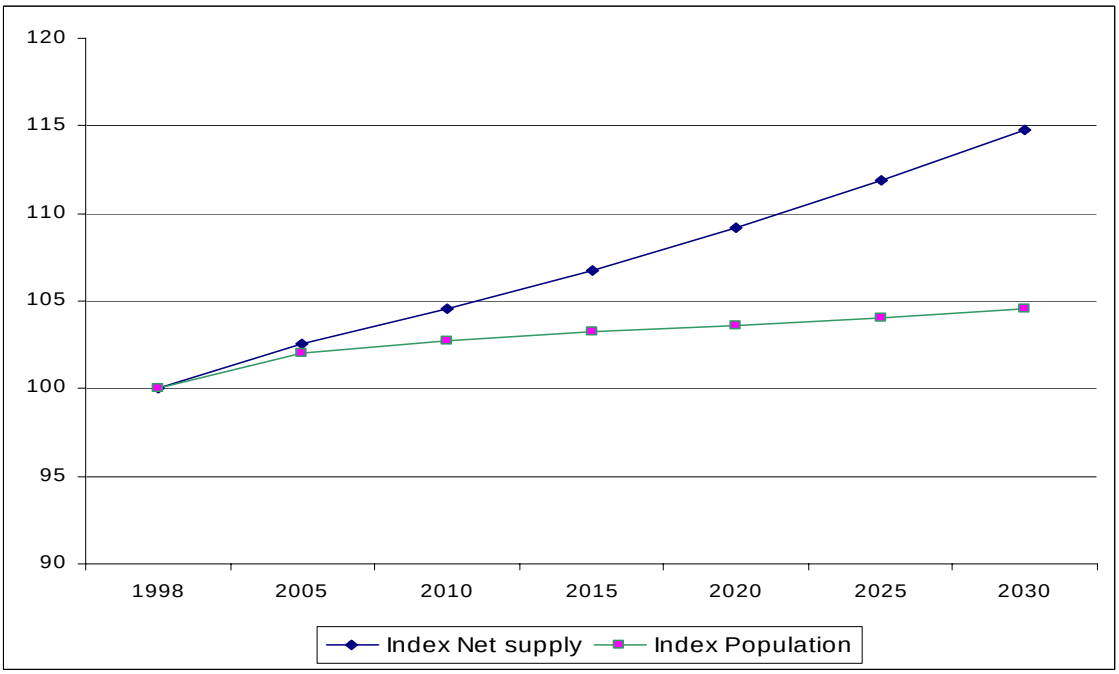


**Figure 3-10: Comparative growth index of EUR-28 population and fish net supply from 1998 to 2030**

There are some differences at the country level (see Annex 15). Some countries will experience a stable apparent consumption (e.g. Spain, Ireland, the Netherlands, Norway) while others will face a significant increase (e.g. Denmark, Finland, Poland, Lithuania, Malta).

Overall, between 1998 and 2030, the EUR-28's apparent consumption (or the net supply of fish) will see an increase of 2 Mt, from 10.2 Mt to 12.2 Mt In 2030, EU-15 will still have the greatest share of the net supply (10.6 Mt), whilst the EUR-6 NC and EUR-7 NC will have only 900 000 tonnes and 700 000 tonnes respectively. However, in terms of growth, the EU-15 net supply will increase by only 12 percent, which is low compared to that of the EUR-6 NC (43 percent) and EUR-7 NC (35 percent); overall, the growth rate will be 15 percent. This means that even if a large part of the growth in volume is coming from the EU-15, over the next thirty years the 13 candidate countries will increasingly contribute to the rise in apparent consumption.

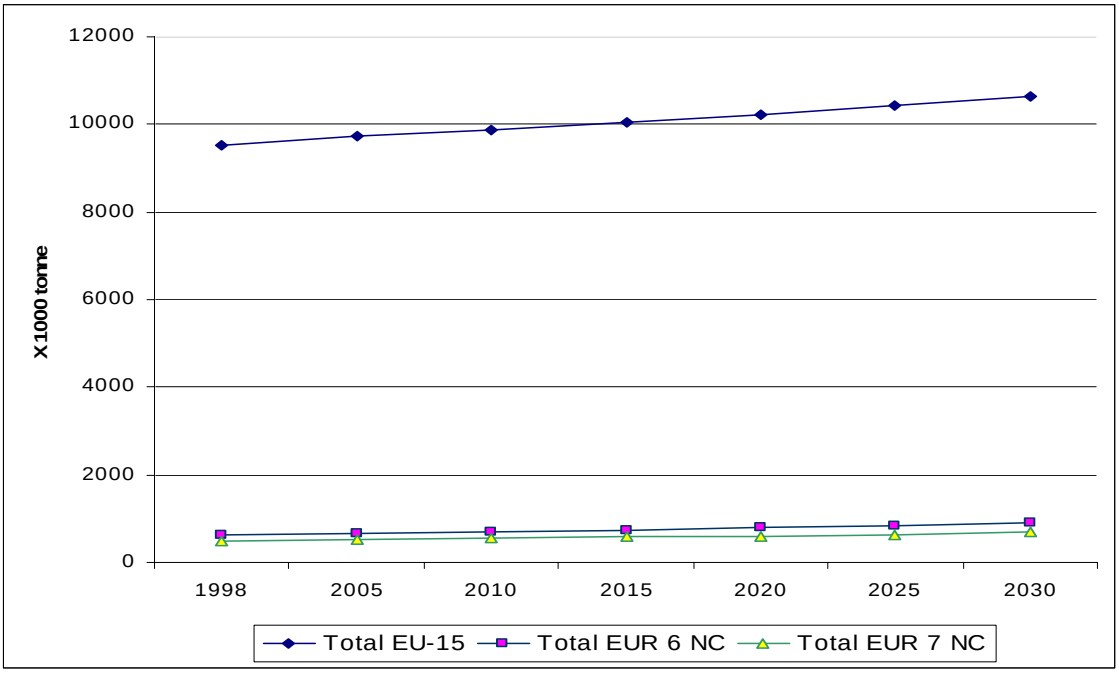


**Figure 3-11: Food use net supply for the EU-15, EUR-6 NC, EUR-7 NC from 1998 to 2030**

In terms of commodities, the net supply of fish for human consumption at the EUR-28 level will present three tendencies over the period 1998-2030:

- Cured fish and fresh/chilled fish will remain more or less stable;
- Crustaceans, molluscs and other prepared aquatic products, fish fillets and prepared/preserved fish, molluscs, crustaceans and cephalopods will see an increase;
- Frozen fish will decrease.

Changes are more remarkable for the EUR-6 and EUR-7 NC countries than for EUR-15. However, due to the high differential in terms of volume (10.6 Mt compared to 1.6 Mt), any changes that occur within the new EUR countries will be insignificant at the EUR-28 level.

At the EU-15 level, the 12 percent increase in net supply can be attributed to the preserved/prepared commodities that will reach almost 3 Mt in 2030, compared to 2.5 Mt in 1998. This type of commodity will increase its share of the total apparent consumption by 1 point[21] (to 27 percent in 2030). Between 1998 and 2030, the net supply of fish fillets will increase by 20 percent and in 2030 will represent 23 percent of the total net supply (+2 points from 1998). The net supply of fresh/chilled fish will increase at a higher rate than the total net supply, but will account for less of the total net supply in 2030 than in 1998 (9 percent in 2030, down from 10 percent in 1998). Frozen fish, which will decline by 10 percent, will still account for 13 percent of the total net supply in 2030 (down from 16 percent in 1998). All of these shifts reflect changes in consumption habits and marketing practices. 2030 will see more and more ready to eat products increasingly bought at supermarkets or at take-away shops (see next section on consumption for details).

Fresh or prepared crustaceans, cephalopods and molluscs will also increase over the next 30 years. Better transport infrastructures and availability through supermarket chains will significantly improve the spread of fresh seafood products other than finfish over the EU-15.

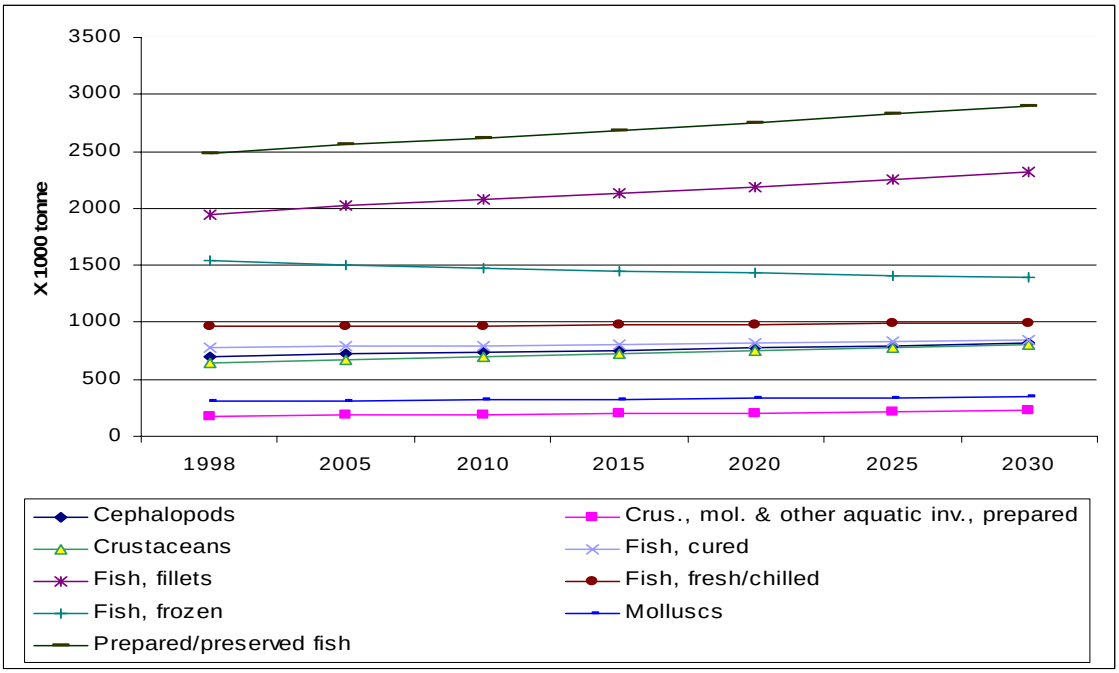


**Figure 3-12: Food use net supply in the EU-15 from 1998 to 2030**

Globally, the apparent consumption of the EUR-6 NC will increase by 43 percent over the next three decades (628 000 tonnes in 1998; 895 000 tonnes in 2030). As mentioned in Annex 5 in the chapter concerning net supply for the period 1989-1998, the figures for the EUR-6 NC may be biased because they over-represent Poland, whose important population of 39 million inhabitants combined with a high level of consumption (16 kg/c/yr in 2030) influence considerably the overall consumption pattern of the EUR-6 NC (64 million inhabitants and an average consumption of 14 kg/c/yr). So, the reader is advised to examine the country-level details presented in Annex 15 and Part 2 of the report.

[21] One point corresponds at 100 000 tonnes for the EU-15 net supply.

The significant increase in net supply (compared to the situation immediately after the separation from the Soviet bloc) is largely the result of increased consumer demand for preserved/prepared commodities (partly canned fish and ready to cook meals). This type of commodity will gain 13 points over 30 years (equivalent to 180 000 tonnes), accounting for 43 percent of the net supply at the end of the projected period. The economic overtures of Western countries in parallel with increased purchasing power will result in increased trade with the rest of the world including duty free trade with other EU countries.

Frozen fish will also contribute to the increased net supply (from 230 000 tonnes in 1998 to 380 000 tonnes in 2030) with a 33 percent share of the total. Demersal species, small pelagics and tuna coming from northern Europe and southern countries will be the main species in this category.

Filleted and cured fish will decline by 3 percent and 2 percent respectively. A shift from these to prepared/preserved commodities is the main reason for this decline. Therefore, fish fillets will account for 14 percent of the total net supply in 2030 compared to 20 percent in 1998. The consumption of smoked and salted freshwater fish is currently quite saturated in many Eastern European countries.

The other three categories (cephalopods, crustaceans and molluscs fresh and prepared) are not currently a part of the diet in the EUR-6 NC. It is therefore unlikely that they will appear significantly in their meal composition over the next 30 years. For this reason, the net supply of these commodities remains low in 2030.

Despite some cultural habits involving freshwater fish[22], the next three decades will see a huge influx of marine fish into the seafood market of Eastern European countries. The improvement of the Eastern counties national and household financial situation will lead to a rise in the standards of consumption, to which fish is a component choice.

Fish will play a significant role in the improving standards of consumption that will be brought about by improvements in national and domestic finances in Eastern European countries.

[22] Except for Cyprus, which is a maritime country with quasi-exclusively a marine seafood consumption.

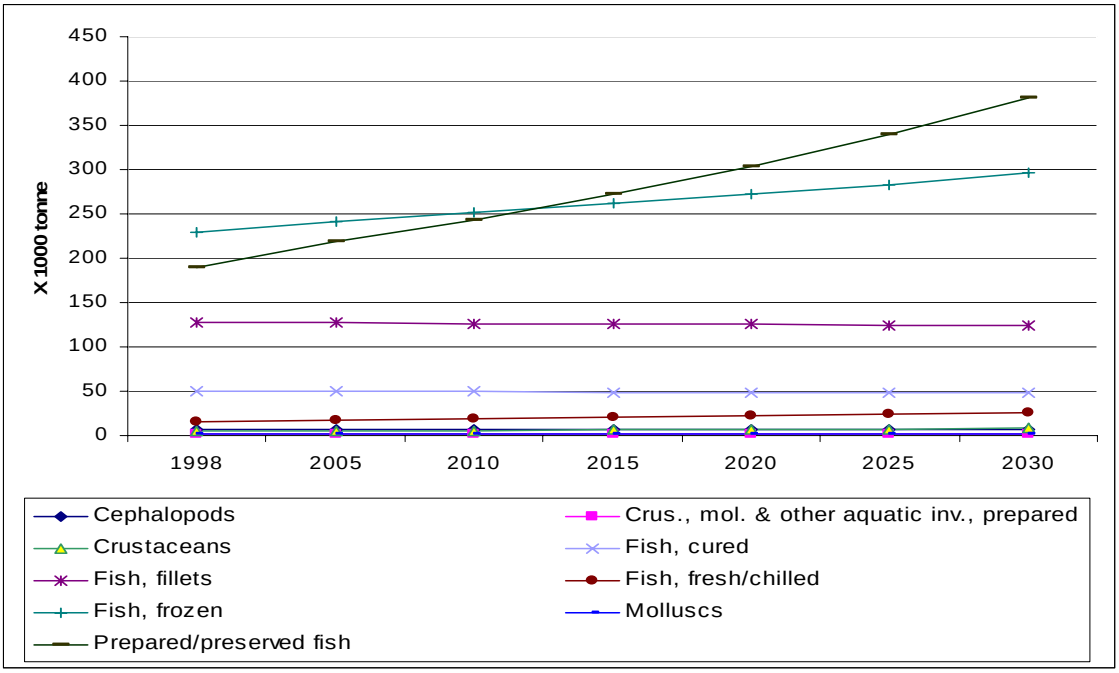


**Figure 3-13: Food use net supply for the EUR-6 NC from 1998 to 2030**

With a 38 percent net supply increase the EUR-7 NC countries will contribute to an overall EUR-28 net supply increase of 200 000 tonnes. However, the extent to which each EUR-7 NC country contributes to this increase is not proportionate to its size. Romania accounts for 50 percent of the total inhabitants of the EUR-7 NC countries (25 M of a total of 51 M in 2030), but its per capita consumption is low (only 5 kg/c/yr) whilst Norway accounts for only 10 percent of the total population but has a much higher rate of consumption at 40 kg/c/yr, which more than compensates for its small population. The effect of population is countervailed here by the importance of individual consumption. Thus, in 2030, Norway will account for 32 percent of the total net supply of the EUR-7 NC whilst Romania, Latvia and Lithuania will account for 18 percent, 15 percent and 14 percent respectively.

Overall, the different groups will benefit from an increase in net supply. Frozen fish, with a growth rate of 37 percent between 1998 and 2030, will maintain its premier position in 2030 with a 35 percent share of the total net supply (240 000 tonnes in 2030 compared to 170 000 tonnes in 1998). In 2030 frozen commodities will be largely composed of demersal and small pelagic species. More specifically, cod and Alaska Pollock will be the main demersal species whilst herring and mackerel will form the largest part of frozen small pelagic commodities. Northern European countries such as Iceland, Greenland and the Faeroes will be the main suppliers of the EUR-7 NC. Norway, with its 3.5 Mt of captures and aquaculture production in 2030 will also play a significant role, but its exports will be deemed intra-EUR trade.

Fish fillets and fresh/chilled fish will increase by 28 percent and 80 percent respectively over the next three decades, reaching 112 000 tonnes and 95 000 tonnes in 2030. Despite the category's growth, fish fillets will lose two points between 1998 and 2030 (its share will be 16 percent in 2030), whilst fresh/chilled fish will gain three points over the same period, growing from 52 000 tonnes in 1998 to 94 000 tonnes in 2030. Like frozen fish, these two categories will mainly be composed of demersal and small pelagic species even though tuna imports increase during the period.

The preserved/prepared fish category follows the same tendencies already seen in the EU-15 and EUR-6 NC, showing an increase of 45 percent with the volume of commodities reaching 160 000 tonnes in 2030. Less time for cooking and improved purchasing power drives the

consumers' preference for ready to eat meals. Produced as much in Eastern Europe as in the West, prepared products will gradually replace some traditional marinades, canned products and cured commodities.

Other types of commodities such as cephalopods, molluscs and crustaceans will remain low in terms of their share of the total net supply accounting for 8 percent. Cured fish will also be stable by accounting for 3 percent of the total net supply in 2030, as it did in 1998.

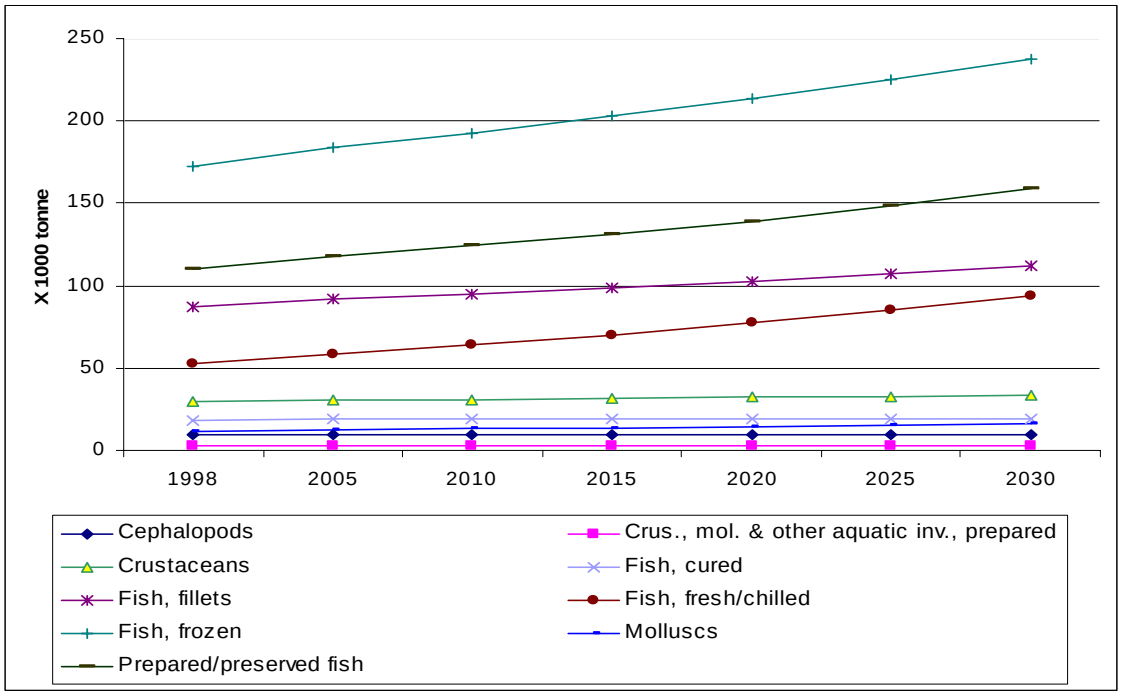


**Figure 3-14: Food use net supply for the EUR-7 NC from 1998 to 2030**

Overall, between 1998 and 2030, there will tend to be an increase in the net supply of all species groups. Demersal species will benefit most from this increase (in terms of volume) as they are a component part of ready to eat dishes and fish fillets both of which will increase. Demersal species are also included in the category "Other marine fish" due to the fact that some commodities are not related to any particular species group.

Tuna and small pelagics will both reach 1.7 Mt in 2030 with a growth of 9 percent and 18 percent respectively since 1998. Tuna supplied by Spanish and French vessels operating in African waters, the Indian Ocean and recently in the Pacific Ocean[23] will provide 20 percent[24] of the net supply of tuna. The remainder will be provided by imports from Asian countries such as Thailand and the Philippines, both countries that are playing an increasing role in the production and export of the world's canned tuna[25]. With a net supply of 1.7 Mt, the EUR-28 will absorb one third of the world tuna production, which can be considered fully exploited at the current level of 4 Mt.

Herring, mackerel and European pilchard will compose the main part of the net supply of small pelagic species in 2030. Mainly provided by EUR-28 vessels, with an average annual production of 4 Mt, the net supply of small pelagic species will not depend on imports and

[23] Thanks to the fishing agreement with Kiribati.
[24] With an annual average of 350 000 tonnes of tuna species caught inside the EEZs of coastal countries that the EU has agreements with and in international waters.
[25] Without being producer countries, these countries have developed a world competitive canned tuna industry. This is a good example of the de-localisation of the canning factories to third countries where fiscal and labor conditions are favorable.

will largely increase the intra-EUR trade due to the fact that major producers and exporters are northern countries like Norway and Poland.

Cephalopods will account for 7 percent of total net supply in 2030 (no change since 1998). With Spain and Italy as the key markets for octopus in EUR-28 in 2030, imports will have to increase to fill the growing gap between increasing demand and stagnant production (mainly in Spain) in the EUR-28 (Anon., 2000d). Morocco should remain the main exporter country to EUR-28, but other countries such as Tunisia, China and Senegal should, based on current trends, increase penetration of key European markets (O'Sullivan, 2003). The import of squid and cuttlefish from Thailand, Morocco and China will contribute to the supply of the EUR-28 market up to 2030, and help fill the gap between EUR-28 production (150 000 tonnes) and apparent consumption (830 000 tonnes).

Diadromous and freshwater fish will together account for 8 percent of the total net supply in 2030 (7 percent and 1 percent respectively) with a growth rate of 11 percent for the former and 6 percent for the latter. Their share of the total net supply will be unchanged from 1998 despite their growth rate being below the EUR-28 average. Farmed salmon from Norway (and to a lesser extent Scotland) will dominate the market for freshwater and diadromous fish in EUR-28. With the EUR-28 producing around 1Mt of these two species groups, the cover rate will exceed 100 percent allowing some room for exports outside of EUR-28.

The net supply of molluscs and crustaceans will increase by 25 percent and 18 percent respectively between 1998 and 2030. Whilst the majority of molluscs consumed in EUR-28 countries in 2030 will be produced by European aquaculture, the apparent consumption of crustacean (mainly shrimp) will inevitably lead to increased imports to supply the growing market. The development of world aquaculture will allow other producer countries to increase their exports to meet EUR-28 demand.

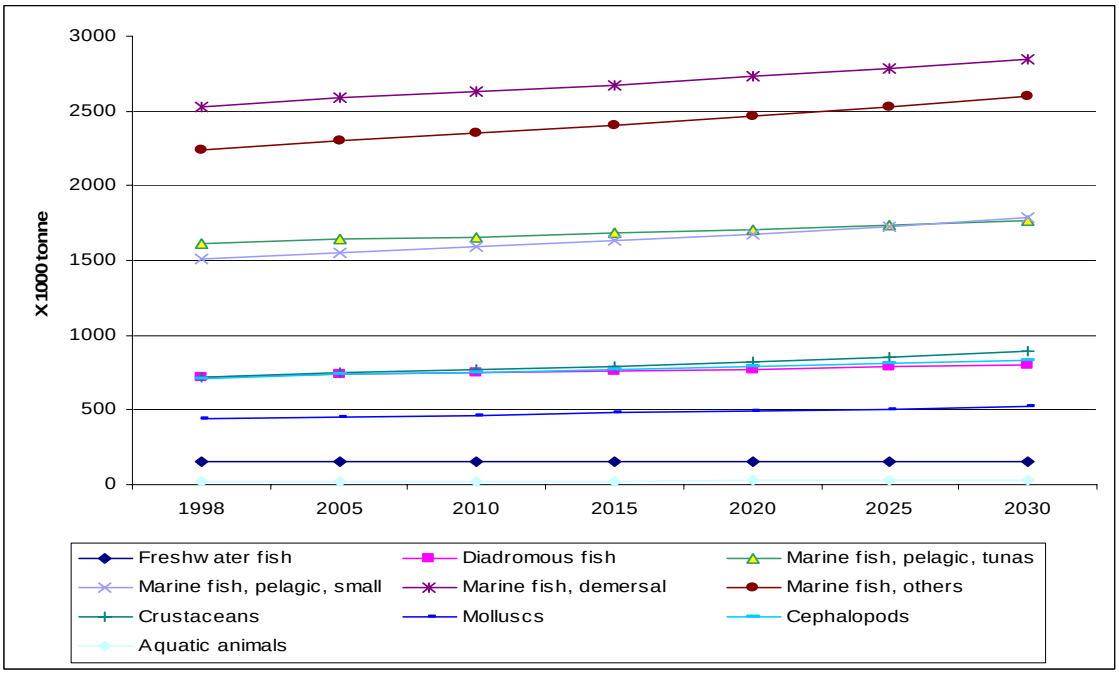


**Figure 3-15: Food use net supply for EUR-28 from 1998 to 2030**

### *3.2.2 Non-food use net supply 2005–2030*

Between 2005 and 2030, non-food use net supply will increase slightly from 3.9 Mt in 1998 to 4.1 Mt in 2030 in response to the growth of aquaculture production. Regarding farmed

animals (particularly chickens), the development of new feeding methods will help to significantly reduce dependence on wild small pelagic and demersal industrial species. Nevertheless, the demand from the growing EUR-28 aquaculture industry combined with the current difficulties in substituting aquatic meal flour with vegetal source proteins leads to an increase in demand and subsequently an increase in the net supply of non-food use commodities between 2000 and 2030.

### 3.3 Production 2005–2030

Forecasts to 2030 of the EUR-28 capture production predict stagnation in catches as stocks become fully or over-exploited. Therefore, in order to meet growing consumption needs, total production will need to be maintained through increased output from aquaculture. It is possible, therefore, that farmed production may increase by 1 Mt by 2030, exceeding 2.1 Mt by 2015 and reaching 2.5 Mt in 2030.

The recent decline of some of the major European stocks like cod will enhance the role of the European Common Fishery Policy (CFP). Its task will not only be to manage and control the fishing industry but also to develop plans that promote a sustainable use of European waters. For that purpose, the Green Paper on reform that the European Commission published in March 2001 singled out many aspects of the 'old' CFP that had proved a failure. The main reforms agreed related to:

- The phasing out of public aid for fleet renewal and modernization;
- The phasing out of public aid for the permanent transfer of EU vessels to third countries, including through the creation of joint ventures;
- Further incentives to scrap fishing vessels via decommissioning schemes;
- Multi-annual recovery plans for stocks outside safe biological limits, and multi-annual management plans for other stocks;
- Current restrictions on access to the 6 - 12 mile zone to fishing vessels which have traditionally fished there;
- Other access arrangements, such as those restricting access to the Shetland Box are retained meantime;
- The principle of relative stability;
- The legal right of free access to Community waters such as the North Sea for Spain, Portugal and Finland;
- Strengthening and harmonization of control and enforcement measures;
- Setting up of Regional Advisory Councils (with a purely advisory role) to increase stakeholder involvement;
- An action plan for Mediterranean fisheries.

Although the European Commission perceives the reforms as far-reaching, many observers have expressed the view that they do not go far enough. In the final analysis, during more than half of the period over which CFP reform was discussed by the European Council, the entire issue was overshadowed by the drastic interim cod protection measures proposed by the Commission following scientific advice on stocks delivered by ICES (the International Council for the Exploration of the Sea) in October 2002. The post-reform debate has, to a great extent, been similarly hi-jacked by the issue of the North Sea cod fishery[26] (Cameron, 2003).

[26] For more details, see: http://europa.eu.int/comm/fisheries/news_corner/discours/disc_en.htm

### *3.3.1 Capture 2005-2030*

As mentioned earlier in the report, capture is deemed to be stable over the next 30 years while aquaculture will experience an overall increase, although some species will encounter some decrease in terms of farm production (mainly inland freshwater species). The table below presents the capture production by country and by FAO groups of species.

**Table 3-2: Capture by country and by FAO groups of species from 2005 to 2030**

(tonnes)

| Country | Av 94-98 | 2030 | FAO Gp Species | Av. 94-98 | 2030 |
|---|---|---|---|---|---|
| Austria | 432 | 432 | Freshwater fish | 139245 | 140711 |
| Belgium | 32401 | 32401 | Diadromous fish | 377843 | 1215609 |
| Denmark | 1789849 | 1789849 | Marine fish, pelagic, tunas | 466211 | 466211 |
| Finland | 174446 | 174446 | Marine fish, pelagic, small | 2699175 | 2701120 |
| France | 656280 | 656280 | Marine fish, demersal | 2603613 | 2685083 |
| Germany | 246458 | 246458 | Marine fish, others | 162471 | 164440 |
| Greece | 163489 | 163489 | Crustaceans | 208088 | 208357 |
| Ireland | 360804 | 360804 | Molluscs | 1088041 | 2521610 |
| Italy | 364551 | 364551 | Cephalopods | 189676 | 189676 |
| Netherlands | 451518 | 451518 | Others | 137157 | 138252 |
| Portugal | 249962 | 249962 | **Total EU-15** | **8071519** | **10431069** |
| Spain | 1124993 | 1124993 | Freshwater fish | 88267 | 90623 |
| Sweden | 386150 | 386150 | Diadromous fish | 10446 | 142797 |
| United Kingdom | 900046 | 900046 | Marine fish, pelagic, tunas | 165 | 165 |
| **Total EU-15** | **6901379** | **6901379** | Marine fish, pelagic, small | 202061 | 202061 |
| Cyprus | 2580 | 2580 | Marine fish, demersal | 233279 | 234772 |
| Czech Republic | 3733 | 3733 | Marine fish, others | 1800 | 1800 |
| Estonia | 122585 | 122585 | Crustaceans | 18623 | 18657 |
| Hungary | 7561 | 7561 | Molluscs | 41 | 90 |
| Poland | 362391 | 362391 | Cephalopods | 1585 | 1585 |
| Slovenia | 2254 | 2254 | Others | 1289 | 1289 |
| **Total EUR-6 NC** | **501103** | **501103** | **Total EUR-6 NC** | **557557** | **693839** |
| Bulgaria | 9074 | 9074 | Freshwater fish | 32448 | 18507 |
| Latvia | 127602 | 127602 | Diadromous fish | 322428 | 773250 |
| Lithuania | 38241 | 38241 | Marine fish, pelagic, tunas | 1273 | 1273 |
| Malta | 869 | 869 | Marine fish, pelagic, small | 1273325 | 1273325 |
| Norway | 2844335 | 2844335 | Marine fish, demersal | 1484623 | 1486854 |
| Romania | 21374 | 21374 | Marine fish, others | 15424 | 16543 |
| Slovakia | 1537 | 1537 | Crustaceans | 48419 | 48419 |
| **Total EUR-7 NC** | **3043032** | **3043032** | Molluscs | 7408 | 7615 |
| **Total EUR-28** | **10445515** | **10445515** | Cephalopods | 3842 | 3842 |
| | | | Others | 197331 | 197331 |
| | | | **Total EUR-7 NC** | **3386521** | **3826959** |
| | | | **Total EUR-28** | **12015597** | **14951867** |

Source: database

Concerning EU fishing agreements with third countries, the incidence of government aid granted to the fisheries sector is a thorny question currently being debated within World Trade Organization (WTO) (Failler and Lecrivain, 2002). At the time of the Doha declaration, the

members of the WTO committed themselves to clarifying and improving the disciplines concerning the subsidies in fishing. An increase in the number of fishing agreements with southern countries will not affect substantially the volume of production since southern countries are less and less important in terms of production (European Parliament, 1999a).

### *3.3.2 Aquaculture 2005-2030*

#### *3.3.2.1 European Commission point of view*

The European Commission may end subsidies for increasing aquaculture production for species such as salmon where the market "is close to saturation" (European Commission, 2001). In its 2001-published Green Paper on the future of the Common Fisheries Policy the Commission suggests that the market should be the driving force for aquaculture development, "Production and demand are currently finely balanced, and any increase in production in excess of the likely evolution in demand should not be encouraged".

In the 1980s, aquaculture (and, more particularly, marine aquaculture) was still essentially a high-risk activity. Today, these risks no longer exist for a number of farmed species. It is therefore questionable whether the Community should continue to subsidize investments by private companies in production capacity for species where the market is close to saturation.

Instead of subsidies for increased production, the Commission suggests that future aid should cover costs in relation to training, control, research and development (in particular for new species), the processing of waste water and the eradication of diseases. It points out that its development aid for aquaculture comes mainly through the Financial Instrument for Fisheries Guidance (FIFG), and says that the scope of FIFG has been widened to include such aid, "Public aid should in particular be devoted to encouraging the development of 'clean' technologies."

The Commission says that the "adoption of sustainable farming practices must be achieved, alongside the imperatives of health and quality standards for products". It adds that the Biodiversity Action Plan for fisheries and aquaculture should help achieve this aim (see also Ben-Yami, 2000). "The plan should foresee a series of actions related to the reduction of environmental impact as well as actions to limit the potential problems arising from the introduction of new species, and secure animal health."

Earlier in the document, the Commission suggests that conflicts between aquaculture and other coastal users need to be resolved if the industry is to have a stable future. Whilst it acknowledges that aquaculture has played a "significant role" in the development of coastal communities, "Nonetheless, while the overall framework shows a positive development, Community aquaculture still experiences a number of problems… In particular, as aquaculture expands, it is increasingly seen as a threat to other activities. The tourism industry is especially critical of aquaculture, which is blamed for occupying space that could be used for recreation, as well as for producing waste materials that affect the quality of nearby bathing water."

#### *3.3.2.2 Potential development, limits and constraints 2005-2030*

The potential development of aquaculture will depend on a number of crucial factors such as environmental constraints, market demand, feed supply, innovation (in terms of the production of new species) and organic production.

Regarding all the factors enumerated above, it seems that aquaculture production is approaching a flat asymptote, and consequently the marginal growth rate will be constantly decreasing. Potential growth can occur for new species, especially ones that compensate for the loss of capture production (cod, for example) and for which there is some significant market demand. However, these new developments will have to cope with the same environmental constraints, feed supply, etc. as traditional aquaculture, and will therefore enter into competition with them in many of these aspects.

#### 3.3.2.2.1 Environmental constraints

Environmental constraints to the future growth of the European aquaculture are mainly related to the diseases, heath and safety, and the interaction between aquaculture farms and their biological and physical environment (Mc Allister, 1999).

In 2000, Scottish salmon farms experienced problems with algae blooms and jellyfish attacks. Estimates indicate that due to these events, farmers lost about 8-9 000 tonnes of harvest-ready fish. The January estimates would have been fairly accurate, but they didn't allow for unforeseen events like algae and jellyfish (Fishery Research Service, 2001).

#### 3.3.2.2.2 Market demand for aquaculture products

In 2002, the price of Norwegian farmed salmon went close to the minimum price of 3.25 €/ kg stated in the Norway-EU salmon agreement. The main reason for the falling salmon prices was that Chile had produced enormous amounts of salmon, and the US market had therefore been flooded. Chile also sends salmon to Europe. In addition, the UK, the Faeroe Islands and Norway also produced much more salmon than previously, which led to prices falling. The European market can't handle that much growth. The 2003 crisis in the Norwegian salmon industry proved that the market is a key parameter to defining potential growth and is more important than price in the way that it forces price to go down below the production costs.

World production has an impact on Norwegian production and profits. Projections should not be based only on growth potential (based on natural resources, feeding and spaces available). It has to take into account the capacity of the market to absorb new production.

#### 3.3.2.2.3 Aquaculture feed supply

The 1998 El Niño was one of the strongest ever recorded. The result was a decline in the Chilean and Peruvian production of fishmeal (by 50 percent) and oil (by 65 percent) compared to the average observed in previous years. The impact on the world market was considerable[27]: prices went up to 800 €/t (compare to a “normal” price of 400 €/t). Shortfall in raw material for aquaculture feeding purposes is inevitable due to high inter-dependency of reduction species with up-welling conditions. The aquaculture industry does not seem to be aware of variations in the fishmeal supply because most of the time the industry considers only the technical aspects of the feeding process.

Running parallel with the growth of aquaculture and the subsequent increased demand in fishmeal and oil, there has been a growing demand for better quality, which means that there are five different quality levels of fishmeals now available on the world market[28]. Aquaculture, which can afford to pay for high quality meal (compared to poultry and pig

[27] Chile and Peru provide nearly 40% of the world fish reduction products.

[28] Quality is based on the freshness of the raw fish being manufactured into meal and the drying process used to ensure that the fishmeal is heated gently (Barlow, 1999).

sectors) is taking more of the best quality meals, which has led to some reduction of its consumption per unit of product (Barlow, 1999).

A 35 percent improvement in the food conversion rate is theoretically possible, suggesting scope for further gains from modified diets and feeding systems. Increased automation looks likely as long as farm units continue to increase in size under pressure to reduce production costs. Further research will help provide a better understanding of the environmental factors affecting feeding and food assimilation, which should lead to further refinement of the type of systems described above.

#### 3.3.2.2.4 Organic products

The farmgate value of UK organic fish increased from 2.8 M€ in 1999/2000 to 5 M€ in 2000/2001, a rise of 80 percent. Of this, trout production accounted for 1.2 M€ and salmon 3.8 M€. The number of registered organic fish producers rose from ten in April 2000 to 15 in April 2001. However, despite the 80 percent growth rate, many producers reported difficulties in establishing a stable market. Part of the problem is that consumers are attracted to artificially pigmented “pink” salmon, which is not permitted in organic fish farming (Agra Europe, 2001).

At the European level, the growing organic market suggests that demand for organic food will be more and more important in the next three decades. The success of organic salmon has encouraged producers to change their production patterns in order to offer products free of chemicals and follow sustainable development processes. It also suggests that there is a growing potential for other organic seafood products (Aarset *et al.*, 2000). If in the past some ideology constituted the roots of organic production, it is now the expected profitability that drives producers’ behaviour toward organic production.

#### 3.3.2.2.5 News species 2005-2030

Many different species of fish can be reproduced artificially under intensive and controlled conditions, and most species grow extremely well in aquaculture systems. The problem is seldom solving the biological needs of new species in aquaculture, nor is it overcoming the obstacles of technology. Such hurdles are relatively easily overcome by the use of professional companies dealing with design and construction of modern fish farms.

The difficult part is to carry the "invention" of a new species all the way through to the market, keeping costs down and making a profit at the end. Of all the species that can be cultivated in Europe today, only about 10 species have shown commercial viability, and of these, two species (salmon and rainbow trout) account for approximately 80 percent of the total production of fish in European aquaculture.

The aquaculture fish market in Europe is dominated by the production of salmon, rainbow trout, sea bass, bream and carp. Salmon farming is undoubtedly the most successful, followed by rainbow trout, a traditional species with the ability to survive under different conditions, and therefore one that can be reared in almost any European country.

Of the new species that have been tried in recent years, only the culture of seabass and seabream have been strong commercial successes, whereas species like turbot, sturgeon and eel, although cultured in many countries, have never reached a level comparable to the turnover in the salmon and trout industry.

This does not mean that the fish farmer who is farming turbot, sturgeon, eel or similar is losing out. He may be very successful on an individual scale and have high earnings, but seen

on a national level, only the farming of salmon, trout, sea bass and bream has had a significant overall impact on the economy of the sector.

Cod is an example of a new species in fish farming that may become as successful as salmon and trout. The rearing technology is more or less solved and production is now directed towards a broad scale of commercialization. Cod fingerlings are produced in controlled recirculation systems and later stocked in cages at sea for grow-out to market size. The technology works, and currently a large expansion in cod culture is expected. The main concern at present is whether the production price and marketing effort of farmed cod can compete in the long run with the market price and marketing of wild cod from commercial fishing. Undoubtedly, this unknown future market situation will be a nerve-wracking experience for the cod farming industry (Bregnballe, 2003).

In Norway, the Government wants to invest in the breeding of cod as a new branch of fish farming and to take for that purpose a long term initiative towards developing cod for fish farming (Anon., 2001b). Troms and Finnmark will become the new region for research and development of this type of aquaculture, with Tromsoe as the natural centre. Globally, the following points can be highlighted (Solsletten & Cameron, 2002):

- 100 new market-ready fish production licences were allocated in Norway in 2001, and in 2002 there is a total of 280 cod farming licences in Norway.
- In 2002, Norwegian production of cod juveniles will be tripled to three million juveniles.
- More than 64 million cod juveniles will be produced in 2005.
- In theory it will be possible to produce more than 190 000 tonnes of farmed cod in 2007.
- Norway will be able to produce 400 000 tonnes of cod after 2015.

In the United Kingdom, cod farming began at the end of the 1990s. Due to the collapse of the North Sea cod stock, cod farming is seen as an invaluable substitute to the wild species. A few points on the UK's cod farming and markets are:

- Ten tonnes of UK farmed cod went on sale in January 2000.
- The market for cod in the UK is around 170 000 tonnes per year – 33% of the world wild-catch supply.
- The British Marine Finfish Association, which represents a total of 22 members working in the various new finfish species, has a production target of 25 000 tonnes of cod within ten years.

#### *3.3.2.3 Aquaculture projections 2005-2030*

Aquaculture projections were made for each species at the country level. Refer to Part 2 of the report for a detailed country presentation.

The two tables below present the aquaculture production by country and by FAO groups of species respectively. The production of aquaculture species should increase from 1.8 Mt in 1998 to more than 2.5 Mt in 2030. Some countries, like Norway and UK with salmon production, for example, are making a significant contribution to the growth. To a lesser extent, southern European countries like Greece and Italy and Spain, with the production of sea bream and sea bass should also contribute to the augmentation of aquaculture volume to 2030.

Austria, Finland, Sweden, Hungary and Poland should experience a decrease in aquaculture production. In three Baltic states (Estonia, Latvia and Lithuania) production should remain stable. The remainder of the EUR-28 countries should present varying positive trends (from 5 percent to 125 percent) in their production.

Having experienced declining aquaculture production of freshwater species such as carp, pike, roach and tench between 1989 and 1998, Austria, Hungary and Poland will continue to follow the same negative trend up to 2030. Aquaculture in Finland (largely dependent on rainbow trout production) showed significant reduction in output between 1989 and 1998, which suggests a reduction to the scale of operation in that country of almost 40 percent.

Climatic conditions in the Baltic States are not favourable to any freshwater aquaculture. The period of non-freezing water is too short to develop any sustainable production. With the EU-FAIR program there was an attempt to sow the rivers with juveniles, but it was limited to salmon.

Most of the maritime countries will face a significant growth of their aquaculture production. Spain, France and to lesser extent the UK will increase their share of the EUR-28 aquaculture production by increasing their production of molluscs and marine demersal fish. Norway, with diadromous fish, will augment its predominance in this market by producing more than 60 percent of the 1.3 Mt EUR-28 production (compared to 50 percent on the average 1994-1998).

**Table 3-3: Aquaculture production by country from 2005 to 2030**

(tonnes)

| Country | Av 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | % 98-30 |
|---|---|---|---|---|---|---|---|---|
| Austria | 2954 | 2084 | 1707 | 1436 | 1244 | 1113 | 1029 | -64 |
| Belgium | 865 | 802 | 789 | 789 | 801 | 824 | 857 | 1 |
| Denmark | 42064 | 45565 | 48013 | 50604 | 53347 | 56252 | 59328 | 40 |
| Finland | 16827 | 14431 | 13397 | 12443 | 11563 | 10752 | 10005 | -38 |
| France | 281739 | 282963 | 290429 | 298621 | 307497 | 317031 | 327211 | 19 |
| Germany | 60427 | 66507 | 67352 | 68915 | 71026 | 73570 | 76466 | 14 |
| Greece | 42886 | 65452 | 69782 | 74452 | 79486 | 84912 | 90764 | 51 |
| Ireland | 33619 | 44673 | 48098 | 51825 | 55881 | 60298 | 65108 | 61 |
| Italy | 224572 | 257964 | 264564 | 271694 | 279363 | 287593 | 296414 | 19 |
| Netherlands | 102284 | 125535 | 129681 | 134011 | 138534 | 143263 | 148209 | 23 |
| Portugal | 6307 | 6727 | 6627 | 6800 | 7188 | 7757 | 8488 | 13 |
| Spain | 237200 | 327221 | 337830 | 349086 | 361017 | 373693 | 387222 | 24 |
| Sweden | 7093 | 5068 | 4822 | 4624 | 4473 | 4368 | 4306 | -22 |
| United Kingdom | 111302 | 146301 | 153155 | 160459 | 168241 | 176535 | 185373 | 35 |
| **Total EU-15** | **1170139** | **1391292** | **1436247** | **1485759** | **1539664** | **1597960** | **1660780** | **24** |
| Cyprus | 731 | 1387 | 1564 | 1770 | 2012 | 2298 | 2639 | 124 |
| Czech Republic | 18061 | 19792 | 21852 | 24126 | 26637 | 29410 | 32471 | 88 |
| Estonia | 298 | 260 | 260 | 260 | 260 | 260 | 260 | 0 |
| Hungary | 9376 | 7300 | 6049 | 5245 | 4750 | 4470 | 4341 | -58 |

| Country | Av 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | % 98-30 |
|---|---|---|---|---|---|---|---|---|
| Poland | 27156 | 29118 | 28756 | 28493 | 28328 | 28263 | 28296 | -5 |
| Slovenia | 831 | 1015 | 1121 | 1238 | 1367 | 1509 | 1666 | 88 |
| **Total EU6 NC** | **56453** | **58872** | **59601** | **61132** | **63355** | **66209** | **69672** | **17** |
| Bulgaria | 5024 | 4841 | 5377 | 6027 | 6816 | 7774 | 8940 | 111 |
| Latvia | 444 | 412 | 412 | 412 | 412 | 412 | 412 | 0 |
| Lithuania | 1631 | 1516 | 1516 | 1516 | 1516 | 1516 | 1516 | 0 |
| Malta | 1420 | 2240 | 2473 | 2730 | 3015 | 3328 | 3675 | 88 |
| Norway | 318762 | 466065 | 511905 | 562381 | 617967 | 679189 | 746624 | 83 |
| Romania | 14948 | 9547 | 9615 | 9693 | 9779 | 9875 | 9982 | 5 |
| Slovakia | 1258 | 731 | 807 | 891 | 983 | 1086 | 1199 | 89 |
| **Total EUR-7 NC** | **343489** | **485351** | **532106** | **583650** | **640488** | **703180** | **772347** | **81** |
| **Total EUR-28** | **1570082** | **1935515** | **2027954** | **2130541** | **2243506** | **2367349** | **2502799** | **37** |

Source: database

Molluscs production will grow substantially for Spain (325 000 tonnes in 2030), France (235 000 tonnes) Italy (195 000 tonnes) and the Netherlands (140 000 tonnes). In Spain, the main species should be the blue mussels that will represent 90 percent of the molluscs' production in 2030 even if production of the common edible coke, pullet carpet shell, and European flat oyster is increasing. Between May and August 2002, sales of Galician processed mussels increased 200 percent, although the mussels were smaller due to the rough winter weather. The total amount of sales reached 32 000 tonnes compared to 18 000 tonnes during the same period of the previous year. Galicia is one of the principal mussel producing regions in Europe with an annual harvest volume reaching 250 000 tonnes. The sinking of the Prestige in Galician waters on 19 November 2002, and the subsequent spilling of its cargo of oil seriously damaged aquaculture production for a number years but it should recover and take advantage of this accident experience[29].

[29] In December 2002, the European Commission announced that 30 million € of financial support would be made available to help affected fishermen and fish farmers. In view of the exceptional damages caused by this spill, compensation for cessation of activities – currently only available to fishermen and vessel owners under FIFG rules (Financial Instrument for Fisheries Guidance) – would be available also for shellfish fisheries and fish farming. Aid would also be paid to help the industry replace damaged fishing gear and shellfish stocks, and clean, repair and rebuild aquaculture sites. To do this, the Commission proposed two things: to adapt some FIFG provisions to allow Spain to provide financial help to this sector, and to allow Spain to re-allocate some 30 million € from money earmarked for the reconverting of the Spanish fleet that used to fish under the EU fisheries agreement with Morocco. In addition, an estimated 80 million € would be reprogrammed under Spain's share of FIFG (European Commission, 2002).

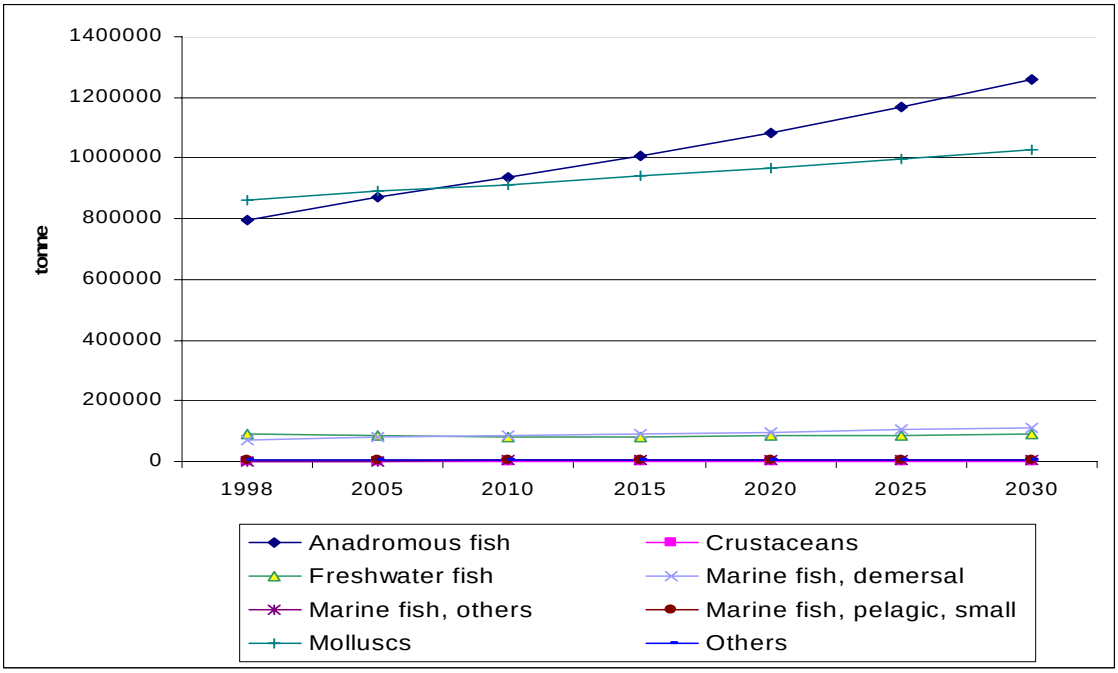


**Figure 3-16: Aquaculture production by FAO groups of species from 1998 to 2030**

French production of Pacific cupped and European flat oysters should grow slightly (170 000 tonnes in 2030), maintaining France as the largest oyster producer in the EUR-28.

Salmon production alone will increase aquaculture production by nearly 350 000 tonnes. Norway (680 000 tonnes in 2030) and Scotland in the United Kingdom (150 000 tonnes) will be the two major producers within the EUR-28. By 2030, trout production will also have grown to reach 65 000 tonnes in Norway and 60 000 tonnes in France.

When the proposed Eastern European countries join the EU, there should be a number of changes in the carp market. Total carp pond area will increase threefold from 60 900 to 195 000 hectares, thereby increasing the risk that fiercer competition will reduce the profits of many companies. However, EU membership will open up additional opportunities since the market will become larger. Nevertheless, it seems that only the Czech Republic will be able to benefit from this market opportunity because of its increasing production of carp up to 2030 (28 000 tonnes).

The production of demersal species will be the biggest challenge facing aquaculture in the next few decades. A great many expectations are being put on cod farming to compensate for the decrease in capture in the North Sea[30]. Despite the early good results in Norway and Scotland, there is too much uncertainty to accurately predict the real growth capacities of this type of aquaculture. More common species such as sea bass and sea bream, which have been considered a major success over the last decade, show some potential for further growth. Greece (a combined tonnage of 55 000 in 2030), Italy (20 000 tonnes), Spain (9 000 tonnes), France (9 000 tonnes) and Malta (4 000 tonnes) will be leaders in the production of sea bass and sea bream in 2030. Finally, turbot and common sole have not met the expectations placed upon them. In 2030, turbot will be a minor production of maritime countries engaged in aquaculture with the exception of Spain (producing 3 000 tonnes in 2030) and France (1 700 tonnes).

### *3.3.3 Total production 2005-2030*

The total production of capture and aquaculture species should increase from more than 12 Mt in 1998 to nearly 13 Mt in 2030. Countries that will benefit the most from the total production are those in which aquaculture will increase due to the constant capture assumption. Diadromous species and molluscs are the two main groups of species that will underlie the growth of the total production until 2030.

[30] Atlantic cod was only recorded in Norway as an aquaculture species and nowhere else in the 1989-1998 aquaculture database.

**Table 3-4: Capture by country and by FAO groups of species from 2005 to 2030**

(tonnes)

| Country | Av 94-98 | 2030 |
|---|---|---|
| Austria | 3386 | 1461 |
| Belgium | 33266 | 33258 |
| Denmark | 1831913 | 1849177 |
| Finland | 191274 | 184451 |
| France | 938019 | 983491 |
| Germany | 306885 | 322923 |
| Greece | 206375 | 254253 |
| Ireland | 394423 | 425912 |
| Italy | 589123 | 660965 |
| Netherlands | 553802 | 599727 |
| Portugal | 256269 | 258451 |
| Spain | 1362193 | 1512215 |
| Sweden | 393243 | 390456 |
| United Kingdom | 1011348 | 1085419 |
| **Total EU-15** | **8071519** | **8562159** |
| Cyprus | 3310 | 5218 |
| Czech Republic | 21794 | 36204 |
| Estonia | 122884 | 122845 |
| Hungary | 16937 | 11902 |
| Poland | 389547 | 390686 |
| Slovenia | 3084 | 3920 |
| **Total EUR-6 NC** | **557557** | **570775** |
| Bulgaria | 14098 | 18014 |
| Latvia | 128046 | 128014 |
| Lithuania | 39872 | 39757 |
| Malta | 2290 | 4544 |
| Norway | 3163097 | 3590959 |
| Romania | 36322 | 31356 |
| Slovakia | 2796 | 2736 |
| **Total EUR-7 NC** | **3386521** | **3815379** |
| **Total EUR-28** | **12015597** | **12948314** |

| FAO Gp Species | Av. 94-98 | 2030 |
|---|---|---|
| Freshwater fish | 139245 | 130583 |
| Diadromous fish | 377843 | 527100 |
| Marine fish, pelagic, tunas | 466211 | 466211 |
| Marine fish, pelagic, small | 2699175 | 2701120 |
| Marine fish, demersal | 2603613 | 2664485 |
| Marine fish, others | 162471 | 164440 |
| Crustaceans | 208088 | 208272 |
| Molluscs | 1088041 | 1372021 |
| Cephalopods | 189676 | 189676 |
| Others | 137157 | 138252 |
| **Total EU-15** | **8071519** | **8562159** |
| Freshwater fish | 88267 | 91907 |
| Diadromous fish | 10446 | 18450 |
| Marine fish, pelagic, tunas | 165 | 165 |
| Marine fish, pelagic, small | 202061 | 202061 |
| Marine fish, demersal | 233279 | 234772 |
| Marine fish, others | 1800 | 1800 |
| Crustaceans | 18623 | 18657 |
| Molluscs | 41 | 90 |
| Cephalopods | 1585 | 1585 |
| Others | 1289 | 1289 |
| **Total EUR-6 NC** | **557557** | **570775** |
| Freshwater fish | 32448 | 30291 |
| Diadromous fish | 322428 | 749886 |
| Marine fish, pelagic, tunas | 1273 | 1273 |
| Marine fish, pelagic, small | 1273325 | 1273325 |
| Marine fish, demersal | 1484623 | 1486854 |
| Marine fish, others | 15424 | 16543 |
| Crustaceans | 48419 | 48419 |
| Molluscs | 7408 | 7615 |
| Cephalopods | 3842 | 3842 |
| Others | 197331 | 197331 |
| **Total EUR-7 NC** | **3386521** | **3815379** |
| **Total EUR-28** | **12015597** | **12948314** |

Source: database

Detailed total production tables by country and by group of species are available in Annex 13.

### *3.3.4 Commodity production*

#### *3.3.4.1 Food use commodity production*

In the light of these assumptions, commodity production will remain stable over the next three decades due to the fact that capture production will stay at the 1998 level and imports will fill the gap between the increasing demand and the national or EU supply. There is here an implicit assumption that imports of raw materials will not be used by the EUR-28 processing industry to increase their production quantities. One of the main reasons for this is that third countries exports to Europe (especially Asian ones) are increasingly refined products. Only ACP countries continue to export unprocessed fish to the EU due to their barrier and tariff preferences (that end in 2008) (Failler and Lecrivain, 2003).

Commodity production follows the total production pattern in the sense that its evolution depends mainly on the aquaculture one. EUR-28 production will go up by 3 percent reaching 9.3 Mt in 2030. The main part of this growth can be attributed to cured and preserved/prepared fish commodities in relation with the processing of aquaculture species.

**Table 3-5: Food use commodity production from 2005 to 2030**

(tonnes)

| | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | % 98-30 |
|---|---|---|---|---|---|---|---|---|
| Austria | 3386 | 2624 | 2222 | 1882 | 1594 | 1350 | 1143 | -65 |
| Belgium-Luxembourg | 35413 | 33632 | 33632 | 33632 | 33632 | 33632 | 33632 | 0 |
| Denmark | 417241 | 435656 | 438628 | 441685 | 444831 | 448068 | 451398 | 5 |
| Finland | 119320 | 125530 | 125637 | 125746 | 125856 | 125969 | 126082 | 1 |
| France | 879250 | 823438 | 823480 | 823522 | 823567 | 823612 | 823659 | 0 |
| Germany | 324543 | 380772 | 381661 | 382557 | 383460 | 384370 | 385287 | 2 |
| Greece | 221634 | 213001 | 214444 | 215909 | 217394 | 218900 | 220428 | 4 |
| Ireland | 412100 | 418663 | 423024 | 427563 | 432289 | 437210 | 442338 | 7 |
| Italy | 578547 | 564930 | 571979 | 579138 | 586408 | 593790 | 601287 | 8 |
| Netherlands | 536994 | 587275 | 589724 | 592230 | 594792 | 597413 | 600095 | 3 |
| Portugal | 233554 | 218783 | 218783 | 218783 | 218783 | 218783 | 218783 | 0 |
| Spain | 1238827 | 1273644 | 1278736 | 1283901 | 1289141 | 1294457 | 1299851 | 3 |
| Sweden | 337006 | 361288 | 361288 | 361288 | 361288 | 361288 | 361288 | 0 |
| United Kingdom | 1143541 | 1316200 | 1320897 | 1325636 | 1330417 | 1335239 | 1340105 | 2 |
| **Total EU-15** | **6481357** | **6755435** | **6784137** | **6813473** | **6843451** | **6874081** | **6905374** | **3** |
| Cyprus | 3310 | 3668 | 3668 | 3668 | 3668 | 3668 | 3668 | 0 |
| Czech Republic | 33275 | 31500 | 31500 | 31500 | 31500 | 31500 | 31500 | 0 |
| Estonia | 131982 | 130269 | 130269 | 130269 | 130269 | 130269 | 130269 | 0 |
| Hungary | 19760 | 20844 | 20844 | 20844 | 20844 | 20844 | 20844 | 0 |
| Poland | 378462 | 269883 | 270370 | 270861 | 271356 | 271854 | 272356 | 1 |
| Slovenia | 3069 | 3061 | 3061 | 3061 | 3061 | 3061 | 3061 | 0 |
| **Total EUR-6 NC** | **569858** | **459225** | **459712** | **460203** | **460697** | **461196** | **461698** | **1** |
| Bulgaria | 23063 | 18815 | 18815 | 18815 | 18815 | 18815 | 18815 | 0 |

| | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | % 98-30 |
|---|---|---|---|---|---|---|---|---|
| Latvia | 156966 | 142795 | 142795 | 142795 | 142795 | 142795 | 142795 | 0 |
| Lithuania | 49956 | 35991 | 35991 | 35991 | 35991 | 35991 | 35991 | 0 |
| Malta | 2290 | 2907 | 2907 | 2907 | 2907 | 2907 | 2907 | 0 |
| Norway | 1643608 | 1678962 | 1694462 | 1710345 | 1726621 | 1743301 | 1760395 | 6 |
| Romania | 36221 | 18385 | 18385 | 18385 | 18385 | 18385 | 18385 | 0 |
| Slovakia | 2796 | 1984 | 1984 | 1984 | 1984 | 1984 | 1984 | 0 |
| **Total EUR-7 NC** | **1914900** | **1899838** | **1915338** | **1931222** | **1947498** | **1964178** | **1981271** | **5** |
| **Total EUR-28** | **8966115** | **9114498** | **9159187** | **9204897** | **9251646** | **9299454** | **9348344** | **3** |

Source: database

2003 has seen the UK fishing industry face one of the worst crises in its history after EU scientists called for a complete ban on catches of cod in a desperate attempt to preserve stocks. Fishermen's leaders have said that the measures could sound the death knell of the white fish industry, putting 20 000 jobs at risk, and devastating numerous coastal communities. The measures recommended by the ICES report[31] included a total ban on cod fishing in the North Sea off the west coast of Scotland, and in the Irish Sea. Fishing for haddock and whiting could also be curbed because cod can be caught when these other species are targeted. Industry leaders have said that adopting the recommendations would all but wipe out fishing in the UK, particularly in Scotland, where 70 percent of the fleet is based. The British fleet has already undergone decades of restructuring and the EU recently announced the most radical overhaul yet of the Common Fisheries Policy, including a reduction of the European fleet by 8.5 percent (the UK fleet has already been reduced by 20 percent through voluntary decommissioning).

The Baltic states and Poland will shortly accede to the EU. For the Baltic fish processing industries, the advantages of becoming EU member states will be immediately apparent with direct access to duty free imports of raw materials from other member states. Currently, the Baltic states mainly concentrate on three types of production:

- Fresh fish filleting of Baltic cod, Baltic salmon, flounder and large Baltic herring.
- Salted and marinated mackerel and herring fillets (Atlantic imports), Baltic sprat and Baltic herring, including smoked products.
- Canned products, including the most popular and well-known smoked sprats in oil.

A further benefit to the Baltic fish processing industry will be the enlarged internal market, although the industry will need to upgrade its processing facilities, procedures and hygiene standards, and implement the Hazard Analysis Critical Control Point (HACCP) in order to be in line with EU legislation (Higuera-Ciapara and Norierga-Orozco, 2000; Panisello *et al.*, 2000). Further, the EU Commissioner for Food Safety and Health has announced that dispensations will not be given to any industry in the new member states when they accede to the Union (Ellegaard and Larsen, 2003).

This will create difficulties for many of the smaller businesses supplying only the local market, Eastern European countries and Russia, as their poorer production facilities will not be able to comply with EU legislation, but are nonetheless capable of producing safe, good quality products. Currently, the survival of these small companies is only due to the

[31] The report from the International Council for the Exploration of the Seas on stock levels is used as the basis for EC fishing quotas every year. It is understood the scientists believe cod stocks are reaching levels from which they may never recover.

dispensations they receive under national legislation. Although national legislation in the Baltic States is very similar to EU legislation (and in some cases, stricter), practical enforcement is less thorough. Once they become member states, EU legislation will supersede national, and stricter enforcement will force many of the smaller companies to close. This will have the effect of making the fish processing industries in the Baltic states smaller in number, but made up of larger individual units, a trend seen throughout the rest of the EU in the last 10-15 years (Ellegaard and Larsen, 2003).

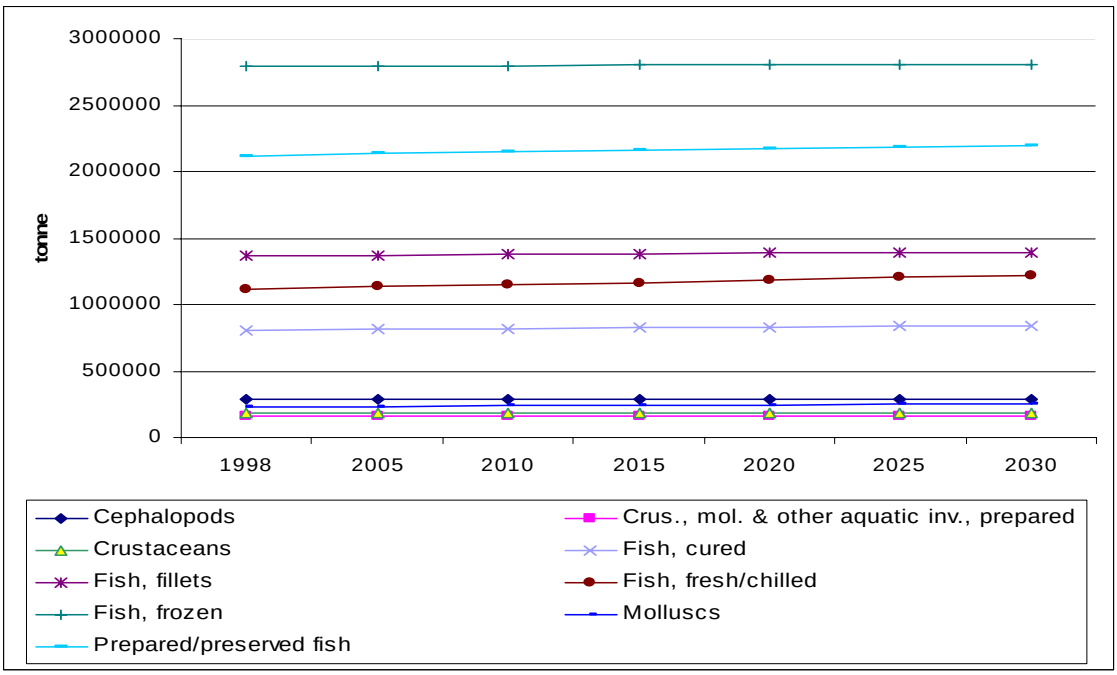


**Figure 3-17: Commodity production by OECD groups of commodities from 1998 to 2030**

A Spanish report entitled “The industrial seafood processing sector 2000”, produced by the country’s National Association of Fish and Shellfish Canners (ANFACO), showed that the production of preserved fish and shellfish increased in 2000, maintaining the rising trend observed in previous years. According to the report, production of canned seafood rose by 2.6 percent in volume and 2.4 percent in value. The species that recorded the biggest increases in volume and value included tuna (5 percent and 1 percent respectively), white tuna (4 percent and 6.5 percent), cockles (3 percent and 2.5 percent) and anchovy (3 percent and 4.5 percent). Tuna was the main species processed by the Spanish industry, representing 55 percent of the total volume of canned fish and shellfish products. The second most important species was anchovy, followed by white tuna, cephalopods, mackerel and mussels.

### *3.3.4.2 Non-food use commodity production*

The International Fishmeal and Fish Oil organization projects that in 2010, assuming 6.5 million tonnes net weight of fishmeal is still being produced, about half the fishmeal produced will go into aquafeed, leaving considerable scope for more to be put to this use as aquaculture grows. Therefore, it does not see fishmeal becoming a constraint on the growth of the aquaculture industry for some years. However, fish oil presents a different scenario. Based on an annual world production of 1.25 million tonnes of fish oil (net weight) and an aquafeed demand of about 1 million tonnes (net weight) in 2010, the projections (depending on the production of fish oil) suggest that 80 percent or even close to 100 percent of fish oil will go into aquafeed, leaving little or no room for growth. Aquafeed will therefore be impacted by the projected lack of fish oil.

Non-food use production will stay at the 1998 production level of around 3.3 Mt due to the limits already reached by reduction fisheries at the EU and world level. If the industry is concerned about the future availability of raw material for fishmeal and fish oil production, it also knows that levels of fish landings can't increase in the future. The only possibility is to reduce wastage and increase the recycling of discarded and wasted fish, which is equal to the current quantity of raw material going into the fishmeal industry[32] (Barlow, 2003).

**Table 3-6: Non-food use production by FAO groups of species and OECD group of commodities from 2005 to 2030**

(tonnes live weight)

| Gp Species | Av. 94-98 | 2005 | OECD gp | Av. 94-98 | 2005 |
|---|---|---|---|---|---|
| Marine fish, pelagic, small | 1534381 | 1447255 | Fish/marine mammal, fat, oil | 365594 | 329203 |
| Marine fish, demersal | 93322 | 51777 | Flour, meal unfit for human consumption | 17087 | 791572698 |
| Marine fish, others | 446671 | 402869 | **Total NFU Production EU-15** | **20743** | **741901901** |
| **Total NFU Production EU-15** | **2074374** | **1901901** | Fish/marine mammal, fat, oil | 11 | 50 |
| Marine fish, pelagic, small | 11483 | 18324 | Flour, meal unfit for human consumption | 63202 | 55409 |
| Marine fish, demersal | 42077 | 32456 | **Total NFU Production EUR-6 NC** | **63213** | **55459** |
| Marine fish, others | 9653 | 4679 | Fish/marine mammal, fat, oil | 291723 | 301139 |
| **Total NFU Production EUR-6 NC** | **63213** | **55459** | Flour, meal unfit for human consumption | 7774 | 361027671 |
| Marine fish, pelagic, small | 770104 | 1020641 | **Total NFU Production EUR-7 NC** | **10691** | **591328810** |
| Marine fish, demersal | 13761 | 12819 | **Total NFU Production EUR-28** | **32067** | **463286169** |
| Marine fish, others | 284649 | 295349 | | | |
| Aquatic mammals | 646 | 0 | | | |
| **Total NFU Production EUR-7 NC** | **1069159** | **1328810** | | | |
| **Total NFU Production EUR-28** | **3206746** | **3286169** | | | |

Source: database

## 3.4 Foreign trade 2005-2030

### *3.4.1 New rules and regulations*

Foreign trade will see significant changes from the previous period due to the progressive disappearance of trade barriers and tariffs and the emergence of new regulations dealing with quality, safety[33] and the environment. The World Trade Organization's rules about the most

[32] An FAO (2000) survey showed that something like 25 million to 30 million tonnes of fish are being discarded or wasted and not produced into any usable product.

[33] For example, in late January 2003 the EU Standing Veterinary Committee suspended the import of animal

privileged nations will be more and more applied which means that all trade countries will benefit from the same advantages that the ACP countries currently enjoy. Hence, the evolution of the EU-ACP countries is crucial for the issues concerning the EU's international trade in general.

Tariff concessions for fishery products granted to ACP countries by the EU have become less preferential. Tariff differentials have been eroded by the general reduction of customs rates generated by GATT agreements, whilst more and more countries benefit from access to the European market, which is free of custom duties. For example, since 2001, under the Everything but the Arms (EBA) initiative, Least Advanced Countries (LAC) have received the same benefits as ACP countries. This tariff reduction has, for several years, been accompanied by changes to the conditions of access to the market (Failler & Lecrivain, 2003).

After 2008, the principle of non-discrimination among ACP States, pillar of the Lome partnership, will no longer apply. The 40 LAC are guaranteed to keep the not-reciprocal preferences of Lome after 2008 (see in Annex 12 the list of counties). The 31 non-LAC countries can preserve their current level of access to the European market only within the framework of an Economic Partnership Agreement (EPA)[34]. Any country that chooses not to sign an EPA could be transferred to an alternative system that has yet to be defined. However, it is likely that this as yet undefined system will be similar to the only option currently allowed by the WTO, namely the General Preference System (GPS) (Jabot, 2000; Lecomte, 2000). From 2004, the EU will study the alternative possibilities of the current partnership; 2004 is also the year in which the next revision of the European GPS will take place (Failler and Lecrivain, 2003).

Labelling and traceability will also be major issues in both intra-EU and third country trade for next years. As Ababouch (2002) pointed out, labelling and traceability could result in the erection of some new barriers or the introduction of another discriminatory principle in the EU international trade. Principal exporting countries of the ACP group thus benefited form EU funds to set up safety and techniques measures that any potential exporter company must from now respect. Regarding labelling, a few points can be highlighted:

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products originating from China, asserting that potentially risky chloramphenicol residues were found in samples of shrimps and prawns imported from China. Also, on July 30, 1997, the EU banned imports of fishery products from Bangladesh as a result of EU inspections of Bangladesh's seafood processing plants. The inspections found serious deficiencies in the infrastructure and hygiene in the processing establishments and insufficient guarantees of quality control by Bangladeshi government inspectors. The ban was estimated to cost the Bangladesh shrimp-processing sector nearly $15 million € in lost revenues from August to December 1997. The impact on both the industry and the economy of Bangladesh was substantial. The only way Bangladesh can improve its export position in the shrimp market is to improve the safety and quality of its exports. Safety improvements over the last two decades, with a major effort in the late 1990s, have been made by the industry and government, and by bilateral and multilateral agencies providing technical assistance. While the short-term loss in foreign currency from the EU ban was high for a developing country, the ban did increase the commitment by industry and government to raise product quality to meet international standards. Both exporters and government made major investments in plant infrastructure and personnel training in order to achieve international technical and sanitary standards. This included new employee acquisition and employee training, sanitation audits, plant repair and modification, and also new equipment (Cato & Subasinghe, 2000).

[34] The Cotonou agreement, signed into 2000, proposed a new comprehensive framework for the ACP-UE partnership. In order to be compatible with the rules of OMC, the European Union recommended a treatment differentiated from the ACP countries, according to the level of development and areas (ECDPM, 2001). Three possibilities are offered to the ACP countries:

- Signature of Economic Partnership Agreements (EPA).
- The least Advanced Countries (LAC), which will choose for the period of negotiation not to conclude some EPA, will preserve the tariff preferences of Lomé.
- The non-PMA, which will choose not to conclude some EPA, will profit from a new mode to define.

- On January 1, 2002, new labelling requirements (Regulation 2065/2001) for fishery and aquaculture products went into force. All products offered for retail sale in the EU must be properly labelled providing the following information:
- commercial name of the species (each member state has established a list of commercial designations)
- production method: "caught in..."; "caught in freshwater"; "farmed" or "cultivated". Member states may decide to omit this requirement when the commercial designation and catch area clearly indicate that the species were caught at sea.
- catch area: for products caught at sea, a reference to one of the areas listed in the Annex; for products caught in freshwater, a reference to the country of origin; for farmed products, a reference to the country in which the product undergoes the final development stage. Operators may indicate a more precise catch area.
- To improve the traceability and control at all marketing stages - from the ship to the shop - the information concerning the commercial designation, the production method and the catch area for all fishery and aquaculture products must be provided either on the label, on the packaging or by means of a commercial document accompanying the goods (e.g. the invoice).

### *3.4.2 Imports 2005–2030*

In 2002, EU-15 imports came from countries on the North Atlantic (Norway, Iceland and the Faeroe Islands), which account for 30 percent of all imports, South America (Argentina, Ecuador and Chile), South East Asia (Thailand, India, etc.) and Africa. Russia, China and the United States are also significant suppliers. In value, ACP countries accounted for only 14 percent of total imports in 2002.

For the import of fishery products for human consumption and bivalve molluscs, the European Commission divides third countries into two categories. The first category includes countries whose processing systems and health standards are at least equivalent to the EU's and whose competent authorities have been audited by an EU inspection team. The countries in the second category have provisional clearance until 31 December 2003, and have not yet been audited by an EU inspection team. Products from this category may be subject to additional national legislation[35].

Since EU production will not be sufficient to cover the needs of the 500 million inhabitants in 2030, imports of raw material and commodities will help to fill the gap between a EUR-28 with more or less stable production (less exports) and increased consumption in most of the member states.

#### *3.4.2.1 Food use imports 2005-2030*

In 2030, EUR-28 will import 11 Million tonnes of food use commodities, which corresponds to an increase of 1.4 Million tonnes since 1998 (+15 percent); highest growth rates will be

[35] Directive 97/78/EC, as amended, lays down principles for veterinary check on products imported from third countries. Inspections of consignments include: documentary check (health certificates), identity check (visual inspection to ensure consistency between certificates and product) and physical check (inspection of the product itself). Directive 2002/99/EC establishes animal health rules governing the production, processing, distribution and introduction of products of animal origin for human consumption.
Each shipment must be accompanied by a health certificate using the model provided by Commission Decision 2001/67/EC for fishery products and by Commission Decision 96/333/EC for molluscs, echinoderms, tunicates and marine gastropods.

experienced in the EUR-6 NC (47 percent) and EUR-7 NC (28 percent). The significant increase in market power as a consequence of EU adhesion will be moderated by an increase of higher commercial value commodities in a general sense. A growing part of the trade with Russia should shift towards Eastern European countries. Imports to the EU-15 will only increase by 12 percent. In terms of quantity, the EU-15 will account for more than 70 percent of total growth.

Germany, France, Italy and Poland will be the major contributors to an increase in imports, with volumes between 190 000 tonnes and 280 000 tonnes. Spain alone will see a reduction of its imports due to a decrease in national demand (a consequence of a very slow population growth, i.e. less than 100 000, and a subsequent decrease in demand from consumers). Candidate member states from the former Soviet Union that have been forced to reduce their consumption of fish by the collapse of the Soviet Union, should recover and better supply their national markets with imports from other European countries and the rest of the world.

**Table 3-7: Food use imports by country from 2005 to 2030**

(tonnes live weight)

| Country | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | # 98/30 | % 98-30 |
|---|---|---|---|---|---|---|---|---|---|
| Austria | 88250 | 93846 | 96872 | 100201 | 103865 | 107905 | 112362 | 22303 | 25 |
| Belgium-Luxembourg | 327049 | 366120 | 370663 | 375952 | 382032 | 388953 | 396769 | 35831 | 10 |
| Denmark | 564041 | 610941 | 614054 | 617348 | 620836 | 624532 | 628450 | 21583 | 4 |
| Finland | 67561 | 71622 | 74650 | 78110 | 82062 | 86576 | 91731 | 23723 | 35 |
| France | 1382082 | 1545030 | 1582132 | 1620991 | 1661715 | 1704417 | 1749224 | 253375 | 17 |
| Germany | 1222634 | 1382762 | 1422901 | 1465856 | 1511762 | 1560766 | 1613020 | 281965 | 21 |
| Greece | 118116 | 157688 | 161706 | 165993 | 170569 | 175457 | 180682 | 28205 | 18 |
| Ireland | 35377 | 44525 | 44771 | 45025 | 45290 | 45565 | 45853 | 1658 | 4 |
| Italy | 877741 | 995492 | 1027111 | 1061091 | 1097642 | 1136991 | 1179390 | 224555 | 24 |
| Netherlands | 572331 | 592280 | 596981 | 601888 | 607009 | 612352 | 617927 | 31898 | 5 |
| Portugal | 486304 | 514084 | 514861 | 515864 | 517113 | 518629 | 520437 | 7095 | 1 |
| Spain | 1041343 | 1150508 | 1135216 | 1122518 | 1112234 | 1104200 | 1098268 | -78392 | -7 |
| Sweden | 185820 | 216458 | 217351 | 219104 | 221727 | 225248 | 229715 | 13035 | 6 |
| United Kingdom | 742943 | 808445 | 826942 | 846328 | 866657 | 887985 | 910371 | 126418 | 16 |
| **Total EU-15** | **7711594** | **8549802** | **8686210** | **8836269** | **9000513** | **9179576** | **9374200** | **993251** | **12** |
| Cyprus | 13162 | 15616 | 16401 | 17274 | 18244 | 19322 | 20521 | 5874 | 40 |
| Czech Republic | 78179 | 81166 | 86404 | 92389 | 99210 | 106966 | 115774 | 40830 | 54 |
| Estonia | 48532 | 78919 | 78846 | 78870 | 78999 | 79239 | 79600 | 428 | 1 |
| Hungary | 22654 | 29374 | 31909 | 34837 | 38221 | 42136 | 46667 | 20283 | 77 |
| Poland | 319405 | 388487 | 414312 | 443123 | 475293 | 511242 | 551452 | 194716 | 55 |
| Slovenia | 13470 | 14053 | 14615 | 15234 | 15917 | 16669 | 17501 | 4149 | 31 |
| **Total EUR-6 NC** | **495403** | **607616** | **642487** | **681728** | **725882** | **775575** | **831515** | **266280** | **47** |
| Bulgaria | 11741 | 25269 | 28437 | 32030 | 36109 | 40741 | 46007 | 24557 | 114 |
| Latvia | 47917 | 45685 | 46730 | 47991 | 49516 | 51364 | 53610 | 9098 | 20 |
| Lithuania | 82809 | 116224 | 123641 | 131684 | 140414 | 149901 | 160218 | 53431 | 50 |
| Malta | 9168 | 11141 | 11773 | 12449 | 13175 | 13951 | 14784 | 4458 | 43 |

| Country | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | # 98/30 | % 98-30 |
|---|---|---|---|---|---|---|---|---|---|
| Norway | 303377 | 369583 | 371454 | 373478 | 375671 | 378051 | 380636 | 13440 | 4 |
| Romania | 28075 | 62892 | 70090 | 78290 | 87656 | 98384 | 110707 | 56470 | 104 |
| Slovakia | 34179 | 29741 | 32086 | 34693 | 37589 | 40809 | 44387 | 17539 | 65 |
| **Total EUR-7 NC** | **517265** | **660536** | **684211** | **710615** | **740131** | **773201** | **810347** | **178993** | **28** |
| **Total EU-28** | **8724262** | **9817953** | **10012909** | **10228612** | **10466526** | **10728352** | **11010631** | **2438523** | **15** |

Source: database

All the OECD groups of commodity production will benefit from the augmentation of imports. The group of crustacean, molluscs and other prepared invertebrates will grow at the highest rate (40 percent), but its contribution will still be minor with about 170 000 tonnes of a total of 11 Mt The main groups will be unchanged from the period 1989-1998: prepared/preserved fish (2.2 Mt in 2030) fresh/chilled fish (2.1 Mt), fish fillet (1.9 Mt), frozen fish (1.8 Mt); but the share of the total volume will be different: prepared/preserved fish (20 percent in 2030, instead of 17 percent in 1998) fresh/chilled fish (20 percent, 22 percent), fish fillet (17 percent, 16 percent), frozen fish (19 percent, 17 percent). Globally, the fresh fish share will be gradually eroded by preserved and prepared fish commodities.

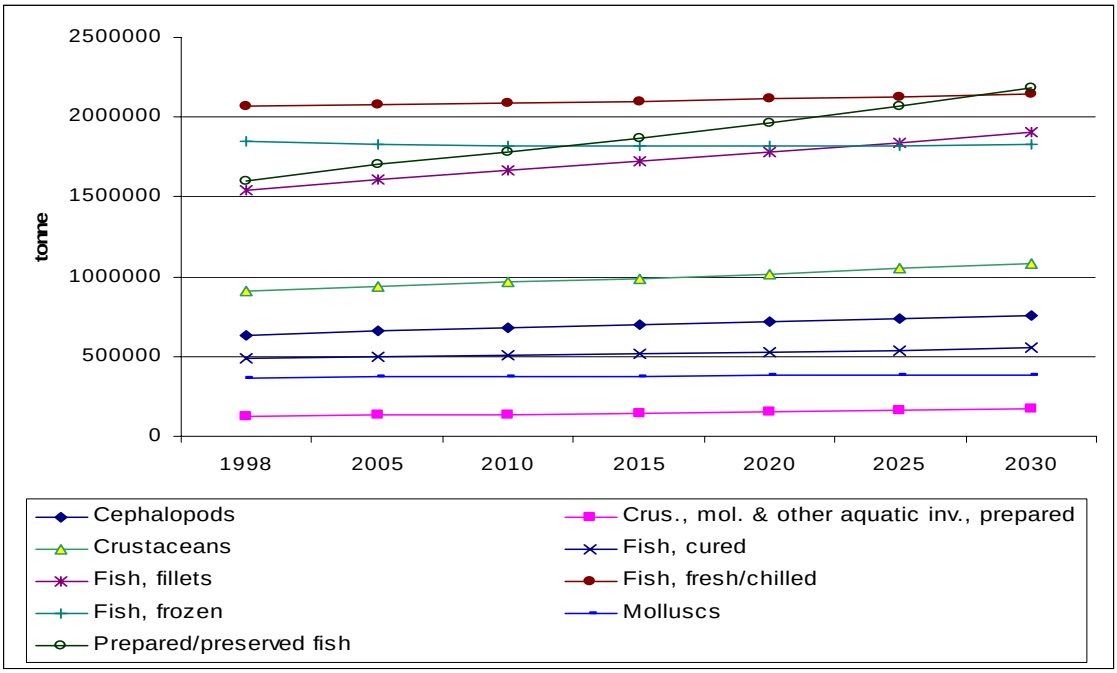


**Figure 3-18: Imports by OECD groups of commodities from 1998 to 2030**

The import of all groups of species will increase. Each group will continue to account for the same percentage (within one or two percent) of total imports. In 2030, demersal species will remain the most significant imported species, increasing by 12 percent and accounting for 30 percent of the total value of imports (as in 1998). Cod, Alaska pollock and hake will be the three principle species imported by EUR-28 in 2030, coming in as fresh/chilled, frozen or filleted fish. Cod and Alaska pollock will come from Northern European countries, Russia and North America, whilst hake will be imported from West Africa and Argentina.

Two million tonnes of small pelagic species will be imported in 2030, of which herring and mackerel will account for nearly 80 percent (1.6 Mt). Pilchard, sprat and anchovy will be the other important species. Imports of small pelagics will consist of prepared/preserved (canned), fresh/chilled and frozen commodities. Northern European countries (Iceland and the Faeroe

Islands) will provide a substantial part of the herring, mackerel and sprat imports, whilst South American and North West African countries will contribute to imports of pilchard and anchovy.

Over a million tonnes of tuna, crustaceans and other marine fish will be imported in 2030. Asian countries such as Thailand will be largely responsible for imports of tuna. The Seychelles in the Indian Ocean will be able to export its own production to Europe by 2030, as it is currently developing its own fishing fleet (seiners) to compliment (and supply) its tuna canning factory in Victoria. Tuna will be imported both frozen and in cans. Eighty percent of imported crustaceans will be shrimp from Asia, South America and the southern countries of Africa (Josupeit, 1999, 2000). Most of these shrimp will be frozen. The other crustaceans like crab and lobster will be imported to Europe alive or fresh from places such as Canada and Morocco.

By 2030, imports of freshwater and diadromous fish will have increased by 7 percent. Imports of freshwater fish will be largely composed of carp, tilapia and Nile perch, coming from China, South America and Africa. A proportion of diadromous fish imports will be intra-European trade, since Norway will be a member of the EUR-28 by 2030 (Ospad, 2000).

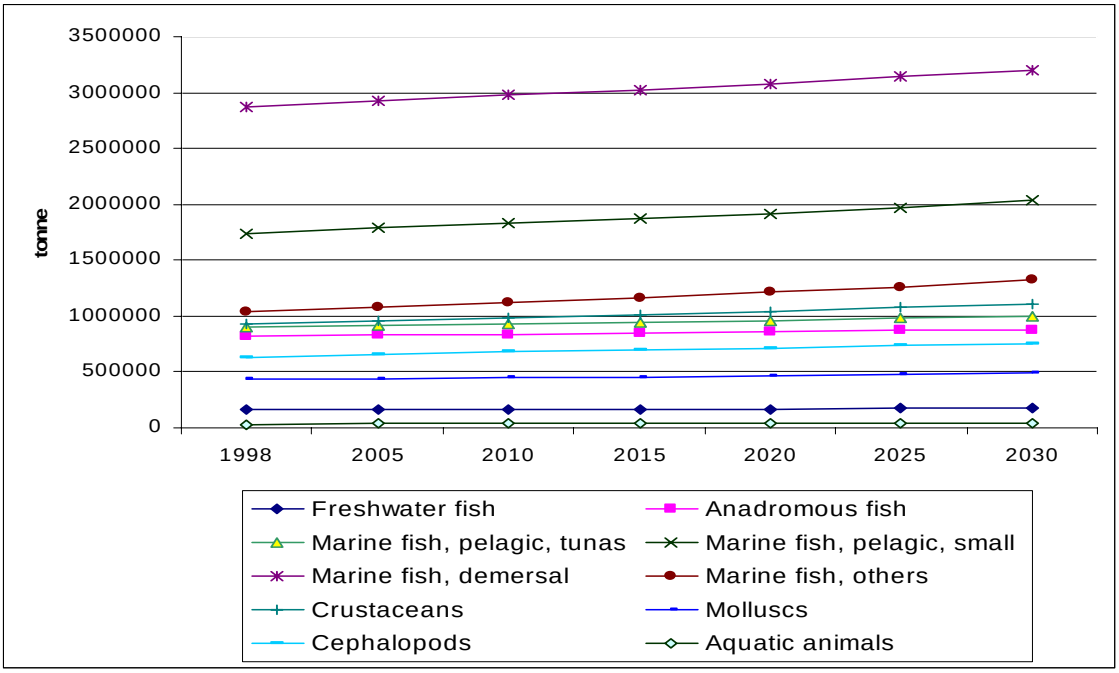


**Figure 3-19: Imports by FAO groups of species from 1998 to 2030**

Detailed tables of food use imports by FAO groups of species and by OECD groups of commodities are presented in Annex 14.

### *3.4.2.2 Non-food use imports 2005-2030*

Non-food use imports decreased slightly between 1989 and 1998, but will remain stable up to 2030 except in those countries where it is expected aquaculture production will increase significantly. Norway will be the only EUR-28 country to increase its imports of fishmeal and fish oil in order to satisfy its aquaculture producers. The estimated volume of aquafeed products will be about 750 000 tonnes and will come from Iceland, Peru and Chile. In 2030, the total volume of EUR-28 non-food use imports will be around 3 Mt.

### *3.4.3 Exports 2005-2030*

#### *3.4.3.1 Food use exports 2005-2030*

Countries that will see an increase in their exports will be those that increase their production from aquaculture. Therefore, Norway will increase its export of diadromous fish to other European countries and Japan by 100 000 tonnes. Overall, EUR-28 exports will increase by 100 000 tonnes to reach 8.1 Mt This small size of the increase can be explained by the fact that increased production from aquaculture will be largely absorbed by the national market and will not enter into the trade circuit (see Annex 12 for tables).

#### *3.4.3.2 Non-food use exports 2005-2030*

Non-food use exports in 2030 will stay at their 1998 level: around 2.3 Mt.

### *3.4.4 Intra-EU trade 2005-2030*

Intra-EUR fish trade for human consumption will significantly increase as:

- Norway will provide the majority of intra-EU trade in salmon;
- Newly joined Eastern European countries will absorb an increasing part of the processed products made in the former EU-15;
- There should have some delocalisation of the processing activities toward the Eastern countries.

Overall, the development of intra-EU trade will depend mainly on the marginal costs reduction that will occur with the development of new infrastructures and communications between the new Member states and old Member States (Bernard, 1997; Anon., 2001f; Guillotreau *et al.*, 1998).

# 4 DISCUSSION AND CONCLUSION

The projections of future fish consumption are based on assumptions derived from past trends, literature review and expert consultation. More than 1 200 assumptions were made for growth rates in captures, aquaculture, commodity production, imports and exports of commodities. For captures, it is likely that the European vessel production will face zero growth up to 2030. Recent regulations by the European Commission on cod and haddock in the North Sea confirm the high level of stock exploitation and the impossibilities of catch increasing. Aquaculture is growing at some substantial rate for salmon and sea bass and sea bream, but environmental constraints, coastal zone occupation choices by the civil society, and health regulations will not allow fish farming to continue its exponential trends in the future.

The European processing industry will face a major challenge in the near future with imports of competitive processed fish from developing countries produced to high standards of quality and safety. Considering that the European industry will be more and more dependent form third countries for its supply on raw material, it is likely that apart from the regrouping of companies under some consortium umbrella, the fishing industry will suffer from this competition and consequently decline. Imports from third countries will also benefit from the progressive elimination of trade barriers and the disappearance of preferences accorded to ACP countries. For Asian countries this should lead to a reinforcement of their competitive position in the world market.

The report does not raise the question of whether supplying the growing European market will constrain the increasing consumption of different products. The main reason for not considering supply from abroad as a constraint is that average fish prices in the European market are slightly above the international price (except in Japan) and the other high-demand countries like the USA (Karasawa, 1996 and 2000). Consequently the projections implicitly assume that there will be a shift in trade products from other countries to Europe. That already happens with African countries that are part of the ACP group. North West African countries experienced a decline in their net supply in demersal fish over the last ten years to the profit of European countries, mainly Spain, France and Italy. There is still some potential for further exports growth from these countries but with the subsequent negative impact for their fish supply.

Prices have been mentioned in the report but have not been used to adjust the levels of supply and demand. This is because the price series over the period 1989-1998 did not show any major changes and because deflated international prices for the main species since 1950 have been stable. In addition, aquaculture production has provided a ceiling for the price of groundfish species: salmon price are taking more and more the role of reference price for the other aquaculture and wild species. That is, aquaculture species have been a price regulator that has tended to go down with each improvement in feeding technology. That has lead from time to time to some dumping procedures on the European market.

Results have shown an increase in the demand for seafood products to 2030. The average per capita consumption of the EUR-28 will move form 22 kg/c/yr in 1998 to 24 kg/c/yr. The two kilogram increase means that the net supply will have to rise by 1.6 Mt (respectively 1.1 Mt for the 2 extra kg and 550 000 tonnes due to the 22 M extra inhabitants). Aquaculture growth

will not be able to meet the increasing demand so imports will rise to 11 Mt (+15 percent from 1998), increasing the dependency of Europe on the rest of the world.

The adhesion of new countries to the current EU-15 will increase the intra-European trade: firstly because a large part of the external European trade is currently between Western countries and Eastern and Northern countries; secondly because of a delocalisation of Western plants to former Soviet Union countries like Poland or Baltic States, and thirdly because of a reduction of the re-exports mechanism between Western countries. The last point will lead to the suppression of some established fish circuits in order to cut down costs, which more or less are transaction costs. Overall, some direct connections will become established between world producers and the European processing industry.

The increasing demand for ready-to-eat products will be observed everywhere in Europe in 2030 but will be more marked in the EU-15 countries because of their high purchasing power. Changes in consumption are mainly changes in commodities rather than species: the same fish species will be consumed in 2030 but they will be in a different shape. Eastern countries will progressively catch up with the EU-15 countries regarding consumption patterns. The improvement of their economies and changes of consumption habits will slowly allow Eastern countries to develop a market driven by demand rather than by supply. But behind the apparent standardization of consumption, regional differences will still exist: a Spanish consumer will not have the same consumption pattern as a Swedish or a Romanian consumer. National preferences will be exacerbated through the net supply of commodities that respect historical tastes and habits, but also integrate the constraints of modern living.

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## ANNEX 1: HISTORY OF THE EUROPEAN UNION

| | |
|---|---|
| 1946, September, 19 | Winston Churchill, like Victor Hugo a century earlier, calls for "United States of Europe". |
| 1950, May, 9 | Paris: French Foreign Minister, Robert Schuman, makes a declaration. |
| 1951, April, 18 | Treaty of Paris: Belgium, Germany, France, Italy, Luxembourg, and the Netherlands (the six) sign a treaty establishing the European Coal and Steel Community (ECSC). |
| 1957, March, 25 | Treaty of Rome: the Six sign treaties setting up the European Economic Community (EEC) and the Atomic Energy Community (EURATOM). |
| 1960 | Implementation of the European Social Fund created in 1958 |
| 1962 | Implementation of the Common Agricultural Policy, first common European policy. |
| 1965, April, 8 | Treaty signed merging the three European Communities (EEC, EURATOM, ECSC), further on called the "EC". |
| 1968, July | Custom union implemented between the Six. |
| 1973, January, 1 | Denmark, Ireland and the United Kingdom join the EC. |
| 1974 | Heads of States and Governments decide to meet regularly as the European Council to deal with Community affairs and political co-operation. |
| 1975 | Establishment of the European Regional Development Fund (ERDF) and first Lomé Convention signed between the European countries and 46 developing countries from Africa, the Caribbean and the Pacific. |
| 1979, March, 13 | The European Monetary System (EMS) and the ECU (European Currency Unit) take effect. |
| 1979, June | First election of the European Parliament (with a 5-year mandate) through direct universal suffrage. |
| 1981, January, 1 | Greece joins the EC. |
| 1985, June, 14 | Presentation of the White paper on completion of a single market. |
| 1985, June | Signature of Schengen Agreement (Articles 30-31-32-34-62-63-66-95 of the Amsterdam Treaty) on free movement of persons between Belgium, France, Germany, Luxembourg and the Netherlands. |
| 1986, January, 1 | Portugal and Spain join the EC. |
| 1986, February | Single European Act (SEA) enters into force, supplementing the Treaties of Rome. The SEA starts the deepening process within the EC, and sets January 1, 1993 as the completion date of the single market. |
| 1988, March, 29 | Presentation of the Cecchini report, quantifying the advantages of a single market and assessing the cost of non-completing Europe. |
| 1989, December | Adoption by 11 Member States (without the UK) of the European Social Charter, and declaration approving the German reunification and integrating the Eastern Lander into EC. |
| 1989 | PHARE (Poland and Hungary Assistance for Restructuring of the Economy) program is launched. It was progressively extended to the other Central European Countries in the following years. (European |

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| | Commission, 1998a) |
| 1990 | Opening of the inter-governmental conference preparing the EMU (Economic and Monetary Union) and the Political Union. |
| 1991, October, 21 | Agreement on setting up the European Economic Area (EEA) uniting in a single market the 380 million inhabitants of the 12-EC Member States and the seven countries (Austria, Finland, Iceland, Liechtenstein, Norway, Sweden, Switzerland) of the European Free Trade Association (EFTA). |
| 1992, February | Signature in Maastricht of the Treaty instituting the European Union, a far-reaching project, building on three major pillars: the EC (Custom Union, Single Market, Common Agricultural Policy, Structural Policy, Economic and Monetary Union), the Common Foreign and Security Policy, and the Co-operation in Justice and Home Affairs. |
| 1993 | The single market enters into force on January 1, and the Treaty on the European Union (EU) on November 1, after ratification by the 12 EU Member States. |
| 1994 | Hungary and Poland apply to join the EU in April. |
| 1994, December, 9 | Essen Summit and agreement on the strategy to bring Central and Eastern European States closer to the EU. |
| 1995, January, 1 | Austria, Finland and Sweden join the EU. |
| 1995 | Romania and the Slovak Republic apply to join the EU in June, Latvia in October, Estonia in November, Lithuania and Bulgaria in December. |
| 1996 | The Czech Republic applies to join the EU in January, and Slovenia in June. |
| 1997, July, 16 | The European Commission presents the Agenda 2000 outlining the EU strategy for the coming decade and dealing with challenges of the reinforcement of its policies and accession of new members within a strict financial framework. It also presents its opinions on the membership applications of the ten acceding countries. As a result, 5 first-tier countries are designated: the Czech Republic, Estonia, Hungary, Poland and Slovenia, along with a second-tier: Bulgaria, Latvia, Lithuania, Romania, and the Slovak Republic. |
| 1997, October | Signature of the Amsterdam Treaty, modifying and supplementing the Maastricht Treaty. |
| 1997, December, 12-13 | European Council in Luxembourg: agreement reached on the enlargement process and the refocusing of PHARE. |
| 1998, March, 1 | Signature of the Memorandum of understating (MOU) between the European Commission, the World Bank, the EBRD and the EIB, on the co-operation of these institutions in the enlargement process. |
| 1998, March, 30 | The EU launches its accession process by providing individual Accession Partnerships to all ten acceding countries. These documents set out the priority areas where further work is needed, and indicate the assistance available from the EU. |
| 1998, April | Formal negotiations for accession are launched with Poland, Hungary, the Czech Republic, Slovenia, Estonia and Cyprus |
| 1998, May | Designation of the EU Member States respecting the Maastricht criteria for entering the EMU and adopting the Euro. |
| 1998, November | The European Commission issues its reports on progress towards |

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|---|---|
| | accession by each of the candidate countries. |
| 1999, January | The Euro becomes the single European currency (UK obtained an "opting out" facility). |
| 1999, March, 25 | Heads of States and Governments, gathered in the Berlin European Council, ask Romano Prodi to set up a new Commission. They agree on a new Agenda 2000 package, concerning the financial perspectives for the period 2000-2006 and the draft regulations governing the Structural<br>Funds, the pre-accession financial instruments for candidate countries and the CAP. |
| 1999, May, 1 | The Amsterdam Treaty (Part 1, Part 2) enters into force after ratification by the fifteen EU Members States. |
| 1999, June | The Council adopts the new Agenda 2000 package. |
| 1999, October | The European Commission issues its second set of reports on progress towards accession by each of the candidate countries. The EC proposes to start negotiations with all of them, ending the distinction between the "first five", already in negotiations, and "second five" countries, undergoing a screening process on implementation of all Acquis, prior to negotiations. Invitations to negotiate for Bulgaria and Romania are conditional. |

The process of European integration showed a very clear acceleration during the Nineties, with:

- the deepening of the single market;
- its partial extension to Iceland, Norway and Liechtenstein through the European Economic Area (EEA), established 1 January 1994 (Egeberg & Trondal, 1999);
- the accession of Austria, Finland and Sweden on 1 January 1995, the signature of the treaty of Amsterdam on 2 October 1997;
- a reorientation of the Community interventions in the social field;
- the opening of the negotiations of adhesion on 30 March 1998 with Estonia, Hungary, Poland, the Czech Republic and Slovenia;
- the passage for 11 of the Member States of the European Union to the economic and monetary union (MOVED) on 1 January 1999 (Union européenne, 1999).

The progressive enlargements of Europe since its creation in 1957 by the Treaty of Rome mean that in 2003 the European Union is one of the most important markets for aquatic products in the world with 370 million consumers in the EU-15 countries and a potential market of more than 480 million with the inclusion of future member states. Over the last decade, fisheries production has been characterised by stagnation in landings but strong growth in aquaculture production (Anon., 2000a; DG-Fisheries, 2000). There is strong intra-regional trade in products because of the wide range of tastes between the Member States. In addition, the European Union has become the largest importer of aquatic products alongside Japan and the United States.

## ANNEX 2: DEFINITION OF COMPONENTS AND FLOWS TO CONSIDER

The figure below shows the level of importance conceded to the 10 different components and the 16 diverse flows of the fish "production-trade-consumption" system. Two sub-systems have been defined: the food use system and the non-food use one. The first deals with fish as food for human consumption, from the producer (aquaculture and capture producer) to the consumer; the second concerns the capture of industrial species, their reduction to fishmeal and oils and their integration into the composition of food stuff for aquaculture and livestock.

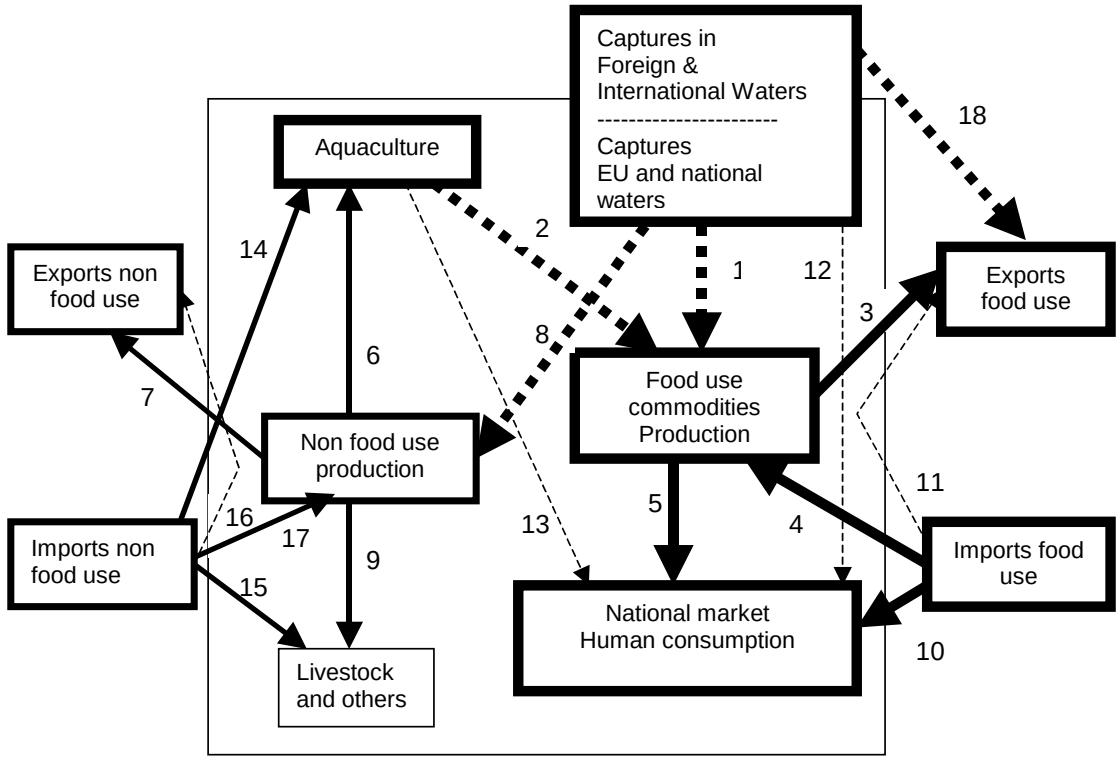


**Figure Annex 2-1: Hierarchy of aspects covered by the study**

Brief definition of components and comments on the data:

- Captures in foreign and international waters and Captures in EU and national waters: nominal catches landed by current EU-15 member states and countries that should join the EU in the future. All catches are in live weight equivalent and are designated for human or industrial purposes. Captures could have occurred inside the EU or national waters, in foreign waters through fishing agreements or in international waters (tuna mainly). These captures could have been landed in the country to which the boat belongs or in another country. From the databases received, it was not always possible to distinguish what was landed in a vessel's flag country from what was landed elsewhere. Similarly, the distinction between captures for fish reduction and captures for human consumption was not possible for some countries.

- Aquaculture: nominal production of fish species from aquaculture sites in the selected European countries. Usually, there is good accuracy of data at the country level except when there are changes in the nomenclature or the data collection procedure.

- Food use commodity production: production of commodities (see list below). Two types of products constitute the commodity production: (a) products that are processed on board from captures or on site from aquaculture and (b) products that are processed on land. The first category can be assimilated to the nominal production (same weight); the second one comes from the processing of landings and imports. Not all European countries keep good records of commodity production: most of the time, the number of products (labelled to species) is far less important than the number of species coming from captures and aquaculture. The level of production is also underestimated for most types of products. Many adjustments were made in the light of information collected. The important point here is that there is no bridge between captures and aquaculture components and commodity production. Captures are intended for both human and animal consumption and are not necessarily landed in the vessel's flag country. To produce foodstuffs that contain fish one can use the production of aquaculture, fishing and the import of raw material and semi-finished commodities. It is therefore improper to compare production from aquaculture and capture, and commodity production.

- Exports and imports for food use: products suitable for the human consumption occur in three different forms: raw material for entering into the production of fish commodities (fish for surimi, for example), semi-finalized product that will be processed to a more advance stage (gutted fresh fish, for example) or displayed on the consumer fish market, and finalized products that are ready for consumption (canned tuna, for example). Landings in foreign ports are considered as imports for the country where they are landed and exports for the country of the vessel that landed the fish. However, many countries do not make this distinction, so some catches landed in foreign ports are recorded as nominal catches but disappear in trade statistics if both countries (boat country and landing country) do not take these flows into account[36].

- National market human consumption: products that come from the national production of commodities sector and/or imports. The national market is addressed in the study by the food use net supply and the consumption per capita per year. The food use net supply corresponds to the total fish products available at a country level. The consumption per capita is the net supply divided by the number of inhabitants of the country. It gives an annual average of the weight of fish consumed per capita. Variation of consumption inside a country is presented in the Part 2 when information was available.

- Non-food use production: production of fishmeal and fish oil essentially. It is important to consider the non-food use production because of its implication to the

[36] A good example is the sardinella caught in Mauritanian waters by Dutch vessels (150 000 tonnes per year on average since 1996), landed in Las Palmas (Spain overseas territory), and shipped to Nigeria, Ivory Coast, Ghana and China. The only record of this is in the nominal catches database. These sardinella do not appear as exports in the Netherlands fish trade database, nor as imports and re-exports in Spain fish trade records.

potential growth of aquaculture of carnivorous species like salmon. The production of non-food use is also linked to livestock production. Using the national databases, it was not possible to make a distinction between what was for aquaculture feeding and what was for livestock purposes. The market for non-food products is aquaculture and livestock and others sectors.

- Exports and imports for non-food use: products unsuitable for human consumption and constituted by fish reduction, industrial species for reduction and other types of marine resources that can't enter into the human consumption sector (for cosmetics, for example). So, imports can be used as input to the fishmeal industry, livestock or aquaculture sector or other economic sectors (cosmetic and pharmaceutical sectors essentially). Exports have the same composition as imports. Re-exports of fishmeal were not taken into account in this study because of the difficulties in identifying them clearly and also because it was not considered as strategic information regarding the non-food use net supply.

- Livestock and others: sectors that use fishmeal and fish oil for the feeding of animals or other purposes. These sectors have not been investigated in the study.

A short definition of flows:

- Arrows 1, 2 and 18: flow of aquaculture and capture production toward the commodity production component inside the country (1 and 2) or outside (18). In many cases, the production of fish is made aboard the catching vessel, with the result that the Captures and Aquaculture components can be assimilated into the commodity production component. No data exist at the country level on these two flows. For the 22 regions (NUTS 3 level[37]) that were studied in 1991 and 1999 in order to assess their level of dependence on fishery and aquaculture activities, data are available but do not cover all of the regions that process fish in a country (Failler, 2003a). Thus, these two flows were estimated subjectively on the basis of the structure of the industry and the national level of supply.

- Arrows 3, 4, 5 and 10: production, imports and exports flows of fish products are the main flows described and analysed in this study. They define the country's net supply or the apparent consumption of edible products. Assumptions for the projections to 2030 relate to changes in these four types of flows. The distinction between flows 4 and 10 is not obvious, as the data doesn't give information on the destination of the product: market or processing plants.

- Arrows 6 and 8 are respectively the flow of raw material for the non-food use industry and the flow of fishmeal and oil for the nutrition of carnivorous species in aquaculture. These flows, which are from time to time described in the literature (professional essentially), have been most of the time supposed a priori.

- Arrows 7 and 9: flows of non-food use products that seem to be correctly recorded in country fish trade databases.

[37] European regional nomenclature.

- Arrows 12 and 13 are the flow of fish products that have not reached the official market and are not taken into account in the estimation of the net supply. To compensate for the absence of this information, some panel consumption surveys were used to compare the national net supply obtained from the addition of the national production and imports less exports to the national supply derived from the extrapolation of a sample to the total population.

- Arrows 14, 15, 17: flows of non-edible products that reach the aquaculture, fishmeal and oil processing, livestock and other sectors. There is no direct relationship between the evolution of the non-food use net supply and the evolution of aquaculture. The livestock sector plays a significant role here since for some countries there are opposite trends between the non-food use net supply and aquaculture.

- Arrows 11 and 16: imports re-exported without any transformation. They are not described in detail in the study but they have been taken into account.

Importance of the various components:

- Highly Important: the focus of the study being the human consumption, all components included in the sub-system "food use" were considered as highly important and as a consequence received special attention in terms of data collection, information, and the assumptions made for the projections to 2030. These components are presented in detail in the report, both for their recent history and the future situations.

- Important: "non-food use" sub-system, which included production of flour and oil, imports, exports. Aquaculture is also part of this sub-system as the nutrition base for the carnivorous species is fish protein from captures. Nevertheless, aquaculture received more attention as a unit of production for food use than as a unit of consumption of fishmeal and oils.

- Unimportant: the livestock and other sectors' situation in each country were not taking into account, either in terms of their recent history or the future. It was considered too much beyond of the scope of the study.

Classification of the flow importance:

- Highly important: All the flows related to the net supply of edible products (1, 2, 3, 4, 5, 10, 18);

- Important: All the flows related to the non-food use products (6, 7, 8, 9, 14, 15, 17);

- Unimportant: Flows of captures and aquaculture species that don't enter into the official market (12, 13), and the flows of food use and non-food use products that are imported and re-exported without any transformation (11, 16).

## ANNEX 3: SOCIO-ECONOMIC OVERVIEW OF EUROPEAN COUNTRIES

It is useful to clarify a certain number of socio-demographic characteristics within the European Union. This enables us to evaluate the respective significance of each country and to demonstrate any trends over the study period (European Parliament, 1999b-f, 2000a-f)

**Table Annex 3-1: Main indicators (1998)**

| Country | Area | Population (1 000 people) | Life Expectancy | | Demo depend % | GDP (Million €) | GDP/H | Real growth rate % | Human Dev. Index |
|---|---|---|---|---|---|---|---|---|---|
| | | | Female | Male | | | | | |
| Austria | 84 | 8075 | 80.6 | 74.3 | 51.3 | 188453 | 23338 | 2.9 | 0.932 |
| Belgium | 31 | 10192 | 80.6 | 74.6 | 50.3 | 223142 | 21894 | 2.9 | 0.932 |
| Denmark | 43 | 5295 | 78.5 | 74.1 | 50.4 | 155789 | 29422 | 2.7 | 0.927 |
| Finland | 338 | 5147 | 80.8 | 73.4 | 51.1 | 114782 | 22301 | 5.0 | 0.94 |
| France | 544 | 58727 | 82.2 | 74.5 | 52.9 | 1297764 | 22098 | 3.2 | 0.946 |
| Germany | 357 | 82057 | 80.3 | 73.6 | 46.2 | 1921764 | 23420 | 2.2 | 0.924 |
| Greece | 132 | 10511 | 80.8 | 74 | 46.8 | 108580 | 10330 | 3.7 | 0.923 |
| Ireland | 69 | 3694 | 78.6 | 73.4 | 49.5 | 75850 | 20533 | 8.9 | 0.929 |
| Italy | 301 | 57563 | 81.3 | 74.9 | 47.1 | 1058697 | 18392 | 1.3 | 0.921 |
| Luxembourg | 3 | 424 | 79.8 | 74.1 | 49.6 | 16389 | 38653 | 5.0 | 0.899 |
| Netherlands | 41 | 15654 | 80.5 | 75.2 | 48.7 | 349675 | 22338 | 3.7 | 0.94 |
| Portugal | 92 | 9957 | 78.8 | 71.6 | 47.5 | 97637 | 9806 | 3.5 | 0.89 |
| Spain | 505 | 39348 | 81.7 | 75.6 | 49.3 | 520196 | 13220 | 4.0 | 0.934 |
| Sweden | 411 | 8848 | 81.8 | 76.7 | 51.2 | 212003 | 23961 | 3.0 | 0.936 |
| United Kingdom | 242 | 59090 | 79.6 | 74.6 | 53.6 | 1252776 | 21201 | 2.2 | 0.931 |
| EU-15 | 3193 | 374582 | 80.4 | 74.3 | 49.5 | 7593497 | 20272 | 2.7 | |
| Cyprus | 9.2 | 700 | 80 | 75 | 55.5 | 6700 | 9571 | 5.0 | 0.913 |
| Czech Rep | 78.9 | 10300 | 78.1 | 71.1 | 44.9 | 46418 | 4507 | -2.3 | 0.884 |
| Estonia | 45.2 | 1400 | 76 | 64.7 | 50.6 | 4872 | 3480 | 4.0 | 0.758 |
| Hungary | 93 | 10100 | 75.1 | 66.4 | 46.8 | 40789 | 4039 | 5.1 | 0.887 |
| Poland | 312.7 | 38700 | 77.3 | 68.9 | 48.8 | 132795 | 3431 | 4.8 | 0.851 |
| Slovenia | 49 | 5400 | 76.7 | 68.6 | 47.7 | 17095 | 3166 | 4.4 | 0.875 |
| Total countries | 6 588 | 66600 | | | | 248669 | 3734 | 3.5 | |
| EUR-21 | 3781 | 441182 | 78.8 | 71.7 | 49.3 | 7842166 | 17775 | 3.1 | |
| Bulgaria | 110.9 | 8200 | 74.2 | 67.1 | 47.7 | 8996 | 1097 | 4.0 | 0.789 |
| Latvia | 64.6 | 2400 | 74.9 | 63.8 | 50.6 | 4930 | 2054 | 3.8 | 0.704 |
| Lithuania | 65.2 | 3700 | 76.8 | 65.9 | 50.4 | 9382 | 2536 | 4.4 | 0.75 |
| Malta | 0.3 | 400 | 80.1 | 74.9 | 49.9 | 3100 | 7750 | 7.6 | 0.899 |
| Romania | 237.5 | 22500 | 73.3 | 65.5 | 47.1 | 31082 | 1381 | -5.5 | 0.767 |

| Country | Area | Population (1 000 people) | Life Expectancy | | Demo depend % | GDP (Million €) | GDP/H | Real growth rate % | Human Dev. Index |
|---|---|---|---|---|---|---|---|---|---|
| Slovakia | 20.3 | 2000 | 78.7 | 71.1 | 43.3 | 16236 | 8118 | 3.9 | 0.887 |
| Norway | 324 | 4400 | 81 | 75.5 | 48.1 | 130770 | 29720 | 2.1 | 0.943 |
| Total 7 countries | 822.8 | 43600 | | | 48.2 | 204496 | 4690 | 2.9 | |
| EUR-28 | 4603.8 | 484782 | 77.9 | 70.4 | 48.7% | 8046662 | 16599 | 3.5 | |

Source: Eurostat, 2000a and 2000b; UNDP, 1997; United Nations, 1999

Germany had the strongest GDP in 1998, followed by France, the United Kingdom and Italy and these countries generated 69 percent of the total EUR-28 GDP in 1998. With respect to GDP per capita, however, Luxembourg had the highest rate, followed by Norway and Denmark. There are 13 countries with a GDP per capita higher than 18 000 €, 7 countries between 7 000 and 14 000 and 8 countries between 5 000 and 1 000 €. Ireland and Malta had the strongest growth in excess of 7 percent, while the Czech Republic and Romania exhibited negative rates. The growth rate of the EU-15 was, on average, weaker in 1998 than the growth rates of the potential applicants for enlargement (Euractiv, 1999).

With respect to social indicators, life expectancy at birth was higher in the EU-15 countries in 1998, than in the other European countries. Average life expectancy for EUR-28 was approximately 78 years for women and 70 years for men. It appears that women live longer in France, with an average of 82 years, and that men live longer in Sweden, with an average of 77 years. In 1998, France, Norway, Finland and the Netherlands ranked highest with respect to the index of human development while the weakest ranking countries were the Baltic States, Romania and Bulgaria.

## ANNEX 4: POPULATION PROJECTIONS 1998-2030

In 1998, the overall population of the EUR-28 countries was approximately 485 million. According to projections made by the United Nations and the EU (1999, 2000), this figure will exceed 500 million in 2015 and will reach about 504 million in 2030, representing a growth over this period of approximately 4 percent. In 1998, Germany had the largest population (17 percent of total EUR-28), followed by the United Kingdom, France and Italy. These four countries accounted for 53 percent of the total population of the EUR-28 and with

**Table Annex 4-1: Population projections from 1998 to 2030**

| Pop nb X 1000 | 1998 | 1999 | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|---|---|
| Austria | 8075 | 8096 | 8116 | 8220 | 8326 | 8384 | 8443 | 8502 | 8562 |
| Belgium | 10192 | 10216 | 10240 | 10361 | 10484 | 10571 | 10658 | 10746 | 10835 |
| Denmark | 5295 | 5308 | 5321 | 5386 | 5452 | 5489 | 5526 | 5563 | 5601 |
| Germany | 82057 | 82286 | 82516 | 83675 | 84854 | 84762 | 84670 | 84578 | 84486 |
| Greece | 10511 | 10557 | 10603 | 10838 | 11079 | 11174 | 11269 | 11365 | 11462 |
| Finland | 5147 | 5159 | 5171 | 5230 | 5290 | 5320 | 5350 | 5380 | 5411 |
| France | 58727 | 58944 | 59161 | 60261 | 61387 | 62104 | 62831 | 63565 | 64307 |
| Ireland | 3694 | 3699 | 3705 | 3732 | 3760 | 3834 | 3909 | 3986 | 4064 |
| Italia | 57563 | 57569 | 57575 | 57604 | 57633 | 57085 | 56543 | 56005 | 55473 |
| Luxemburg | 424 | 428 | 431 | 451 | 471 | 486 | 501 | 517 | 533 |
| Netherlands | 15654 | 15735 | 15817 | 16231 | 16659 | 16929 | 17204 | 17483 | 17766 |
| Portugal | 9957 | 9985 | 10012 | 10151 | 10293 | 10402 | 10513 | 10625 | 10737 |
| Spain | 39348 | 39432 | 39517 | 39941 | 40372 | 40339 | 40307 | 40275 | 40242 |
| Sweden | 8848 | 8875 | 8902 | 9038 | 9176 | 9322 | 9470 | 9620 | 9773 |
| United Kingdom | 59090 | 59177 | 59265 | 59703 | 60146 | 60590 | 61038 | 61489 | 61943 |
| **EU-15** | **374582** | **375465** | **376351** | **380823** | **385382** | **386790** | **388232** | **389698** | **391194** |
| Cyprus | 700 | 700 | 717 | 761 | 808 | 858 | 913 | 969 | 1029 |
| Czech Rep | 10300 | 10300 | 10310 | 10335 | 10361 | 10386 | 10412 | 10438 | 10463 |
| Estonia | 1400 | 1400 | 1408 | 1428 | 1448 | 1468 | 1489 | 1510 | 1531 |
| Hungary | 10100 | 10100 | 10114 | 10149 | 10184 | 10219 | 10254 | 10289 | 10325 |
| Poland | 38700 | 38768 | 38900 | 39500 | 39521 | 39606 | 39069 | 39153 | 39238 |
| Slovenia | 2000 | 2000 | 2003 | 2011 | 2018 | 2026 | 2034 | 2042 | 2050 |
| Total 6 countries | 63200 | 63268 | 63452 | 64184 | 64340 | 64564 | 64171 | 64402 | 64636 |
| **EUR-21** | **437782** | **438733** | **439803** | **445007** | **449722** | **451354** | **452403** | **454100** | **455830** |
| Bulgaria | 8200 | 8200 | 8201 | 8205 | 8208 | 8212 | 8215 | 8218 | 8222 |
| Latvia | 2400 | 2400 | 2410 | 2435 | 2460 | 2486 | 2512 | 2538 | 2565 |
| Lithuania | 3700 | 3700 | 3717 | 3760 | 3803 | 3847 | 3892 | 3937 | 3982 |

| Pop nb X 1000 | 1998 | 1999 | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|---|---|
| Malta | 400 | 400 | 403 | 411 | 419 | 427 | 436 | 445 | 453 |
| Romania | 22500 | 22500 | 22659 | 23063 | 23473 | 23891 | 24320 | 24753 | 25194 |
| Slovakia | 5400 | 5400 | 5402 | 5408 | 5414 | 5419 | 5425 | 5431 | 5436 |
| Norway | 4400 | 4421 | 4443 | 4551 | 4663 | 4756 | 4851 | 4948 | 5046 |
| **Total 7 countries** | **47000** | **47021** | **47236** | **47833** | **48441** | **49039** | **49651** | **50269** | **50898** |
| **EUR-28** | **484782** | **485754** | **487039** | **492840** | **498164** | **500393** | **502054** | **504369** | **506728** |

Source: Database and Eurostat, 2000; UNDP, 1997; United Nations, 1999

Spain and Poland this percentage is over 69 percent. The tables below present the estimated population for each country from 2000 to 2030[38] and the growth rates.

**Table Annex 4-2: Population growth rates, from 1998 to 2030**

(Geometric average) (in percentages)

| | 1998/2010 | | 2010/2020 | |
|---|---|---|---|---|
| | whole period | annually | Whole period | annually |
| Belgium | 2.82 | 0.24 | 1.65 | 0.16 |
| Denmark | 2.92 | 0.24 | 1.35 | 0.13 |
| Germany | 3.35 | 0.28 | -0.22 | -0.02 |
| Greece | 5.26 | 0.44 | 1.70 | 0.17 |
| Spain | 2.57 | 0.21 | -0.16 | -0.02 |
| France | 4.43 | 0.37 | 2.33 | 0.23 |
| Ireland | 1.77 | 0.15 | 3.89 | 0.39 |
| Italia | 0.12 | 0.01 | -1.91 | -0.19 |
| Luxemburg | 10.51 | 0.88 | 6.17 | 0.62 |
| Netherlands | 6.22 | 0.52 | 3.22 | 0.32 |
| Austria | 3.06 | 0.26 | 1.40 | 0.14 |
| Portugal | 3.32 | 0.28 | 2.11 | 0.21 |
| Finland | 2.74 | 0.23 | 1.13 | 0.11 |
| Sweden | 3.64 | 0.30 | 3.15 | 0.32 |
| United Kingdom | 1.77 | 0.15 | 1.47 | 0.15 |

| | 1998/2020 | |
|---|---|---|
| | Whole period | annually |
| Cyprus | 26.57 | 1.21 |
| Czech Rep | 1.08 | 0.05 |

[38] The geometric average has been used to estimate the population for each period considered. The rate of growth is based on the EU and United Nations projections for the period 2000-2010-2020.

| | | | | |
|---|---|---|---|---|
| Estonia | | | 6.16 | 0.28 |
| Hungary | | | 1.51 | 0.07 |
| Poland | 2.10 | 0.17 | 0.95 | 0.04 |
| Slovenia | | | 1.69 | 0.08 |
| Total 6 countries | | | 1.52 | 0.07 |
| | | | | |
| Bulgaria | | | 0.18 | 0.01 |
| Latvia | | | 4.56 | 0.21 |
| Lithuania | | | 5.06 | 0.23 |
| Malta | | | 8.62 | 0.39 |
| Romania | | | 7.78 | 0.35 |
| Slovakia | | | 0.46 | 0.02 |
| Norway | 5.81 | 0.48 | 3.95 | 0.40 |

Source: United Nations, 1999; Eurostat, 2000; UNDP, 1997.

## ANNEX 5: PRESENTATION OF PRODUCTION, TRADE AND CONSUMPTION, 1989-1998

### European fishing sector: facts and the Common Fishery Policy

Fishing and aquaculture are important economic activities in the European Union, even if their contribution to the gross national product of Member States generally represents less than one percent. However, those sectors can provide more than 10 percent of all jobs in certain zones, such the Atlantic coast of Spain or Scotland (Goulding *et al*., 2000).

In the EU-15 member states, landings of fish in 1990 were 6.38 million tonnes, rising to 7.45 million tonnes in 1995 (Eurostat, 2000c). Since then they have declined slightly to 6.3 million tonnes in 1998, with an estimated value of € 7.3 billion. Overall, the EU fleet accounts for about 7.5 percent (by quantity) of global marine capture fisheries. Although Denmark lands some 30 percent of the EU-15 total by volume (1.9 million tonnes) most of this is used for reduction, and is of relatively low unit value. With the exception of Sweden, in most other countries the landings are utilized mainly for human consumption, and have much higher unit value. After Denmark, Spain had the next highest landings, with 964 603 tonnes, followed by the UK, France, Netherlands and Italy. EU-15 vessels, particularly UK and Spanish ones, landed 423 000 tonnes outside the EU in 1998.

A growing gap between Community supply and demand for fish and fish products generates increasing dependence of the European market on imports from third countries. The deficit increased between 1990 and 1999 by 63 percent to reach € 8.6 billion, i.e. an amount equivalent to the value of the EU landings. Insofar as the imported quantities increased only by 32 percent, this reveals that those are high value imports. In 1997, the average value of the tons landed by Member States was € 995, that of Community aquaculture €1850, that of the tons exported by the EU € 1167, while the average of the imported ton amounted to € 2208 (European Commission, 2001a).

The Common Fisheries Policy (CFP) is the EU's instrument for the management of fisheries and aquaculture. Justification for the Community's involvement in fisheries is perfectly clear being based on Articles 38 and 39 of the Treaty of Rome signed in 1957 (Parlement européen, 1994). It means there must be common rules adopted at Community level and implemented in all Member States, covering all aspects of the fishing industry from the sea to the consumer.

It was only in 1970 that the first common measures were taken. Rules were set for access to fishing grounds, for a common market and for a structural policy to coordinate the modernization of fishing vessels, port infrastructures and processing plants (Commission européenne, 1996; Anon., 2000a). It was agreed that, in principle, all fishers should have equal access to all waters under the Community jurisdiction. However, a coastal band was reserved for local fishers and those who traditionally fished those areas. In 1976, Member States followed the worldwide movement to extend their rights from 12 to 200 miles. The change in the international access to fishing grounds really gave impetus to build the actual CFP, born after difficult negotiations in 1983 (Commission of the European Communities, 1991 and 2000, La Commission des Communautés européennes, 1993).

The CFP deals with the biological, social and economic dimensions of fisheries. To integrate those multiple areas, it relies on five instruments:

- The policy and conservation management of resources (allocations of TACs and quotas, restructuring plans, technical measures on fishing gears..).

- The structural policy for fisheries (modernization of the fleet, adaptation of activity vis-à-vis depletion of resources).

- The Common Organization of the Markets (prices of withdrawal, distinction between fishery products and aquaculture products, quality strategies, etc.).

- International relations (participation of the EU in several international and regional conventions, fisheries agreement with third countries).

- The monitoring and inspection policy (of growing importance within the CFP framework).

The Agenda 2000 introduced new guidelines for a better CFP, where concepts such as "responsible fishing" and "sustainable development" were highlighted (Vrignaud, 2002).

In March 2001, the Commission published a "Green Paper" intending to reform the CFP (European Commission, 2001b). The overall objective of this future Common Fishery Policy would be to reduce the European fleet and develop its aquaculture industry while paying more attention to environmental and consumer protection.

The new CFP was to take effect by January 2003 but given the strong objections from the Member States towards the Commission’s proposals, it seems that the first semester 2003 is a better schedule for the CFP's implementation.

**Production: captures, aquaculture and commodities 1989-1998**

***Captures***

The data for catches are expressed in live weight landing equivalents (i.e. weight of landed product multiplied by a suitable conversion coefficient). Consequently, these data exclude fishery products captured but not landed such as by-catch and fish rejected at sea (e.g. non-commercial species, fish below the minimal size). The origin of the landings depends on the flag of the fishing vessel, except in the case of joint-venture companies and chartering.

Total catches for the 28 countries reached an average 10.4 millions tonnes between 1989 and 1998. During the 1990s, this volume ranged from its lowest level in 1990 with 8.6 million tonnes to its highest level in 1995 at 10.8 million tonnes.

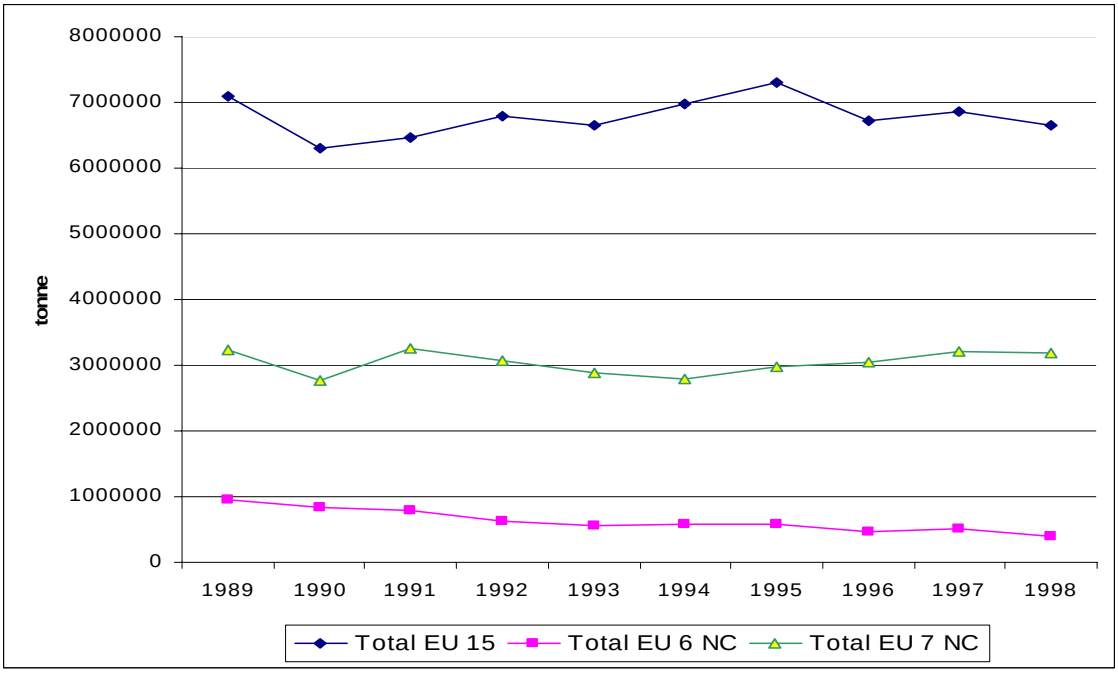


**Figure Annex 5-1: Evolution of captures from 1989 to 1998**

Between 1994 and 1998, the catches by the 15 countries currently in the European Union accounted for 66 percent of the total tonnage. The largest producers in this group were Denmark (26 percent), Spain (16 percent), the United Kingdom (13 percent) and France (10 percent). Norway is the largest European producer and represents nearly 27 percent of total EUR-28, followed by Denmark with 17 percent of the total. During the 1990s, Norwegian catches increased markedly by almost 40 percent, while Danish catches fell by 10 percent. Spanish and French catches also decreased by almost 10 percent, while total landings by the UK, except during the year 1990, recorded a regular overall increase of approximately 5 percent. The decline in landings by Poland, Romania and the Baltic States following the disintegration of the former Soviet Union should also be noted.

**Table Annex 5-1: Volume of captures by country from 1989 to 1998**

(tonnes)

| Country | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Ave 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 550 | 533 | 500 | 479 | 420 | 388 | 404 | 450 | 465 | 451 | 464 |
| Belgium | 39633 | 41459 | 39890 | 37119 | 36097 | 34255 | 35595 | 30822 | 30499 | 30834 | 35620 |
| Denmark | 1896296 | 1475676 | 1751211 | 1953581 | 1618687 | 1877750 | 2006022 | 1681461 | 1826810 | 1557203 | 1764470 |
| Finland | 150536 | 141833 | 128169 | 151753 | 156294 | 164269 | 167484 | 179077 | 180098 | 181304 | 160082 |
| France | 716371 | 697014 | 653305 | 667708 | 680458 | 702958 | 687246 | 644640 | 643293 | 603265 | 669626 |
| Germany | 344724 | 323908 | 232377 | 216557 | 252540 | 230150 | 239843 | 236388 | 259328 | 266579 | 260239 |
| Greece | 135391 | 136818 | 144206 | 159249 | 166879 | 190965 | 165333 | 162424 | 170493 | 128230 | 155999 |
| Ireland | 220308 | 248373 | 265509 | 279887 | 310303 | 327382 | 420888 | 366859 | 328063 | 360830 | 312840 |
| Italy | 419754 | 383348 | 407885 | 396466 | 395843 | 398232 | 396393 | 367755 | 342776 | 317600 | 382605 |
| Netherlands | 421287 | 406189 | 407164 | 433062 | 461771 | 420170 | 438097 | 410843 | 451842 | 536638 | 438706 |
| Portugal | 331036 | 325960 | 325583 | 295267 | 292549 | 267697 | 265281 | 263242 | 224821 | 228770 | 282021 |
| Spain | 1306309 | 1106244 | 1064977 | 1077414 | 1077674 | 1092277 | 1148914 | 1129602 | 1145129 | 1109043 | 1125758 |
| Sweden | 249840 | 251088 | 237063 | 307524 | 341871 | 386829 | 404612 | 371002 | 357408 | 410898 | 331814 |

| Country | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Ave 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| United Kingdom | 865635 | 771690 | 797221 | 818667 | 865780 | 884493 | 918421 | 874284 | 895121 | 927911 | 861922 |
| **Total EU-15** | **7097670** | **6310133** | **6455059** | **6794732** | **6657166** | **6977815** | **7294534** | **6718849** | **6856146** | **6659555** | **6782166** |
| Cyprus | 2560 | 2619 | 2619 | 2662 | 2703 | 2795 | 2589 | 2636 | 2388 | 2490 | 2606 |
| Czech Republic | na | na | na | na | 3178 | 3954 | 3926 | 3520 | 3317 | 3949 | 3641 |
| Estonia | 404930 | 367682 | 358464 | 131347 | 147175 | 124091 | 132576 | 108609 | 126057 | 121594 | 202253 |
| Hungary | 14969 | 16222 | 8440 | 8669 | 7886 | 8307 | 7314 | 7606 | 7406 | 7172 | 9399 |
| Poland | 538532 | 446535 | 427876 | 475571 | 404400 | 435729 | 426235 | 341171 | 361852 | 246966 | 410487 |
| Slovenia | na | na | na | 3882 | 2264 | 2310 | 2121 | 2329 | 2331 | 2177 | 2488 |
| **Total EUR-6 NC** | **960991** | **833058** | **797399** | **622131** | **567606** | **577186** | **574761** | **465871** | **503351** | **384348** | **628670** |
| Bulgaria | 91214 | 49099 | 50011 | 23986 | 13688 | 6405 | 8187 | 8846 | 11217 | 10716 | 27337 |
| Latvia | 545218 | 465023 | 413633 | 156778 | 141891 | 138167 | 149190 | 142642 | 105681 | 102330 | 236055 |
| Lithuania | 416744 | 345327 | 469964 | 188385 | 116998 | 49150 | 47784 | 55183 | 18319 | 20767 | 172862 |
| Malta | 916 | 6357 | 4965 | 4763 | 669 | 893 | 841 | 806 | 849 | 957 | 2202 |
| Norway | 1991575 | 1815394 | 2217309 | 2634280 | 2597621 | 2569478 | 2725332 | 2828848 | 3058240 | 3039779 | 2547786 |
| Romania | 177375 | 92739 | 95368 | 70759 | 13819 | 22215 | 49275 | 18259 | 8154 | 8965 | 55693 |
| Slovakia | na | na | na | na | 1179 | 1620 | 1936 | 1406 | 1376 | 1348 | 1478 |
| **Total EUR-7 NC** | **3223042** | **2773939** | **3251250** | **3078951** | **2885865** | **2787928** | **2982545** | **3055990** | **3203836** | **3184862** | **3042821** |
| **Total EUR-28** | **11281703** | **9917130** | **10503708** | **10495814** | **10110637** | **10342929** | **10851840** | **10240710** | **10563333** | **10228765** | **10453657** |

Source: database

Between 1989 and 1998, the main landings of the EUR-28 countries were comprised of small pelagics and demersal fish. Of the small pelagic species, Atlantic herring (1.6 millions tonnes in 1998), European sprat, Atlantic mackerel and European pilchard dominated and of the demersal species, cod, saithe and flatfish were most important and were the economic heavy weights of the sector. Species such as sandeels, sprat and blue whiting are primarily intended for industrial uses such as fishmeal and fish oil. Blue mussels and the common edible cockle make up the main molluscs production. There was also significant production from aquatic plants (brown seaweed) and crustaceans such as northern prawns and Norway lobsters. Others catches include freshwater fish, cephalopods (octopus, squid) and the diadromous fish such as sea trout and salmon. Almost all of the catches of the EU fleet are taken in fishing regions adjacent to the European Union.

It has to be noted that the demersal species group contain both high value species and industrial species such as Norway pout and sandeels. For instance, at the EUR-28 level, these industrial species represent more than 30 percent of the demersal species landings. For this reason, the level of demersal species seems to be stable over the last decade. But it fact, at the EU-15 level, there is a drop of cod catches by 40 percent between 1989 and 1998, 50 percent for the European plaice and saithe, and 40 percent for the hake, compensated by an important increase of the Norwegian landings of sandeels (+76 percent, 350 000 tonnes in 1998), Cod (+70 percent, 330 000 tonnes in 1998), saithe (+35 percent, 200 000 in 1998), haddock (+100 percent, 80 000 tonnes in 1998). So the global picture hides a significant decline in the EU-15 high value demersal species.

The share per group of species of the EU-15 catches in 1998 is presented below. Small pelagic species, like herring (730 000 tonnes), sprat (460 000 tonnes), European pilchard (390 000 tonnes), Atlantic mackerel (375 000 tonnes), Atlantic horse mackerel (370 000 tonnes) represent 41 percent of the total landings. Demersal, mainly composed of sandeels (690 000 tonnes), cod (260 000 tonnes), haddock (105 000 tonnes), European plaice (90 000 tonnes) and others, weight for 36 percent of the total EU-15 landings. Tuna species are mainly

Skipjack (135 000 tonnes) and Yellow Fin in the Indian Ocean and West African waters notably through the European fishing agreements with Seychelles, Senegal, Mauritania, Guinea Bissau and Ivory Coast.

Mussels accounting for a significant part of the EU-15 mollusc production in 1998 (120 000 tonnes in 1998) are mainly product in Denmark and Italy. The Common Edible cockle, produced in the Netherlands (70 000 tonnes), the Striped Venus from Italy (30 000 tonnes) and the Great Atlantic scallop caught in France and the United Kingdom (35 000 tonnes) also contributed to the 6 percent share of the total EU-15 catches.

Cephalopods, essentially octopus, squids and cuttlefish are caught both in European and West African waters[39] (Mauritania and Senegal).

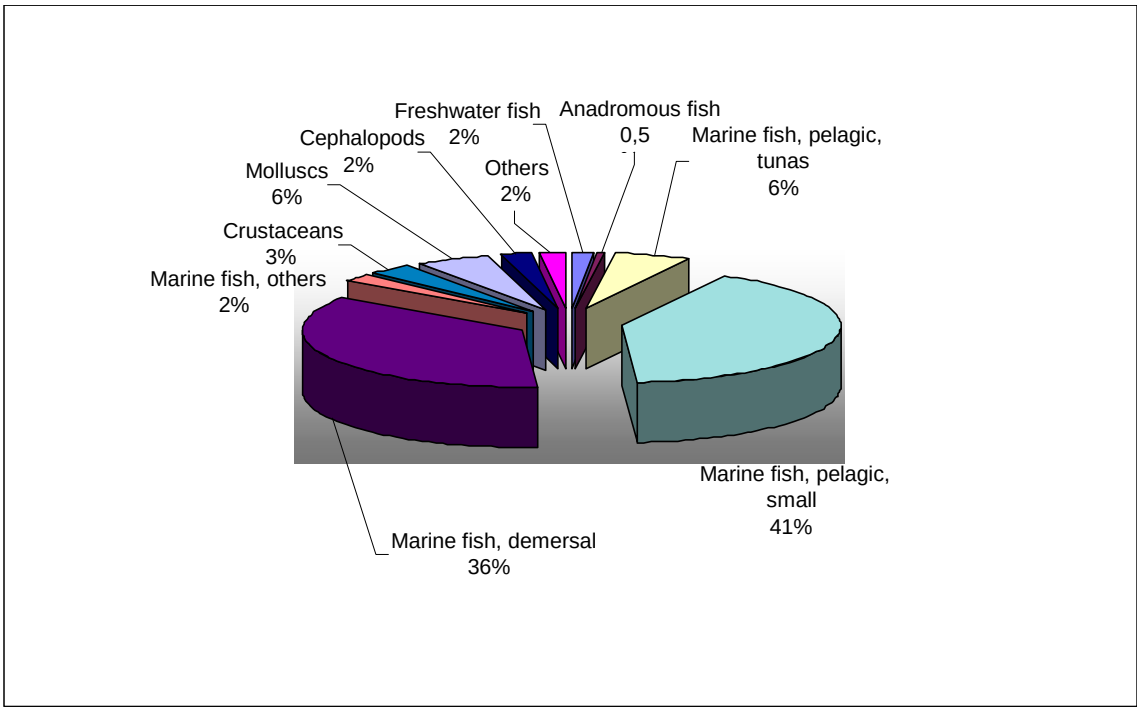


**Figure Annex 5-2: EU-15 shares of captures by FAO groups of species in 1998**

In 1998, captures form Cyprus, Czech Republic, Estonia, Hungary, Poland and Slovenia were mainly composed of small pelagic and demersal species. Poland and Estonia account for 94 percent of the total catches of this group of 6 countries even if their catches have been in constant decline since 1989: they lost more than 580 000 tonnes over the decade.

Of a total of 180 000 tonnes of small pelagic species, the main part is due to the caches of sprat (90 000 tonnes) and herring (65 000 tonnes) in the Baltic Sea, and Atlantic mackerel (75 000 tonnes) in the North Sea. Alaska pollock (82 000 tonnes), despite a large reduction of catches over the period 1989-1998 (- 70 percent) is still the main demersal species, followed by cod (28 000 tonnes) mainly caught in the Baltic Sea by Poland and Estonia. Catches of sprat, herring, cod and salmon in the Baltic Sea are under quota regulation. Every year, the International Baltic Sea Fishery Commission[40] set up a quota in volume for the three first

[39] Before the end of the fishing agreement with Morocco in 1999, the main pat of the octopus was fish in Moroccan waters. The EU agreement with Mauritania is supplying to the Spanish market more or less 15 000 tonnes of octopus per year.

[40] See http://www.ibsfc.org/

species and a quota in number for salmon. Some new demersal species, like Roundnose grenadier, are caught in Northern waters by Polish vessels.

Freshwater fish are mainly produced by the Czech Republic, Hungary and Poland. Common carp (6 500 tonnes), freshwater bream (4 700 tonnes) and European perch (2 700 tonnes) are the principal species produced by the EUR-6NC.

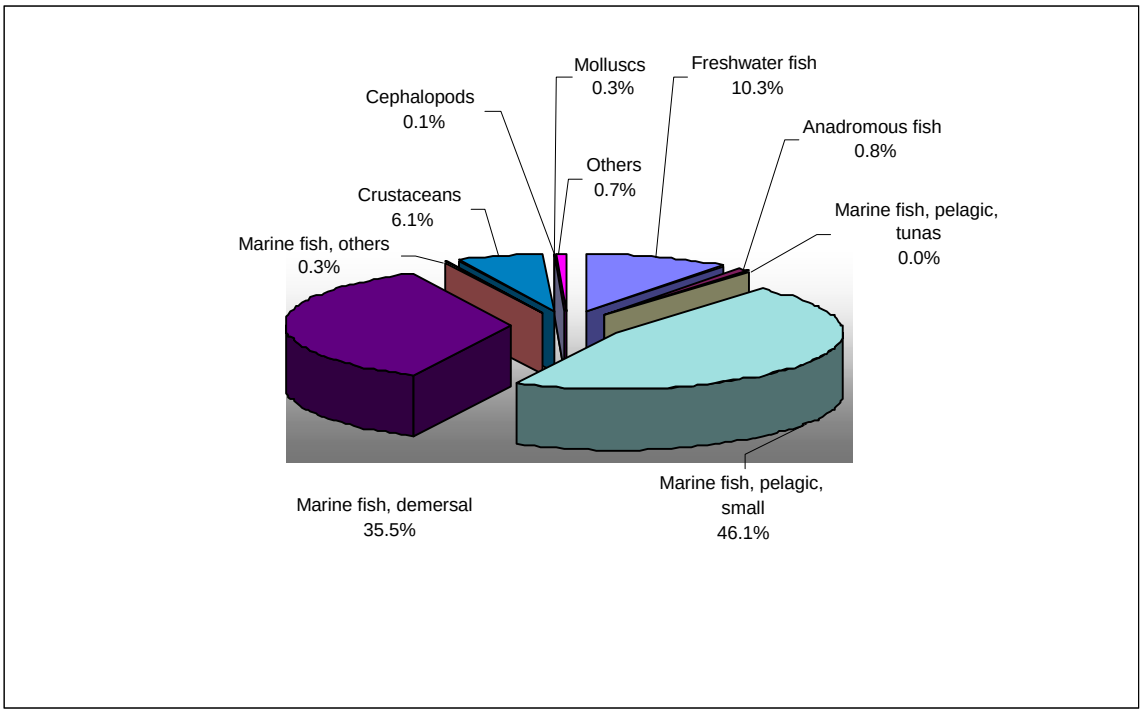


**Figure Annex 5-3: EUR-6 NC shares of captures by FAO groups of species in 1998**

Norway is fishing 95 percent of the total catches of the EUR-7 NC composed of Bulgaria, Latvia, Lithuania, Malta, Norway, Romania, and Slovakia. Industrial species are predominant in the catches of this set of countries and account for more than 1.5 Mt Small pelagic catches increased significantly over the last 10 years.

Atlantic herring catches, used for both human consumption and reduction, went from 300 000 tonnes in 1989 to more than 850 000 tonnes in 1998. The increase of Norwegian industrial species catches is linked to the rapid growth of aquaculture over the same period. For example, Blue whiting catches increased by 96 percent (570 000 tonnes in 1998), sandeels by 80 percent (350 000 tonnes), European sprat by 140 percent (95 000 tonnes) even if catches for the two Baltic States went down significantly. Only Capelin catches diminished by 22 percent during the same period to reach a volume 90 000 tonnes.

Cod dominates the demersal species for human consumption (335 000 tonnes). Like the industrial species, cod production has increased significantly over the period with a rate of 78 percent. Saithe (Pollock) is the second demersal species fished by Norwegian vessels (195 000 tonnes, +35 percent). Atlantic redfishes (30 000 tonnes, -40 percent) and Ling (22 000 tonnes, -12 percent) are the two other main demersal species caught.

The production of algae is quite significant in Norway with 180 000 tonnes. The production has been stable during the last decade. The fertilizer industry is using these algae to mix with other components to produce fertilizer for agriculture.

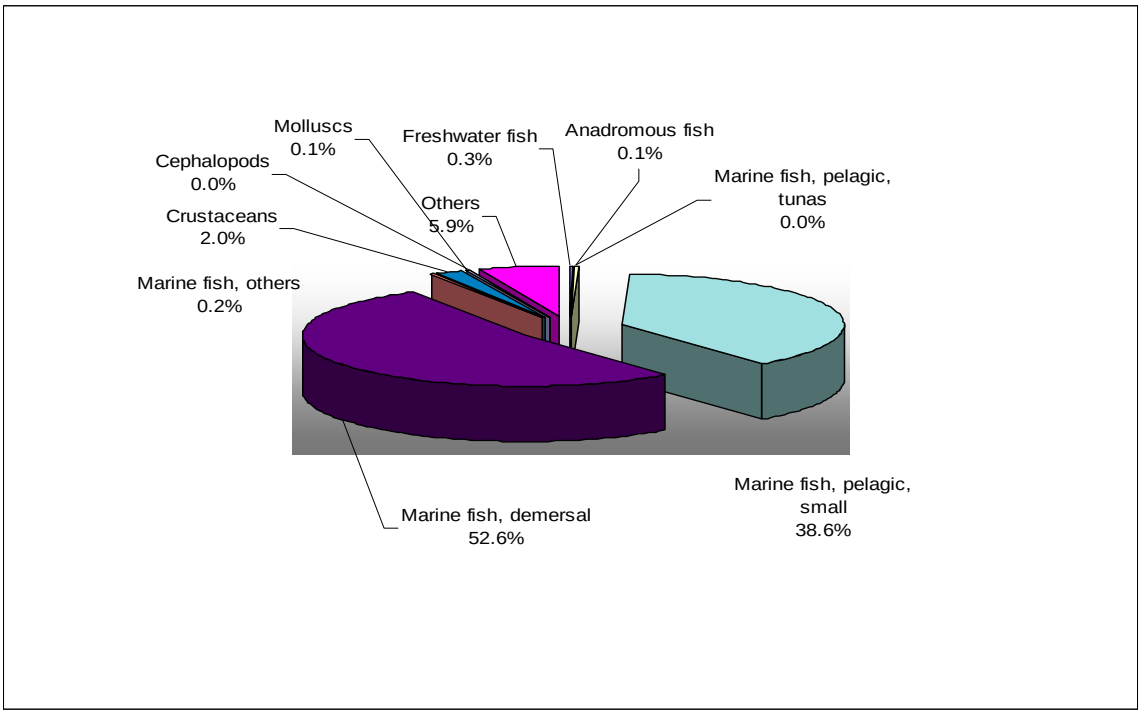


**Figure Annex 5-4: EUR-7 NC shares of captures by FAO groups of species in 1998**

As demonstrated in the figure below, catches of demersal species have been relatively stable between 1988 and 1998, as were catches of pelagic species. Landings of pelagic tuna increased slightly up to 1995 but then decreased by approximately 30 percent. Crustaceans and molluscs are the only species groups for which production has increased significantly over the 1990s.

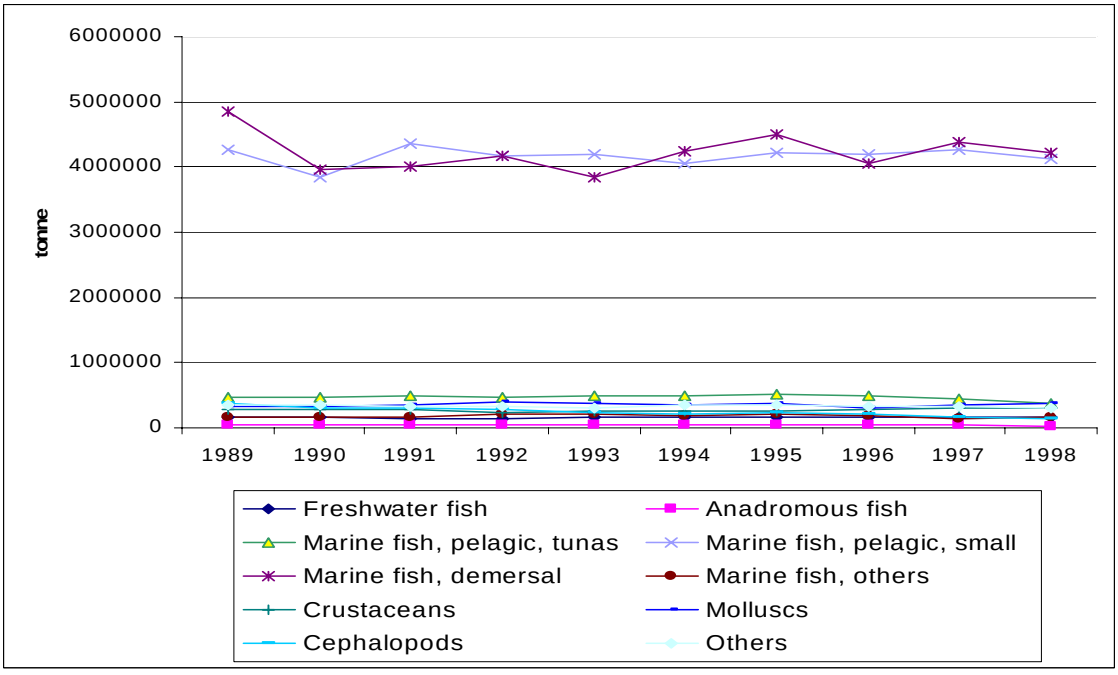


**Figure Annex 5-5: Evolution of the principal groups of species from 1989 to 1998**

***Farmed production***

Farmed production is defined here as the breeding of aquatic species, particularly fish, molluscs, shellfish and plants. In turn, 'breeding' is used to describe an intervention in the natural lifecycle process to increase production (e.g. regular stocking, feeding and protection from predators). Breeding also implies some form of personal or collective ownership of the breeding stock.

In 1998, EUR-28 production from aquaculture was 1.8 Mt with 900 000 tonnes of fin fish species worth €3 000 million and the same volume of molluscs. In 1998 the EU produced 8 percent by weight of world-wide aquaculture production[41]. Total production remained fairly stable between 1989 and 1993 at approximately 1.2 million tonnes and then increased by 19 percent (see figure below).

It is estimated that 80 000 people (54 000 full time equivalents) are employed in aquaculture activities in the EU, 3.5 percent of the active population. Each full time equivalent accounts for approximately 20 tonnes of production including upstream and downstream activities. Ireland has the greatest proportion of its active population employed in aquaculture followed by Spain and Greece (Macalister Elliott, 1999).

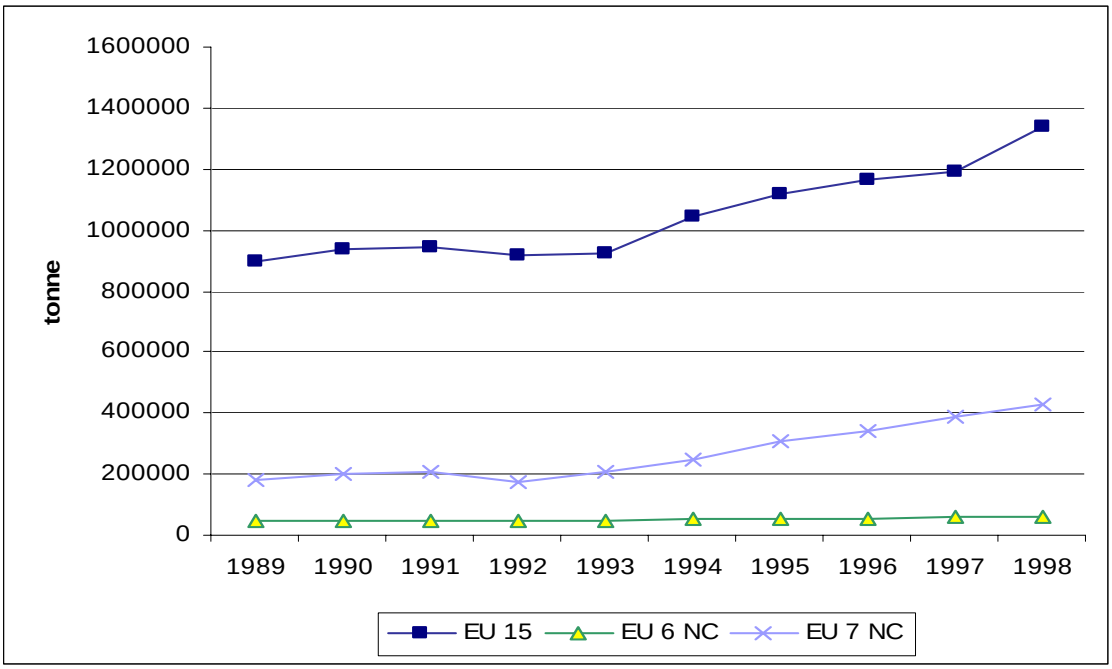


**Figure Annex 5-6: Evolution of aquaculture from 1989 to 1998**

The main fin fish species are salmon, trout, sea bass and bream, carp, eels, turbot and cod. Among EU-15 member states, France, Italy and the United Kingdom are the main producers in terms of value at between €350-400 000 followed by Spain at €210 000. All have a large production of shellfish and fin fish, although the latter are much the most important in the United Kingdom where salmon is the most valuable. Greece is the main producer of the Mediterranean species bass and bream and Germany is the most important producer of carp (Aldana, 2000; Anon. 2000b and Freddi, 2000).

[41] The major producing countries outside Europe are China, Thailand, Indonesia, and South American countries such as Ecuador.

Norway is the largest European aquaculture producer outside the EU-15. The value of salmon sold in Norway in 1998 was NOK 9.5 billion, from 365 000 tonnes. The value of trout sold was NOK 1.00 billion from 40 000 tonnes.

On average, production by the EU-15 countries represented 75 percent of entire European production over the 1990s and of these countries the largest producers were France (18 percent), Spain (15 percent) and Italy (14 percent). Norway was the largest aquaculture producer in Europe, however, with 20 percent of the total production in 1998 and Norwegian production increased threefold between 1989 and 1998, reaching more than 400 000 tonnes. Over the same period, the EU-15 production increased by approximately 40 percent including a virtual doubling of production by the UK and an increase in French production by approximately 20 percent. Italian and Spanish production also increased significantly at 60 percent and 30 percent, respectively. However, farmed production from the Baltic States, Hungary, Bulgaria and Romania completely collapsed during the 1990s, while Austrian, Finnish, Swedish and Portuguese production also experienced strong falls.

Although the European aquaculture sector is diverse, being characterized by numerous species, zones of production and cultivation techniques, several species dominate total production by weight. The principal farmed species produced by the EUR-28 are diadromous fish, particularly salmon and rainbow trout and molluscs such as mussels and oysters (Groen, 2000; Shaw and Gabott, 1992). There are also some fish farms producing demersal species such as seabream and seabass, freshwater species such as carp or pelagic species like mullet (Shaw and Curr, 1989). Aquatic plants and crustaceans such as shrimp and crayfish are also cultivated commercially.

**Table Annex 5-2: Aquaculture production per country from 1989 to 1998**

(tonnes)

| Country | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 4450 | 3126 | 3135 | 3140 | 3140 | 3103 | 2918 | 2949 | 2940 | 2861 | 3176 |
| Belgium | 735 | 675 | 845 | 845 | 845 | 845 | 845 | 945 | 845 | 845 | 827 |
| Denmark | 33059 | 41946 | 42098 | 43264 | 43231 | 42892 | 44730 | 41424 | 38908 | 42364 | 41392 |
| Finland | 18479 | 18393 | 19125 | 17824 | 17526 | 16682 | 17345 | 17659 | 16426 | 16024 | 17548 |
| France | 224037 | 256073 | 245077 | 250254 | 277323 | 280954 | 280785 | 285616 | 287490 | 273848 | 266146 |
| Germany | 63052 | 61693 | 68092 | 90019 | 63000 | 42352 | 58096 | 75237 | 59433 | 67018 | 64799 |
| Greece | 4741 | 9559 | 12615 | 20306 | 32578 | 33177 | 32644 | 39851 | 48833 | 59923 | 29423 |
| Ireland | 20790 | 26573 | 27699 | 27081 | 30158 | 28615 | 27366 | 34925 | 36854 | 40335 | 30040 |
| Italy | 132170 | 153542 | 175191 | 170376 | 176319 | 206420 | 235725 | 214372 | 216719 | 249625 | 193046 |
| Netherlands | 108875 | 100995 | 51648 | 54105 | 71125 | 109379 | 83938 | 99871 | 98210 | 120024 | 89817 |
| Portugal | 8528 | 4963 | 6234 | 6371 | 5954 | 6546 | 4969 | 5346 | 7162 | 7513 | 6359 |
| Spain | 219825 | 200831 | 222703 | 168710 | 126103 | 177929 | 223944 | 231535 | 239105 | 313485 | 212417 |
| Sweden | 7938 | 9142 | 8000 | 7141 | 5923 | 7428 | 7567 | 8266 | 6706 | 5500 | 7361 |
| United Kingdom | 49304 | 50026 | 60874 | 56811 | 68762 | 85693 | 93826 | 109886 | 129695 | 137411 | 84229 |
| **Total EU-15** | **895983** | **937537** | **943336** | **916247** | **921987** | **1042015** | **1114698** | **1167882** | **1189326** | **1336776** | **1046579** |
| Cyprus | 82 | 125 | 127 | 155 | 259 | 290 | 441 | 776 | 968 | 1178 | 440 |
| Czech Republic | na | na | na | na | 20240 | 18650 | 18671 | 18197 | 17557 | 17230 | 18424 |
| Estonia | 1232 | 936 | 1337 | 693 | 322 | 414 | 308 | 255 | 255 | 260 | 601 |
| Hungary | 20502 | 17499 | 14357 | 14191 | 9492 | 9895 | 9360 | 8077 | 9331 | 10219 | 12292 |

| Country | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Poland | 25951 | 26400 | 29500 | 30200 | 18609 | 24500 | 25111 | 27700 | 28680 | 29791 | 26644 |
| Slovenia | na | na | na | 851 | 698 | 774 | 755 | 843 | 897 | 884 | 815 |
| **Total EU6 NC** | **47767** | **44960** | **45321** | **46090** | **49620** | **54523** | **54646** | **55848** | **57688** | **59562** | **51603** |
| Bulgaria | 11615 | 7849 | 7798 | 8132 | 7897 | 6100 | 4615 | 4727 | 5437 | 4242 | 6841 |
| Latvia | 6288 | 2235 | 2685 | 641 | 339 | 560 | 525 | 380 | 345 | 412 | 1441 |
| Lithuania | 4526 | 4611 | 4750 | 3899 | 2907 | 1874 | 1714 | 1537 | 1516 | 1516 | 2885 |
| Malta | na | na | 200 | 500 | 650 | 900 | 900 | 1552 | 1800 | 1950 | 1057 |
| Norway | 113762 | 150024 | 160705 | 137619 | 173497 | 218471 | 277636 | 321542 | 367298 | 408862 | 232942 |
| Romania | 47260 | 34950 | 29530 | 24620 | 21100 | 20400 | 19830 | 13900 | 11148 | 9463 | 23220 |
| Slovakia | na | na | na | na | 1586 | 1857 | 1614 | 950 | 1235 | 636 | 1313 |
| **Total EUR-7 NC** | **183451** | **199669** | **205668** | **175411** | **207976** | **250162** | **306834** | **344588** | **388779** | **427081** | **268962** |
| **Total EUR-28** | **1127201118216611943251137748117958313467001476178156831816357931823419** | | | | | | | | | | **1367143** |

Source: database

Production of diadromous species increased significantly during the 1990s decade and salmon production increased threefold in these years (see Figure below) (Iseth *et al.*, 1991; Steen *et al.*, 1998). The production of rainbow trout also increased by approximately 40 percent during this period. Mollusc production, particularly of blue mussels and oysters, increased by 30 percent during the decade and the production of cultivated crustaceans and aquatic plants also exhibited a marked increase. Improved techniques and knowledge saw the production of demersal species increase from about 3000 tonnes in 1989 to approximately 70 000 tonnes in 1998.

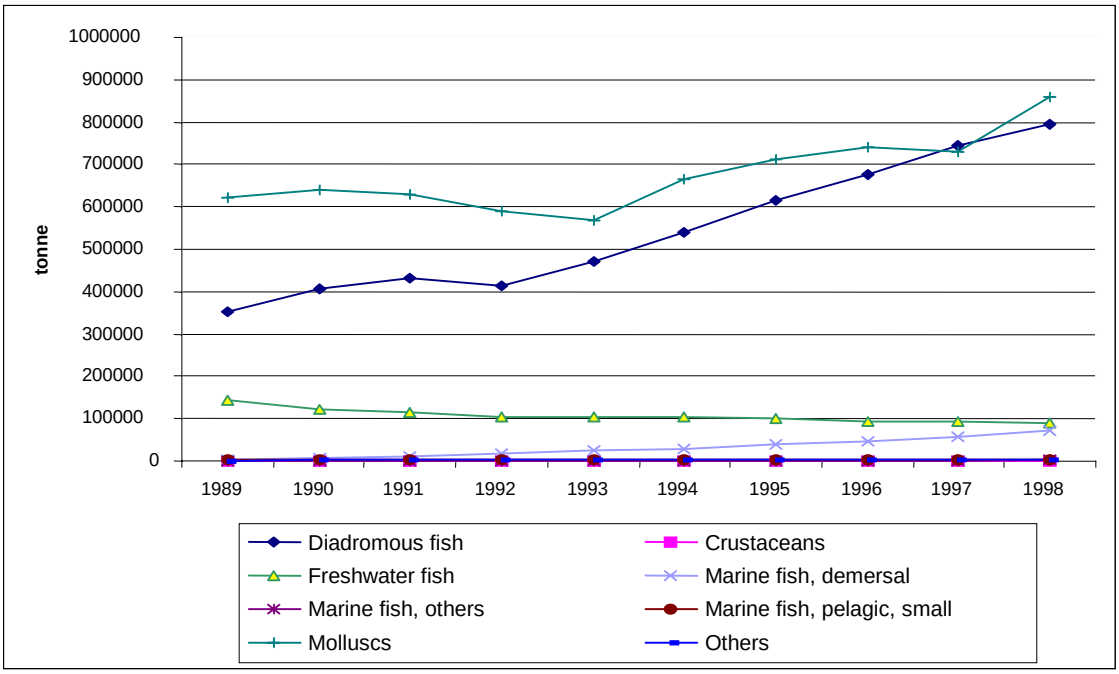


**Figure Annex 5-7: Evolution of main aquaculture species from 1989 to 1998**

The only fall recorded during this period was in the production of freshwater species, particularly carp. However, although the production of carp represents a small proportion of

aquaculture in terms of volume and value across the EUR-28 countries, it can be economically significant on a regional scale. The countries of Eastern Europe, in particular, cultivate large quantities of carp and in 1998, 150 000 tonnes were produced, representing 80 percent of all freshwater fish produced in the region (Fiche, 2000).

In the decade from 1988-1998 freshwater aquaculture production in Europe dropped from about 600 000 tonnes to 430 000 tonnes. This compares with marine aquaculture that increased from 150 000 tonnes to 660 000 tonnes, excluding molluscs and aquatic plants. These gross figures, however, hide significant differences between Western and Eastern Europe. While production in Western Europe increased from 195 000 tonnes to 250 000 tonnes during the period, in Eastern Europe it fell from 410 000 tonnes to 180 000 tonnes, mainly as result of turbulent economic times. There are also major differences in species composition. In the East carps dominated with around 86 percent while salmonids were restricted to 9.4 percent (although trout production did increase during the period). In the West the reverse was true with salmonids just over 85 percent and carps almost 9 percent. The balance in the West represents diversification to small quantities of eel, and smaller quantities of sturgeon and catfish (Kouka, 1995).

It is impossible to avoid the conclusion that, as a result of a variety of factors, freshwater aquaculture has been eclipsed by marine aquaculture both in importance and diversity. The task of identifying these factors is not simple and the core question is whether they can be resolved in order to allow sectorial development.

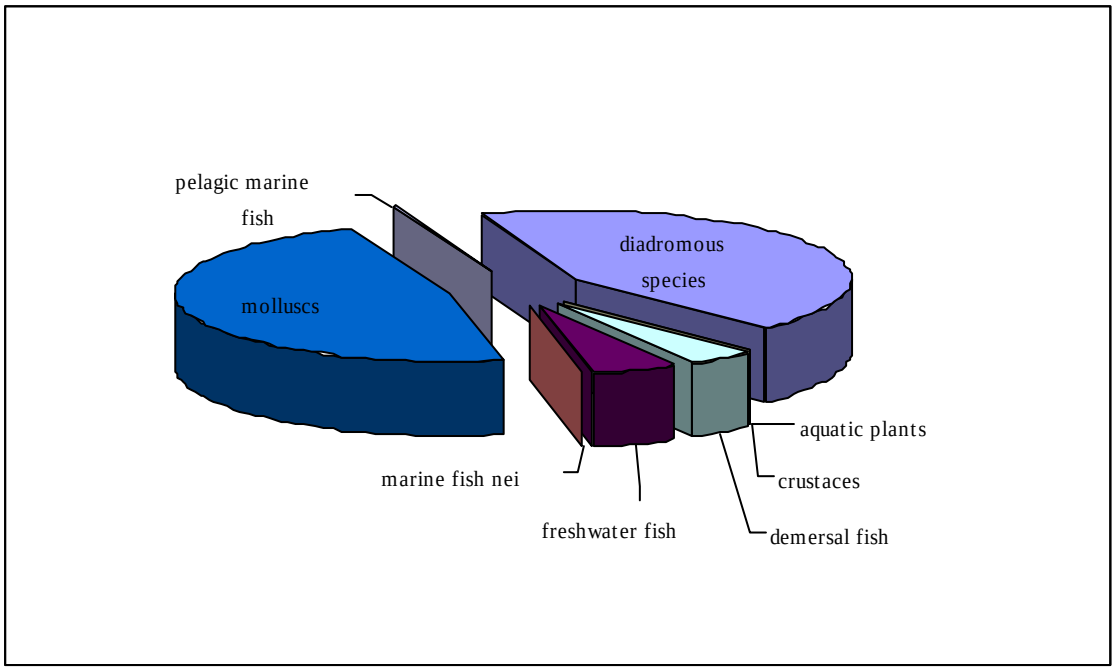


**Figure Annex 5-8: Share of main FAO groups of species in aquaculture in 1998**

Finally, as aquaculture production increases both globally and within the EU, the supply of feed could become a limiting factor in the growth of the industry (Barlow, 2003). Fish oil and fishmeal production is currently at 1.2 million tonnes and 7 million tonnes respectively, and this level is not expected to increase in the future. Further research and experimentation with substitute proteins (such as plant proteins) will be needed if aquaculture is to keep expanding. In addition, the reduction of fish to oil and meal has an environmental impact. Barlow (1999) recommends that this issue can be addressed by both substituting alternative feeds and by establishing new markets for omnivorous species such as catfish and tilapia.

The production of fishery products in the aquaculture industry has increased significantly over the past decade. Today, it represents 31 percent of the total value of fishery production in the European Union. The value of aquaculture production in some member states, such as Finland and Greece, is greater than the value of landings in those countries. The increase in the production of fishery products available through aquaculture has partly compensated for the decrease in the quantities of fish caught at sea.

### *Total capture and aquaculture production*

Total production comprises the sum of catches and farmed production. During the 1990s, the total production of the EUR-28 increased from some 10 Mt to approximately 12 Mt with the proportion attributable to aquaculture increasing consistently. In 1989, for instance, aquaculture accounted for 10 percent of this total but by 1998, contributed 15 percent. Total production is divided according to its use for either human consumption products or for non-human consumption (meal, oil). In 1998, the share of production directed towards non-human foodstuff represented more than 25 percent for the EUR-28.

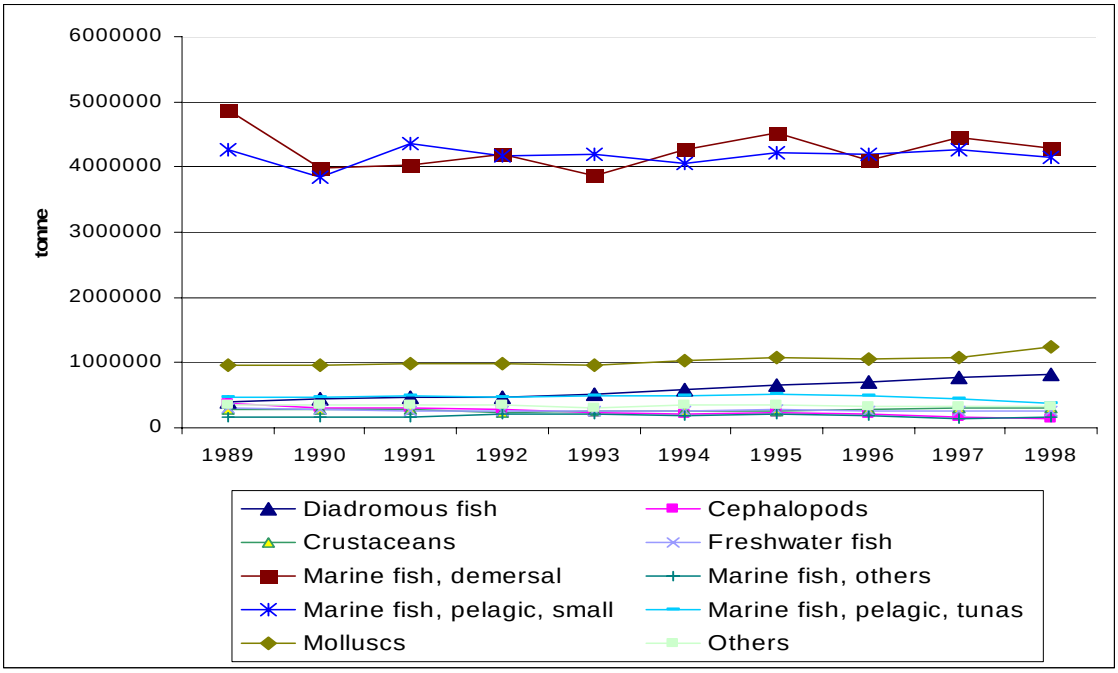


**Figure Annex 5-9: Total production EUR-28 by FAO groups of species from 1989 to 1998**

Adding aquaculture to captures doesn't differ too much from what was obtained for captures: small pelagics and demersal species are still the dominated groups of species. Nevertheless, diadromous species and molluscs, which were crushed in the bottom of the capture graph, appear here and show a continuous growth over the period.

Table below presents per country the volume of the total production. The main captures countries (France, Spain, UK and Norway) are also the main aquaculture countries. Adding both production sectors reinforces the already predominant position of these countries to the other ones.

**Table Annex 5-3: Total production per country from 1989 to 1998**

(tonnes)

| Country | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 5000 | 3659 | 3635 | 3619 | 3560 | 3491 | 3322 | 3399 | 3405 | 3312 | 3640 |
| Belgium | 40368 | 42134 | 40735 | 37964 | 36942 | 35100 | 36440 | 31767 | 31344 | 31679 | 36447 |
| Denmark | 1929355 | 1517622 | 1793309 | 1996845 | 1661918 | 1920642 | 2050752 | 1722885 | 1865718 | 1599567 | 1805861 |
| Finland | 169015 | 160226 | 147294 | 169577 | 173820 | 180951 | 184829 | 196736 | 196524 | 197328 | 177630 |
| France | 940408 | 953087 | 898382 | 917962 | 957781 | 983912 | 968031 | 930256 | 930783 | 877113 | 935771 |
| Germany | 407776 | 385601 | 300469 | 306576 | 315540 | 272502 | 297939 | 311625 | 318761 | 333597 | 325039 |
| Greece | 140132 | 146377 | 156821 | 179555 | 199457 | 224142 | 197977 | 202275 | 219326 | 188153 | 185421 |
| Ireland | 241098 | 274946 | 293208 | 306968 | 340461 | 355997 | 448254 | 401784 | 364917 | 401165 | 342880 |
| Italy | 551924 | 536890 | 583076 | 566842 | 572162 | 604652 | 632118 | 582127 | 559495 | 567225 | 575651 |
| Netherlands | 530162 | 507184 | 458812 | 487167 | 532896 | 529549 | 522035 | 510714 | 550052 | 656662 | 528523 |
| Portugal | 339564 | 330923 | 331817 | 301638 | 298503 | 274243 | 270250 | 268588 | 231983 | 236283 | 288379 |
| Spain | 1526134 | 1307075 | 1287680 | 1246124 | 1203777 | 1270206 | 1372858 | 1361137 | 1384234 | 1422528 | 1338175 |
| Sweden | 257778 | 260230 | 245063 | 314665 | 347794 | 394257 | 412179 | 379268 | 364114 | 416398 | 339175 |
| United Kingdom | 914939 | 821716 | 858095 | 875478 | 934542 | 970186 | 1012247 | 984170 | 1024816 | 1065322 | 946151 |
| **Total EU-15** | **7993653** | **7247670** | **7398395** | **7710979** | **7579153** | **8019830** | **8409232** | **7886731** | **8045472** | **7996331** | **7828744** |
| Cyprus | 2642 | 2744 | 2746 | 2817 | 2962 | 3085 | 3030 | 3412 | 3356 | 3668 | 3046 |
| Czech Republic | na | na | na | na | 23418 | 22604 | 22597 | 21717 | 20874 | 21179 | 22065 |
| Estonia | 406162 | 368618 | 359801 | 132040 | 147497 | 124505 | 132884 | 108864 | 126312 | 121854 | 202854 |
| Hungary | 35471 | 33721 | 22797 | 22860 | 17378 | 18202 | 16674 | 15683 | 16737 | 17391 | 21691 |
| Poland | 564483 | 472935 | 457376 | 505771 | 423009 | 460229 | 451346 | 368871 | 390532 | 276757 | 437131 |
| Slovenia | na | na | na | 4733 | 2962 | 3084 | 2876 | 3172 | 3228 | 3061 | 3302 |
| **Total EUR-6 NC** | **1008758** | **878018** | **842720** | **668221** | **617226** | **631709** | **629407** | **521719** | **561039** | **443910** | **680273** |
| Bulgaria | 102829 | 56948 | 57809 | 32118 | 21585 | 12505 | 12802 | 13573 | 16654 | 14958 | 34178 |
| Latvia | 551506 | 467258 | 416318 | 157419 | 142230 | 138727 | 149715 | 143022 | 106026 | 102742 | 237496 |
| Lithuania | 421270 | 349938 | 474714 | 192284 | 119905 | 51024 | 49498 | 56720 | 19835 | 22283 | 175747 |
| Malta | 916 | 6357 | 5165 | 5263 | 1319 | 1793 | 1741 | 2358 | 2649 | 2907 | 3047 |
| Norway | 2105337 | 1965418 | 2378014 | 2771899 | 2771118 | 2787949 | 3002968 | 3150390 | 3425538 | 3448641 | 2780727 |
| Romania | 224635 | 127689 | 124898 | 95379 | 34919 | 42615 | 69105 | 32159 | 19302 | 18428 | 78913 |
| Slovakia | na | na | na | na | 2765 | 3477 | 3550 | 2356 | 2611 | 1984 | 2791 |
| **Total EUR-7 NC** | **3406493** | **2973608** | **3456918** | **3254362** | **3093841** | **3038090** | **3289379** | **3400578** | **3592615** | **3611943** | **3311783** |
| **Total EUR-28** | **12408904110992961169803311633562112902201168962912328018118090281219912612052184118208 00** | | | | | | | | | | |

Source: Database

It does not matter the level (EU-15, EUR-6 NC, EUR-7 NC), the two first species are small pelagic and demersal. For the EU-15, molluscs occupy the third rank with 1.2 Million tonnes in 1998, followed by diadromous fish (400 000 tonnes) and tunas (380 000 tonnes). For the EUR-6 NC, freshwater fishes (90 000 tonnes), with carp, constituted in 1998 the main group of species after small pelagics and demersal fishes. Diadromous fishes (410 000 tonnes), mainly salmon, are the third principal species in the group of EUR-7 NC.

***Commodity production***

Commodity production is the production of fish (processed and unprocessed) for human consumption and of fish reduction for animal feeding purposes. For the EU-15, there is more or less 20-25 percent of fish that is sold without any transformation. From the quantities that are processed, 40 percent is for the fishmeal and oil reduction, and 60 percent for the human consumption (Josupeit, 1998).

At a country level, there is "no-bridge" between capture and aquaculture production and commodity production since: 1- the production of commodities is based on both national capture and aquaculture production and imports (and the national production of raw material can be exported) and 2-the capture production is used for human food production or fish reduction. For small pelagic species like herring or sprat it is impossible from the capture statistics to know if the production will be used as human consumption or fishmeal. For these reasons, the tables of commodity production cannot be compared to the tables that show the capture and aquaculture production. Tables below show the commodity production per country, by FAO groups of species and by OECD groups of commodities.

*Food use commodity production*

Fish is a product with a wide range of products forms and tastes and levels of processing. That goes from traditional fresh fish, smoked salmon, pickled herring, canned tuna, smoked sprat to some more advanced process commodities like surimi and ready to eat meals. The versatility of fish processing is increasing because of the new processing methods and the high demand for new products.

In EU-15, the value of the production is twice the value of the capture sector. The estimated total output of the processing industry was about 11 billion € in 1997. Spain, France, Denmark, Germany, and Portugal produce the greatest value of processed fish, each with an output over 1 billion € per year in 1996/97 (see figure below). Spain is by far the largest producer, with an output of 2.25 billion € in 1996, accounting for 20 percent of the EU production. In Spain, the activity is concentrated in the North (especially in Galicia), along the Atlantic coast and in the Canary Isles. France accounts for 17 percent of output, mainly from the North and Brittany and the Atlantic coast. Denmark and Germany (with Austria) are also major producers of processed fish, with outputs corresponding to 13 percent and 11 percent of EU value (MacAllister Elliot and Partners, 1999).

As mentioned above, linkages between fish landings and the processing sector are weak. So, at a country level, the importance of the processing sector is not linked to national landings. In Germany, for example, the value of landings is less than 2 percent of the EU-15 one but the value of the processing sector corresponds to 12 percent of the EU-15 total. Portugal, with only 4 percent by value of EU landings, produces 9 percent of the processed fish. On the opposite, Italy, which provides 15 percent of the EU-15 landings, only accounts for 5 percent of the EU-15 total value of the processing sector. The differences reflect the extent to which the market uses processed rather than fresh fish, and the use of imports rather than local supplies as raw material for processing (European Commission, 2001a).

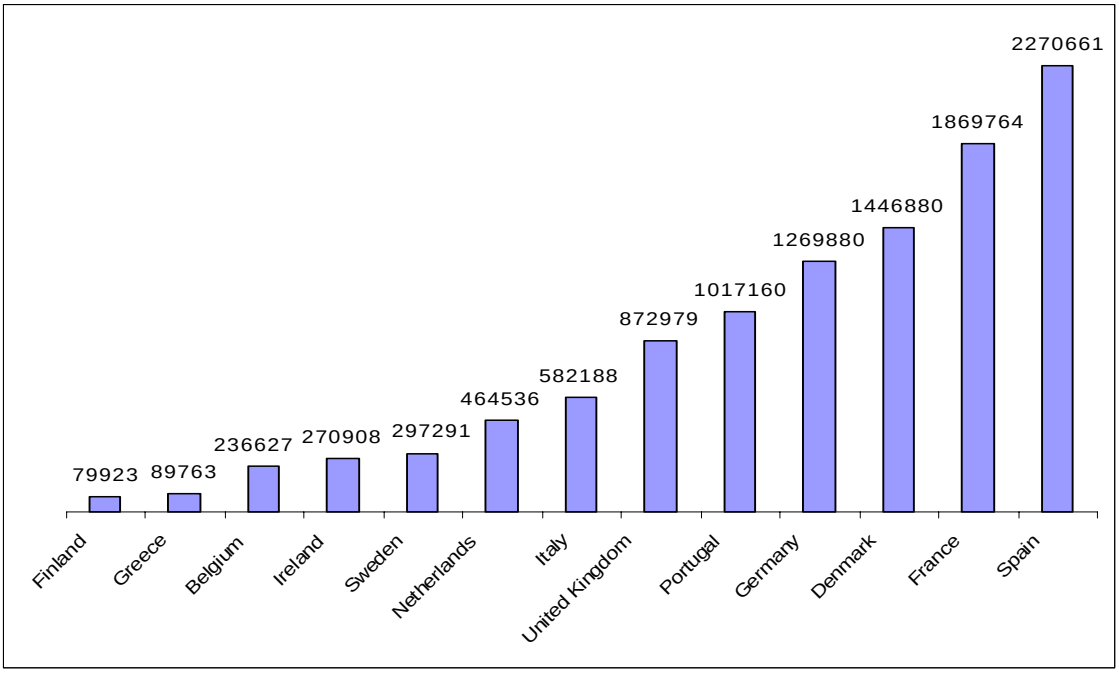


**Figure Annex 5-10: Value (thousand of €) of the output of the processing sector (1996/1997) EU-15**

The European processing industry is made up of mainly small and medium enterprises coping with insufficient, irregular and non-competitive supplies, health and hygiene requirements, competition from third countries and the appearance of major retail companies which set prices at lower levels (European Commission, 2001a). Significant Community structural aid has been given to the sector[42]. There are some 2000 processing enterprises in this industry. These are mainly small or medium enterprises (SMEs) which have had to cope with a number of problems: insufficient, irregular and non-competitive supplies, combined with difficulties due to outdated production equipment, partial conformity with health and hygiene requirements, major competition from third countries' products and the appearance of the major retail companies which set prices at lower levels.

Supplies are a major problem, since the EU has a deficit in fishery products and diminishing Community resources make the situation worse. The Community industry is able to import fish at a reduced duty rate in order to be competitive. Imports primarily involve semi-processed and frozen products that the Community firms in turn process, adding value to these products.

In response to the problems the industry has experienced in recent years, there was an important restructuring drive. This gave rise to a concentration process and the emergence of major companies (often integrated into agricultural-feedstuff, financial or major distribution groups) generally having at least a national or European dimension, and producing multi-products with high added-value, or of major vertically integrated companies developed around the principle of privileged access to raw material. These conglomerates have become major players in the sector (European Commission, 2001a).

Between 1986 and 1999, the Community's policy on aiding the processing industry evolved from an accompanying policy to develop and modernize the sector, to a policy of restructuring and encouraging the adoption of production techniques aimed at an overall improvement of competitiveness.

[42] For the period 1994-1999, the structural financial aid amounted to 530 M€.

The distribution of employment in fish processing is quite different to that of employment in marine fishing. Fish processing is more evenly distributed throughout the EU, with the UK accounting for 18 140 jobs (20 percent of the EU total in this activity). France with 11 899 (13 percent) employed in the sector, and Spain with 15 449 (17 percent), also have significant employment in fish processing. Italy and Greece, despite having relatively high numbers employed in fishing (18 percent and 17 percent of fishers) have only relatively low levels of employment in processing (accounting for 7 percent and 3 percent of processing employment). This is the converse of the situation in Germany, which has a relatively large processing sector of 11 280 (13 percent of the EU processing employment), compared to employment in fishing of only 2 932 (1 percent of fishers).

Despite expansion of the EU, employment in fish processing fell from 104 316 in 1990 to 89 468 in 1998 (a decline of just over 14 percent). Portugal and Denmark experienced the largest apparent declines in employment in processing. Significant declines were also suffered in Italy, France and the UK (around 20 percent over the period). Spain experienced a lesser decline (around 12 percent) and numbers employed in fish processing appear to have increased slightly in Belgium and Germany (European Commission, 2001a).

**Table Annex 5-4: Commodity production by country from 1989 to 1998**

(tonnes)

| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 5000 | 3659 | 3635 | 3619 | 3560 | 3491 | 3322 | 3399 | 3405 | 3312 | 3640 |
| Belgium-Luxembourg | 42351 | 44292 | 43121 | 40181 | 39049 | 37214 | 38687 | 34076 | 33458 | 33632 | 38606 |
| Denmark | 385380 | 405155 | 487356 | 479606 | 484107 | 413690 | 376793 | 426294 | 437794 | 431636 | 432781 |
| Finland | 92179 | 99255 | 95872 | 107637 | 105127 | 94243 | 128011 | 125196 | 123768 | 125383 | 109667 |
| France | 862386 | 880206 | 841756 | 872393 | 893149 | 922348 | 905896 | 873759 | 870866 | 823382 | 874614 |
| Germany | 378510 | 359987 | 286105 | 284742 | 295399 | 271531 | 298562 | 316933 | 356148 | 379538 | 322746 |
| Greece | 143320 | 148008 | 165595 | 194169 | 204232 | 218171 | 211316 | 221087 | 246585 | 211013 | 196350 |
| Ireland | 256941 | 236511 | 315245 | 346347 | 434782 | 338069 | 457100 | 433627 | 418867 | 412839 | 365033 |
| Italy | 540725 | 525470 | 571591 | 561987 | 564887 | 597498 | 621527 | 570819 | 547653 | 555240 | 565740 |
| Netherlands | 533517 | 518749 | 475936 | 508488 | 535691 | 531812 | 475288 | 497302 | 596631 | 583937 | 525735 |
| Portugal | 310787 | 287205 | 259306 | 277128 | 271417 | 252631 | 245841 | 231271 | 219246 | 218783 | 257361 |
| Spain | 1275485 | 1071744 | 1068934 | 1080237 | 1124928 | 1187383 | 1273386 | 1239259 | 1227474 | 1266636 | 1181546 |
| Sweden | 217456 | 233300 | 208238 | 304792 | 316369 | 340200 | 323410 | 319729 | 340401 | 361288 | 296518 |
| United Kingdom | 1039952 | 924872 | 1136779 | 1117695 | 1170465 | 1066431 | 1081607 | 1087102 | 1172872 | 1309692 | 1110747 |
| **Total EU-15** | **6083989** | **5738415** | **5959468** | **6179020** | **6443161** | **6274710** | **6440747** | **6379853** | **6595167** | **6716309** | **6281084** |
| Cyprus | 2642 | 2744 | 2746 | 2817 | 2962 | 3085 | 3030 | 3412 | 3356 | 3668 | 3046 |
| Czech Republic | | | | | 34346 | 36146 | 33584 | 33839 | 31306 | 31500 | 33454 |
| Estonia | | | | | 153044 | 154110 | 123462 | 121833 | 130235 | 130269 | 135492 |
| Hungary | | | 26221 | 25204 | 19701 | 20967 | 19328 | 18337 | 19326 | 20844 | 21241 |
| Poland | 472419 | 391106 | 377583 | 469939 | 382403 | 430745 | 424431 | 369780 | 398146 | 269207 | 398576 |
| Slovenia | | | | 2921 | 2784 | 3084 | 2876 | 3096 | 3228 | 3061 | 3007 |
| **Total EUR-6 NC** | **475061** | **393850** | **406550** | **500882** | **595240** | **648137** | **606711** | **550296** | **585597** | **458549** | **522087** |
| Bulgaria | | | | | 24583 | 18562 | 30133 | 27066 | 20740 | 18815 | 23316 |
| Latvia | | | | 148169 | 138287 | 134513 | 147994 | 188181 | 171349 | 142795 | 153041 |

| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Lithuania | | | | 192284 | 120472 | 56610 | 61557 | 65709 | 29915 | 35991 | 80363 |
| Malta | 916 | 6357 | 5165 | 5263 | 1319 | 1793 | 1741 | 2358 | 2649 | 2907 | 3047 |
| Norway | 958439 | 963294 | 1066111 | 1088974 | 1229338 | 1485972 | 1559749 | 1668015 | 1846418 | 1657886 | 1352419 |
| Romania | 210550 | 121487 | 120005 | 88680 | 34708 | 42458 | 69023 | 32045 | 19194 | 18385 | 75654 |
| Slovakia | | | | | 2765 | 3477 | 3550 | 2356 | 2611 | 1984 | 2791 |
| **Total EUR-7 NC** | **1169905** | **1091138** | **1191281** | **1523370** | **1551472** | **1743384** | **1873747** | **1985730** | **2092877** | **1878762** | **1610167** |
| **Total EUR-28** | **7728956** | **7223404** | **7557299** | **8203271** | **8589873** | **8666231** | **8921205** | **8915879** | **9273641** | **9053621** | **8413338** |

Source: Database

The total production of the EUR-28 was about 9 Mt in 1998. EU-15, with France, Germany, Italy, Spain and UK, is the main producer of fish products in EUR-28, with 6.7 Mt in 1998. Norway on its own has produced 1.6 Mt on average since 1995. The collapse of the Eastern European coastal and distant water fleet still affects the commodity production in 1998 since the reorganization of industry was just starting, notably with the commencement of the EU joining process.

The relative stability of the EU-15 during the last decade contrasts with the important increase of the Norwegian production of salmon, small pelagic and demersal species (Tveteras and Hesmati, 1998). The increasing difficulties in obtaining traditional processed species and the decline of the EU fleet are the main factors that affect the onshore industry. In 1999, the non-renewing of the fishing agreement with Morocco[43] created a new crisis for the Spanish industry that was dependent on its distant water fleet of 400 000 tonnes for demersal (hake mainly), shrimp, tuna and cephalopods (through EU fishing agreements).

Whereas numbers employed in processing have fallen by 14 percent, employment in fishing has declined by 21 percent over the same period. In many sectors of the EU processing industry there is no direct proportional link between employment at sea and employment in processing. It is known that the EU imports substantial quantities of fish to be used as raw material for processing and the importance of imported raw material in sustaining employment in the fish processing industry is recognized by the Common Fisheries Policy in the establishment of import tariffs for fishery products (European Commission, 2001a).

Some of the major imports are white fish fillet blocks, herring, tuna for canning and frozen crustacean. Overall, only an estimated 53 percent of processing jobs appeared to be dependent on EU landings in 1996/97. Sectors of the EU processing industry which are still considered to be substantially dependent on EU landings are tuna and sardine canning, and the primary processing of white fish (European Commission, 2001a; Commerce and Peigne, 1998).

The tuna canning sectors of Spain, France and Portugal are substantially dependent on EU landings into Galicia, Brittany and the Azores respectively. The Italian tuna canning industry is considered to be exceptional, since it is now almost 100 percent dependent on imported raw material from third countries (European Commission, 2001a).

Sardine canning provides employment linked exclusively to local landings in Spain (Huelva in the South), Portugal (mainland) and France (Brittany and Bay of Biscay). In Italy about 35 percent of fish processing employment is linked to local landings, mainly in the sardine canning and anchovy conserving sectors (European Commission, 2001a).

[43] Slightly compensated by the increasing of vessels number in Mauritania for cephalopods (Failler, 2002).

In most of the more northern EU countries such as Belgium, Germany, Denmark, Sweden, and in parts of the UK, the EU-landing related employment in processing is limited to primary processing of whitefish and some shellfish processing (e.g. shrimp processing in Netherlands and Denmark) (Lambert, 1990). In Germany, nearly 100 percent of the processing inputs (fillet blocks and herring) are imported, and there are few, if any links to landings. Similarly, in Belgium, the larger industrial processors rely on imports. In Denmark, although the fishmeal industry does rely exclusively on local landings, it provides little employment relative to the volume of material processed (European Commission, 2001a).

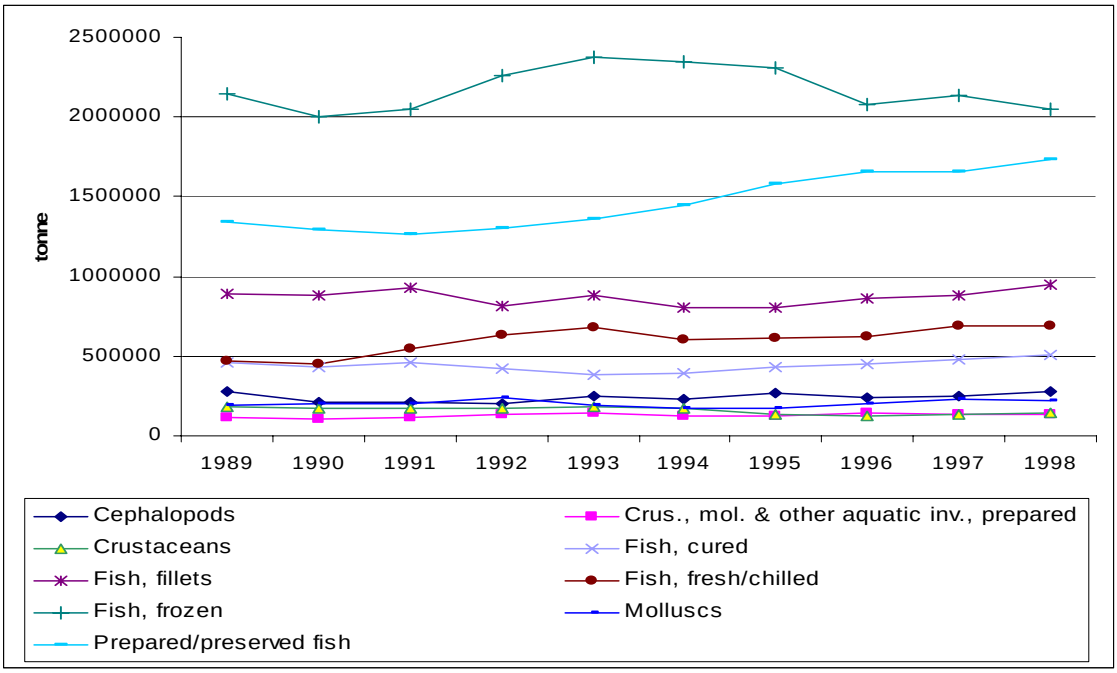


**Figure Annex 5-11: Commodity production in the EU-15 from 1989 to 1998 (t live weight)**

The Austrian fish-processing sector employs some 80 people mainly for the production of smoked trout fillet. Most of the time processing plants are part of fishing farms.

In Belgium[44], processing output was € 236.6 million in 1997. The larger processing firms are generally not dependent on local landings but rely on imports of frozen fish. In 1997 there were 1 261 people employed in the Belgian processing industry; this number includes wholesale traders and importers due to the fact that small scale processing and wholesaling are substantially integrated. Employment is concentrated in the Oostende and Brugge region. It is estimated that almost half (569) of the workers are female.

The Danish processing industry is highly capitalized. In 1998 there were a total of 193 fish processing and preservation factories with a total production output value of € 1.19 billion. The processing industry (all sectors including fishmeal) in Denmark employed a total of 7 650 people in 1998.

In 1998 there were around 172 establishments engaged in fish processing in Finland. The industry is highly concentrated with the 10 largest companies accounting for over 50 percent of the production volume. The total amount of fish (mainly Baltic herring and farmed rainbow trout) processed for human consumption was 38 711 tonnes, of which 85 percent tonnes was domestic production and the rest was imported raw material.

[44] Country description are from the European Commission Green Paper (2001), volume II.

Processing in France is split into primary processing and wholesaling (*mareyage*) and secondary processing. The output value of *mareyage* in 1998 was recorded as € 1.4 billion. This activity employed 4 007 people registered in over 300 enterprises, with the majority (42 percent) being located in Brittany. Secondary processing in 1997 produced a further € 2.1 billion of output value and employed 11 899 people in 173 enterprises. Auction hall and fish market employment in 1998 totalled 819 FTE in 43 establishments and sales amounted to € 652.9 million.

Germany has a large fish processing industry with a total production output value of 1 273 million € in 1997. The processing industry is relatively independent of the German and EU landings, as it relies largely on imported raw materials from third countries, Norway in particular. The North Sea centres of Bremerhaven, Cuxhaven and Hamburg account for almost 70 percent of the 11 280 processing jobs recorded in 1997.

Fish processing is relatively less important in Greece than in other EU Member States. The majority of the fish processing takes place in Thessaloniki, Attica and Kavala. Most processing facilities are old and rely on both local production and imports from abroad. The processing sector in Greece provided employment for 1 455 full time and 954 part time workers. Women made up 32 percent of those employed in this sector.

The Irish fish processing industries had a throughput of 145 000 tonnes in 1998 with a total value € 285 million. Ireland is a net exporter of fish products, with exports predominately in mackerel, horse mackerel and salmon. The processing sector employed 2 746 people in 1998; 57 percent of these workers are part-time and the largest concentration of processing employment is in County Donegal, where over 1 000 people are involved.

The Italian fish-processing sector is broadly divided into small scale artisanal processing and larger scale industrial processing. There were 393 processing firms in Italy in 1997, plus 40 industrial canning firms, concentrating on tuna and sardines. Production of processed tuna products amounted to 34 000 tonnes in 1997. Anchovy processing occurs mainly on the Adriatic coastline. The tuna-canning sector is coming under pressure from cheaper third country imports, and many factories now use frozen imported loins to reduce labour costs. Sardine processing is also under pressure from imports; production in 1997 was only 2 000 tonnes. In 1997 the processing sector provided employment for 6 447 people. In contrast to the harvesting sector, many of these are women (up to 87 percent in the case of Sardinia and Sicily) and significant numbers are part time workers (in some regions up to 28 percent of the total employed).

In 1997 there were an estimated 6 051 involved in the processing and distribution sectors in the Netherlands. About one third of process workers are women. The main activities are in the processing of flat fish and shellfish.

Processing in Portugal is dominated by the production of *bacalhau* (dry salted cod), which accounts for 37 percent of output volume and 46 percent by value (and almost exclusively, uses imported raw material) (Lem & Di Marzio, 1996a). Total value of processing output (sales) in 1998 was € 503.7 million, corresponding to 138 653 tonnes of finished product. Industrial canning on the mainland uses mainly imported tuna, and in the Azores uses both locally caught and imported fish.

Traditionally the Spanish fish-processing sector was based on fish canning (mainly tuna and sardine). Nowadays, however, the production of frozen value-added fish products is the major activity. In 1996, there were 15 449 people employed in the fish-processing sector; more than 79 percent were located in Galicia and the Basque country. An estimated 56 percent of employees in fish processing are women.

There were 160 processing establishments in Sweden in 1997, mainly processing cod and herring. The Swedish processing industry imports 55 percent of its raw material, which includes substantial amounts of frozen whitefish fillet blocks. Total production value in 1997 was € 346.8 million. The processing sector in Sweden employs 1 933 persons and women make up 52 percent of the workforce.

The UK has one of the EU's largest fish processing industries. Demersal species account for 83 percent of the total volume of fish (433 000 tonnes) processed in England and Wales. The main processing activities include primary processing of white fish derived from North Sea fisheries and value-added processing of fish and shellfish. Salmon processing is also a significant activity in the West of Scotland. The main locations for the fish-processing sector are Humberside in the north of England and NE Scotland. In 1997 the processing industry in the UK employed 18 140. About 9 598 were employed in England and Wales (mainly Grimsby, with 2 300 FTEs) and about 8 500 were employed in Scotland. An estimated 83 percent of jobs are full time; women occupied an estimated 49 percent of all jobs in this sector.

For the EUR-6 NC, former communist countries have inherited a large processing industry mostly focused on canned and frozen products. This industry has had to adapt from a centrally planned economy to a market economy that resulted in a reorganization of the sector. The loss of cheap supply from the distant water fleets that collapsed in the beginning of the nineties due to a lack of subsidies was one of the consequences of this transition. Another big shock for this industry was the Russian crisis around 1998 that resulted in heavily reduced exports towards this reference market for several countries (Poland among others). Landlocked countries such as Hungary and the Czech Republic are characterized by limited and generally decreasing freshwater fish processing, running at full capacity only during the traditional Christmas period. As a rule, in recent years much effort has been put expended in all these countries to try to comply with the health and safety regulations of the European Union with the prospect of accession.

In 1999, there were 25 fish processing plants in the Czech Republic, but they were working at full capacity only during December in order to meet the demand for fish products during the Christmas season (FAO, 1999b). The share of fish cured products (mostly dried and salted or smoked freshwater fish) has been declining since 1993 but remain the first commodity produced in the country. Carp is the main species used in the processing industry and is produced in various forms. Hungary’s processing industry also relies heavily on carp products but mostly in frozen from. This traditional species is also sold fresh or prepared in a variety of ways. Production has remained stable over the past few years.

In Estonia, production of fish and seafood is the fourth largest sector in the food industry after the production of milk products, beverages, meat and meat products. Estonia targets both the Eastern (canned and frozen products) and Western markets (fillets and delicatessen) (Eurofish, 2003).

Main Polish food use commodities are fish fillets and prepared/preserved fish (canned pelagic). These two products represent on average 50 percent of total Polish food use commodity production. Polish production was badly hit in 1998 with the collapse of the traditional Eastern markets in the aftermath of the Russian crisis of 1998-1999 (Eurofish, 2003).

Slovenian production of food use commodities is very limited and mostly comprises frozen and canned products aimed at exports to the Eastern markets, while Cyprus does not possess any processing industries. All fish produced on the island is sold fresh, and exports are very limited.

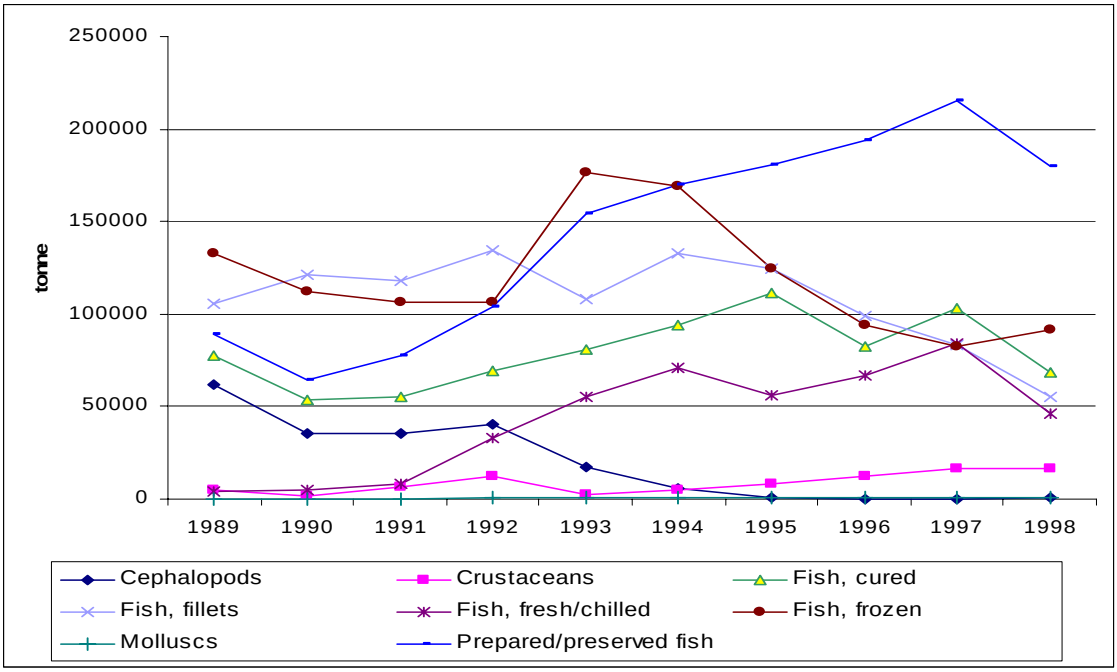


**Figure Annex 5-12: Commodity production of the EUR-6 NC from 1989 to 1998 (t live weight)**

The pattern for the former communist countries of the EUR-7 NC is similar to that of the EUR-6 NC, with a large aging frozen and canned industry inherited from the communist era that has undergone a drastic reorganization, leading to a dramatic fall in production at the beginning of the nineties. Since then much effort has been put into diversifying the range of products and modernizing production facilities to comply with the European Union health and safety regulations (Klinkhardt, 2001).

Nowadays, the range of processed fish products in Latvia is large and includes a wide choice of chilled, frozen, salted, smoked and canned fish, delicatessen fish products and preserves (Eurofish, 2003). The sector is one of the most important contributors to Latvia's food exports and industrial fish production represented about 3.4 percent of GDP in 1996.

As with many countries in the region, the processing industry in Lithuania has suffered since the dismantling of the Soviet Union, with production decreasing by almost 75 percent between 1990 and 1994. The sector has been recovering in recent years but the European Parliament (1998a and 1998b) reported in 1998 that better administrative practices and improvements of hygiene and environmental standards were a prerequisite for any further development.

Romanian food use commodity production is fairly low at around 18 000 tonnes and has not yet recovered from the collapse of the centrally planned economy when production levels of 200 000 tonnes were achieved. Bulgarian production experienced a similar fate and stagnates around the same level. Low domestic fish consumption is another factor negatively affecting the processing sector in these two countries.

The Slovakian processing industry is mostly based on domestic freshwater production with its main products consisting of frozen, fresh and cured freshwater species (mostly carps).

No transformation takes place in Malta, and commodity production is therefore limited to the sale of fresh/chilled fish. Species involved are large pelagic coming from capture fisheries and sea bass and sea bream coming form the aquaculture sector.

Food use commodity production is a buoyant industry in Norway and production levels have doubled since 1989. This increase in production has been fuelled by both an increase in landings and a rise in aquaculture production. Most of the production is exported and increasing the processing level of exports has become a priority for the Norwegian industry (OECD, 2003). Frozen fish (herring), aimed at Eastern markets is the main commodity produced in Norway, followed by fresh fish (dominated by salmon), fish fillets and cured fish (dominated by cod) mostly directed towards Western Europe.

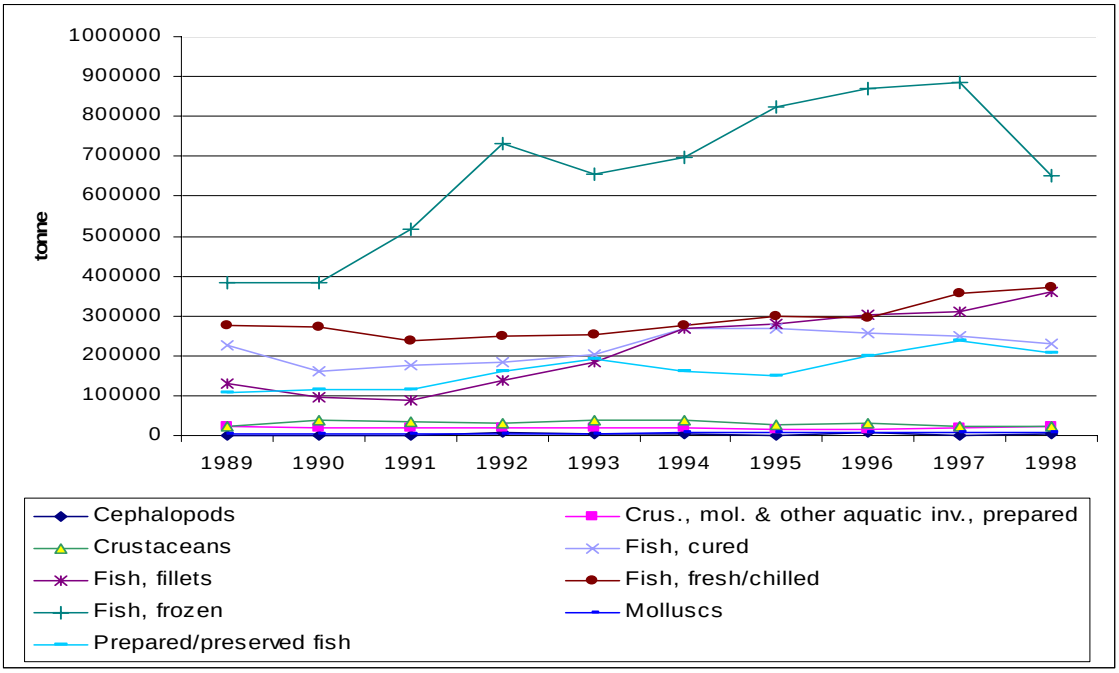


**Figure Annex 5-13: Commodity production of the EUR-7 NC from 1989 to 1998 (t live weight)**

Detailed tables on food use commodity production are available in Annex 13.

*Non-food use commodity production*

The fishmeal and oil industry, which started in northern Europe and North America at the beginning of the 19th century, was based mainly on surplus catches of herring from seasonal coastal fisheries. This was essentially an oil production activity; the oil finding industrial uses in leather tanning and in the production of soap and glycerol and other non-food products. The residue was originally used as fertilizer, but since the turn of this century it has been dried and ground into fishmeal for animal feed. In fact, one definition of fishmeal is that it is a solid product, ground, that has been obtained by removing most of the water and some or all of the oil from fish or fish waste. Its main use is in the diets of poultry, pigs and fish that need higher quality protein than other farm stock, such as cattle and sheep (FIN, 2003).

The production of non-food use commodities is essentially fishmeal and fish oil as an ingredient of the livestock and aquaculture carnivorous species food. The usage by sector is approximately 50 percent fish, 20 percent poultry, 20 percent pig. In EU, the main producer is Denmark, which exports the main part of its production to Norway and other EU countries. Norway is both a producer and consumer since the aquaculture production of salmon requires a substantial amount of small pelagic meal to feed it. Tables below present the non-food use production of fishmeal and fish oil and other fish commodities that are not for human consumption.

Fishmeal production also provides a means of utilizing the trimmings from the food fish processing sector that would otherwise be dumped at extra cost to the environment and the consumer. In the EU, Spain, France, Germany, Ireland and the UK produce fishmeal (primarily from trimmings) that accounts for 44 percent of the fishmeal produced in the EU-15 (FIN, 2003).

**Table Annex 5-5: Non-food use production per country from 1989 to 1998**

(tonnes)

| Country | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Belgium-Luxembourg | 1129 | 1096 | 838 | 844 | 847 | 725 | 761 | 390 | 465 | 422 | 752 |
| Denmark | 1568203 | 1132224 | 1305119 | 1569601 | 1176786 | 1478622 | 1608365 | 1240717 | 1379410 | 1257998 | 1371704 |
| Finland | 28099 | 19596 | 15831 | 17642 | 13169 | 40290 | 42595 | 40241 | 31500 | 10190 | 25915 |
| France | 101477 | 96313 | 82280 | 91246 | 92320 | 85920 | 85689 | 77842 | 84273 | 82521 | 87988 |
| Germany | 25502 | 23531 | 19929 | 20774 | 22865 | 16909 | 14562 | 12757 | 12489 | 16805 | 18612 |
| Greece | 0 | 3383 | 4321 | 4563 | 5277 | 7155 | 4871 | 5051 | 5900 | 2083 | 4260 |
| Ireland | 27400 | 40610 | 58255 | 67658 | 62374 | 50602 | 65584 | 64859 | 51375 | 67243 | 55596 |
| Italy | 11199 | 11420 | 11485 | 4856 | 7275 | 7154 | 10591 | 11307 | 11842 | 11984 | 9911 |
| Netherlands | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Portugal | 31300 | 28250 | 30401 | 41053 | 35851 | 28155 | 28730 | 26176 | 22737 | 13990 | 28664 |
| Spain | 250649 | 235331 | 218746 | 167118 | 78848 | 82824 | 99444 | 121878 | 156761 | 155892 | 156749 |
| Sweden | 55320 | 53643 | 52951 | 78828 | 85887 | 116453 | 150543 | 111790 | 82598 | 123117 | 91113 |
| United Kingdom | 283859 | 268185 | 230535 | 226370 | 240607 | 256813 | 242775 | 194055 | 197423 | 159657 | 230028 |
| **Total EU-15** | **2384137** | **1913582** | **2030691** | **2290553** | **1822107** | **2171622** | **2354511** | **1907062** | **2036771** | **1901901** | **2081294** |
| Cyprus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Czech Republic | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Estonia | 0 | 0 | 0 | 0 | 6791 | 2958 | 5296 | 3756 | 2870 | 3454 | 2512 |
| Hungary | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Poland | 92064 | 81829 | 79793 | 86285 | 66284 | 75219 | 62001 | 43555 | 64876 | 52005 | 70391 |
| Slovenia | 0 | 0 | 0 | 834 | 178 | 0 | 0 | 76 | 0 | 0 | 109 |
| **Total EUR-6 NC** | **92064** | **81829** | **79793** | **87119** | **73254** | **78177** | **67297** | **47387** | **67746** | **55459** | **73012** |
| Bulgaria | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Latvia | 0 | 0 | 0 | 27749 | 26249 | 16218 | 17963 | 21112 | 13062 | 12528 | 13488 |
| Lithuania | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8645 | 7054 | 3699 | 1940 |
| Malta | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Norway | 819159 | 849460 | 1179424 | 1468389 | 1426628 | 927747 | 945810 | 929447 | 1129469 | 1312539 | 1098807 |
| Romania | 14085 | 6202 | 4893 | 6699 | 211 | 157 | 82 | 114 | 108 | 43 | 3259 |
| Slovakia | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| **Total EUR-7 NC** | **833244** | **855661** | **1184318** | **1502837** | **1453088** | **944122** | **963855** | **959318** | **1149692** | **1328810** | **1117495** |
| **Total EUR-28** | **3309445** | **2851072** | **3294802** | **3880509** | **3348449** | **3193921** | **3385664** | **2913768** | **3254210** | **3286169** | **3271801** |

Source: Database

The fish used in the production of fishmeal can be divided into three groups: (i) No use for human consumption (inedible feed grade fish - sandeel, capelin, Norway pout) (ii) Potential use for human consumption but mainly used for fishmeal because of limited outlets for human consumption (blue whiting, sprat) (iii) Primary use is human consumption but surplus may be used for fishmeal (herring, horse mackerel).

At the present time, the main sources for fishmeal production are made up of Norwegian pout stocks that can be caught in the North Sea, the capelin in the Arctic seas and the Blue whiting in the seas around the Faeroes and west of the British Isles.

Due to its high content of proteins with an extremely well balanced composition of amino acids, fishmeal is a highly regarded ingredient of compounded feeds for poultry and pigs, etc. Fishmeal constitutes about 2-8 percent of these feeds.

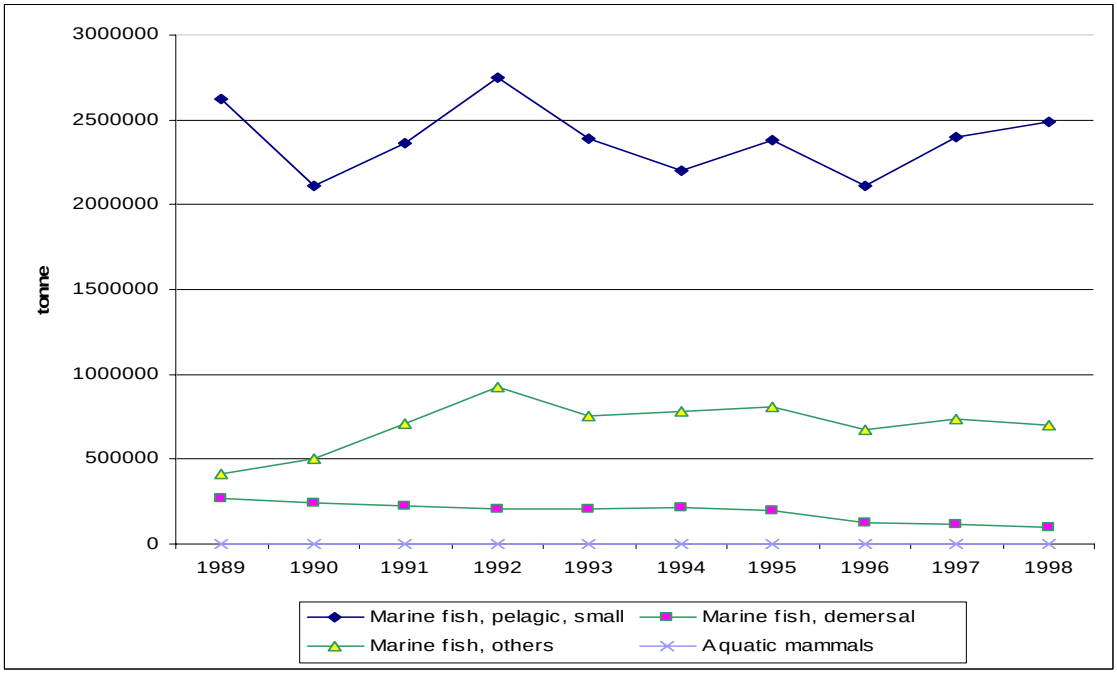


**Figure Annex 5-14: Non-food use commodity production by FAO groups of species EUR-28 from 1989 to 1998 (t live weight)**

There are seven main species used to produce fishmeal and fish oil in Europe (FIN, 2003):

- Sandeel: mainly caught in the North Sea with average landings of 800 000 tonnes per year.
- Norway pout: The status of the stock is mainly determined by natural processes and less by the fishery. So, captures vary from a few thousand tonnes to nearly a million tonnes.
- Sprat: Sprat is a short-lived species with large natural fluctuations occurring annually in stock biomass.
- Capelin: There are two capelin stocks: the Barents Sea capelin and the Icelandic capelin. Both of them are heavily dependent on the natural environmental conditions. Stock is healthy. Every year a precautionary quota is set up by ICES.
- Horse mackerel: Mainly caught in the North Sea, this species has been under pressure for many years but seems to recover.
- Blue whiting: Blue whiting stocks are receiving special consideration at the moment due to their low biomass.

- Herring: The herring fishery predominantly divides up between the North Sea (spawning in autumn and spring), Icelandic waters (spring and summer spawning) and the North East Atlantic (Norwegian spring spawning). North Sea spring spawners have been stable over the last five years but there are some indications that the stock is currently being harvested outside of biological limits. All other stocks were considered to be within safe biological limits with no indications of overfishing.

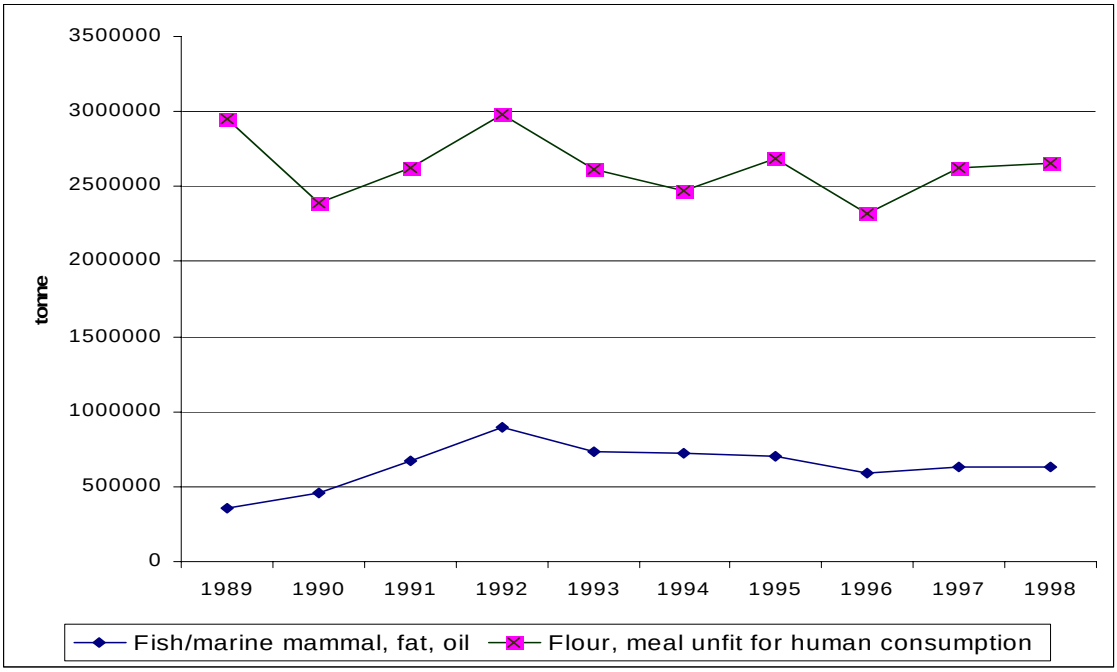


**Figure Annex 5-15: Non-food use commodity production EUR-28 from 1989 to 1998 (t live weight)**

Detailed tables on non-food-use commodity production are available in Annex 10.

## Foreign Trade 1989–1998

Foreign trade during the1990s was characterized by strong growth in exports, together with more moderate growth in imports as intra-regional trade continued to increase. In the future, it is likely that increased consumption, linked with declining national resources, will lead to Europe's growing dependence on foreign suppliers.

### *Imports 1989–1998*

*Imports regulations*

Third (non-EU) countries are classified into two categories. Particular account is taken of the third country legislation; of the organization and powers of the third country competent authority and inspection services; the actual health conditions (see Annex 8 for imports controls).

Countries (+ Norway and Iceland as members of the European Economic Area) included in List 1 are "harmonized" or "approved" countries (Anon., 2000d). This means that their legislation requirements are at least equivalent to those governing the EU domestic

production, and that an EU inspection team has audited the competent authority, which satisfied EU requirements. A specific decision has been adopted for each of those countries fixing specific import conditions, including the official recognition of the competent authority, a specific model of health certificate and a list of approved establishments (Anon., 2000e).

List 2 includes third countries that have given, at least on paper, enough guarantees concerning their inspection system and their legal sanitary requirements. But these countries have not yet been visited by an EU team of inspectors to audit the competent authority. After 2004, imports from non-approved countries will be banned. This list of countries, of which the United States is one, constitutes the so-called "pre-listed" or "pre-harmonized" group. Products imported from these countries may be subject to additional national legislation. Some Member States may request lists of approved establishments. A list may be fully accepted by one Member State, and partially rejected by another one. The US is one of the countries scheduled to be part of the first list by the end of 2003.

All other countries not mentioned in either List 1 or 2 cannot export any fish and fishery products to the European Union. If a third country, not listed on List 1 or 2, wants to export fish and fishery products to the EU, it has first to contact the European Commission to provide information on its legal system concerning controls on seafood establishments. Discussions and negotiations may lead to an official visit to the country by a team of EU inspectors who will make a recommendation on whether the country in question should be approved or not.

*Overview 1989-1998*

Between 1989 and 1998, imports to all 28 countries increased by 20 percent, from 10.2 million to approximately 12.5 million. Imports to the EU-15 accounted for 83 percent of this total. The principal importing countries were Germany (15 percent of total EUR-28), France (14 percent), Spain (10 percent) and the United Kingdom (10 percent).

EU-15 depends on the rest of the world for much of its fisheries products and imports come mainly from countries bordering the North Atlantic (Norway, Iceland, Faroes), some South American countries (Argentina, Ecuador, Chile), South East Asia (Thailand, India) and Africa. Russia, China and the United States are also significant suppliers. Norway has considerably increased its imports from Russia, generating a fall in trade with the EU-15 countries (PEE-CFCE, 1999).

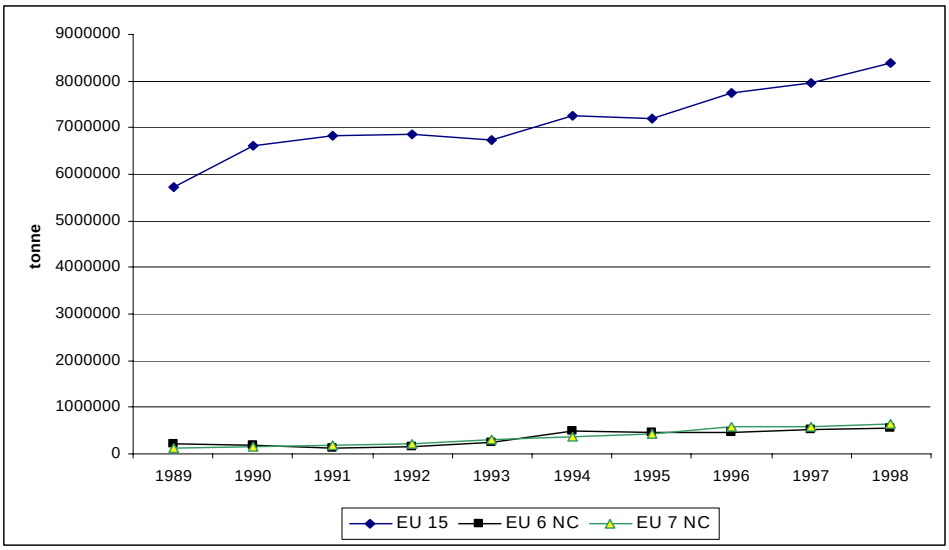


**Figure Annex 5-16: Food use imports from 1989 to 1998**

Imports for human consumption to the EU-15 rose from 61 percent of the whole in 1989 to 75 percent in 1998. For the EUR-28, imports for human consumption rose from 59 percent of the whole in 1989 to 76 percent in 1998. In summary, imports of products for human consumption have risen sharply over the last decade, whilst the import of products for non-human consumption has fallen in all EUR-28 countries except Norway and France.

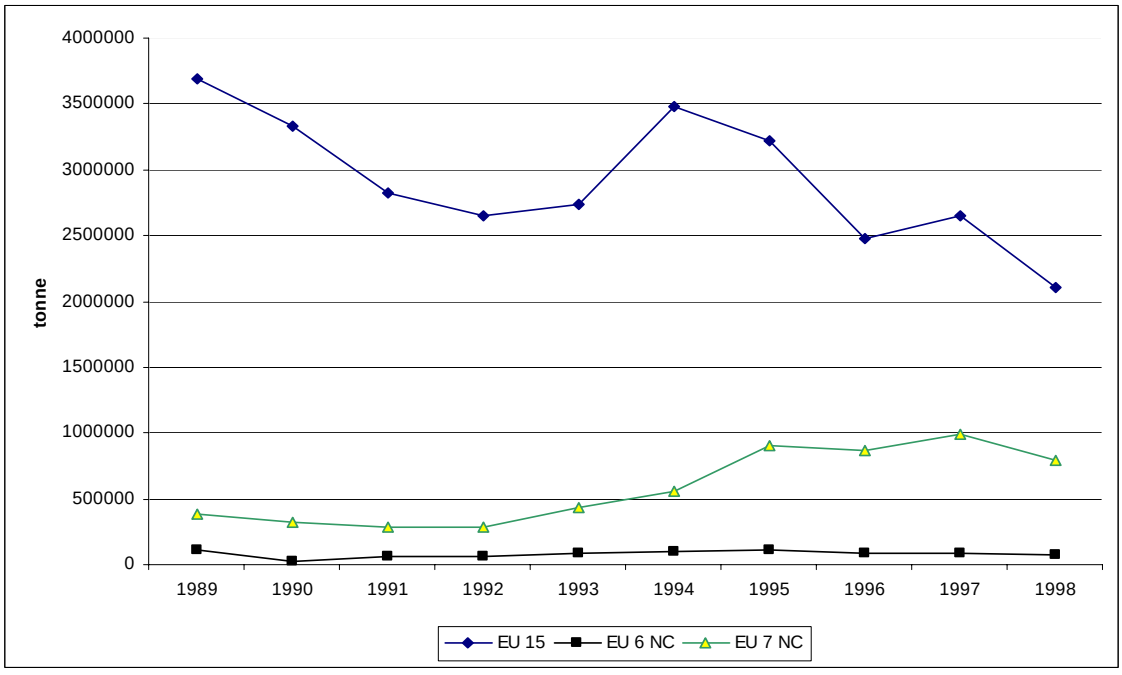


**Figure Annex 5-17: Non-food use imports from 1989 to 1998**

*Food use imports 1989-1998*

The value of the EU-15 food-use imports from foreign countries was around 10 billion € in 1998. The main suppliers of the EU-15 are Norway (18 percent of the total), Iceland (7.5 percent) Thailand (5), Russia (4 percent), United States (4 percent) and Morocco (4 percent).

France is the largest importer of products for human consumption (16 percent of total EUR-28 for human consumption), followed by Germany (14 percent), Spain (12 percent) and Italy. With respect to products for non-human consumption, Norway is the principal importer (25 percent of total EUR-28 for non-human foodstuffs), followed by Germany (19 percent) and the United Kingdom (15 percent).

**Table Annex 5-6: Food use imports per country from 1989 to 1998**

(tonnes)

| Country | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 64981 | 67563 | 68862 | 78304 | 75658 | 93781 | 76872 | 91615 | 88920 | 90060 | 79662 |
| Belgium-Luxembourg | 236876 | 267826 | 259439 | 271333 | 257635 | 303940 | 322568 | 300029 | 347769 | 360938 | 292835 |
| Denmark | 370473 | 410065 | 407891 | 449997 | 452784 | 555624 | 526430 | 559828 | 571457 | 606866 | 491142 |
| Finland | 73388 | 68736 | 67506 | 65249 | 68940 | 86355 | 51975 | 62896 | 68571 | 68009 | 68162 |
| France | 1174013 | 1324913 | 1328477 | 1314559 | 1272085 | 1297612 | 1352657 | 1397788 | 1366505 | 1495849 | 1332446 |
| Germany | 800537 | 958771 | 1024362 | 1043666 | 1034482 | 1195067 | 1172412 | 1182576 | 1232062 | 1331055 | 1097499 |
| Greece | 90564 | 90554 | 86161 | 83698 | 84722 | 90010 | 99005 | 116127 | 132963 | 152477 | 102628 |
| Ireland | 35416 | 53604 | 46673 | 46034 | 34460 | 25262 | 30874 | 37324 | 39231 | 44194 | 39307 |
| Italy | 802757 | 832747 | 881899 | 836249 | 822661 | 842038 | 802638 | 892342 | 896853 | 954835 | 856502 |
| Netherlands | 348397 | 437419 | 513539 | 533575 | 478677 | 538316 | 568080 | 568231 | 601000 | 586029 | 517326 |
| Portugal | 358815 | 414679 | 454721 | 425083 | 434825 | 449841 | 470810 | 503292 | 494235 | 513342 | 451964 |
| Spain | 673796 | 881349 | 947350 | 862292 | 908014 | 923416 | 887468 | 1075112 | 1144060 | 1176660 | 947952 |
| Sweden | 109161 | 116566 | 116851 | 124137 | 118389 | 146840 | 159245 | 194162 | 212170 | 216680 | 151420 |
| United Kingdom | 570922 | 677201 | 637838 | 710515 | 676383 | 720555 | 678349 | 767230 | 764630 | 783954 | 698758 |
| **Total EU-15** | **5710096** | **6601994** | **6841571** | **6844691** | **6719717** | **7268658** | **7199382** | **7748552** | **7960426** | **8380949** | **7127604** |
| Cyprus | 9577 | 9694 | 9993 | 12725 | 11548 | 12147 | 14282 | 12181 | 12556 | 14647 | 11935 |
| Czech Republic | | | | | 55103 | 76622 | 73668 | 84835 | 80828 | 74944 | 74333 |
| Estonia | | | | | 6974 | 26762 | 30192 | 31447 | 75087 | 79173 | 41606 |
| Hungary | | | 17398 | 16182 | 18300 | 22207 | 20867 | 19971 | 23842 | 26384 | 20644 |
| Poland | 214120 | 167037 | 98399 | 130145 | 130929 | 324154 | 298359 | 297866 | 319908 | 356736 | 233765 |
| Slovenia | | | | 9050 | 11916 | 12753 | 13855 | 14440 | 12951 | 13351 | 12617 |
| **Total EUR-6 NC** | **223697** | **176731** | **125789** | **168102** | **234769** | **474645** | **451223** | **460741** | **525172** | **565235** | **340610** |
| Bulgaria | | | | | 5637 | 6597 | 9481 | 4213 | 16963 | 21450 | 10724 |
| Latvia | | | | 7344 | 12568 | 35865 | 37582 | 52966 | 68658 | 44511 | 37071 |
| Lithuania | | | | 1976 | 7734 | 48324 | 44027 | 104689 | 110218 | 106787 | 60536 |
| Malta | 7213 | 4400 | 6375 | 7791 | 6279 | 7504 | 8575 | 8991 | 10444 | 10326 | 7790 |
| Norway | 88106 | 113824 | 190492 | 206386 | 243671 | 214504 | 271070 | 325723 | 338390 | 367196 | 235936 |
| Romania | 11983 | 27560 | 1840 | 1737 | 8564 | 23536 | 10630 | 28551 | 23420 | 54237 | 19206 |
| Slovakia | | | | | 31541 | 35981 | 35200 | 46768 | 26099 | 26848 | 33740 |
| **Total EUR-7 NC** | **107303** | **145784** | **198707** | **225234** | **315994** | **372312** | **416565** | **571901** | **594193** | **631355** | **357935** |
| **Total EUR-28** | **6041095** | **6924509** | **7166067** | **7238027** | **7270479** | **8115616** | **8067170** | **8781195** | **9079791** | **9577539** | **7826149** |

Source: Database

The principal species groups imported for human consumption are shrimp, salmon, tuna and cod:

- Salmon is generally imported fresh or frozen, with the vast majority coming from Norway, which exports nearly two thirds of its production to the EU-15. Imported processed salmon generally originates from the United States and Canada (Lem and Di Marzio, 1996b).

- Much of the fresh or frozen tuna originates from South American countries, but Spain and France are also significant suppliers. The main imported product to the EU-15 is processed tuna of which the majority comes from the Ivory Coast and Thailand. The main markets for imported tuna are in the United Kingdom and France.

- The principal producers of fresh and frozen cod are Norway, Russia and Iceland. Dried or salted cod is also produced by Norway and Iceland, of which Portugal is the principal importer.

- Shrimp are the largest imported shellfish group, with Spain, Denmark and France as the principal importers. Crayfish and lobsters also form a significant share of imported shellfish with France the main market.

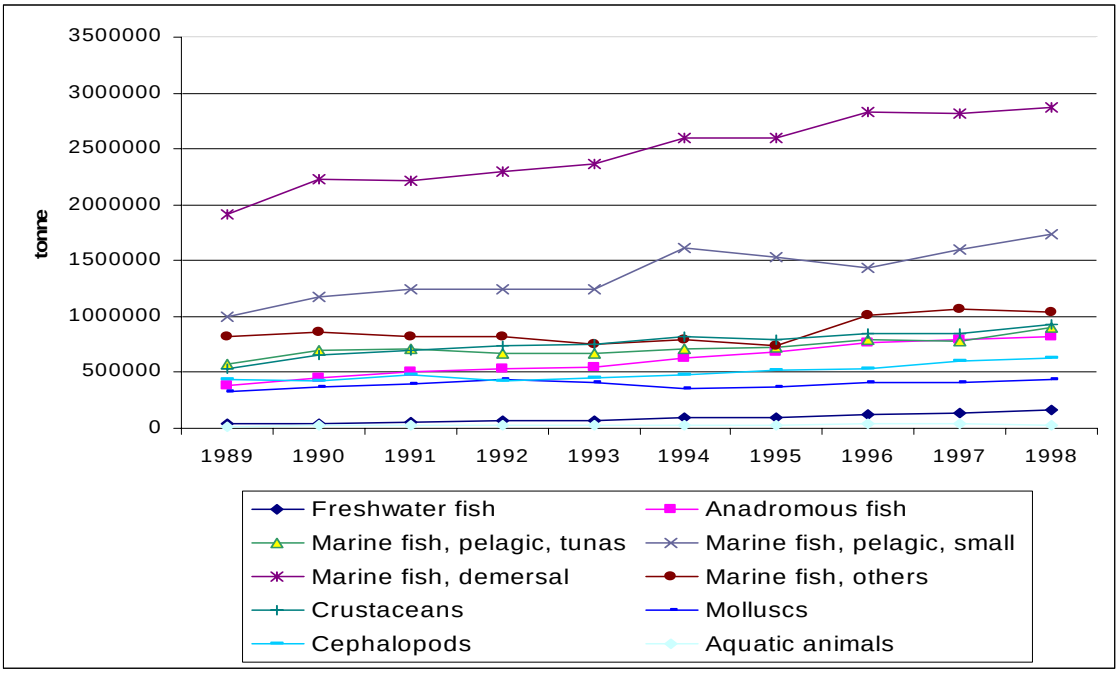


**Figure Annex 5-18: Food use imports by FAO groups of species EUR-28 from 1989 to 1998**

Of the imported molluscs, cuttlefish, octopus and squid are the most significant with Spain and, to a lesser extent, India and Thailand the principal suppliers to the larger markets such as Spain and Italy. Mussels provide considerable intra-European trade between exporters such as the Netherlands, Spain, Denmark and importers such as France and Italy. France is the main producer of oysters, of which Italy is the main importer while European imports of scallops come largely from China, with France the main importer.

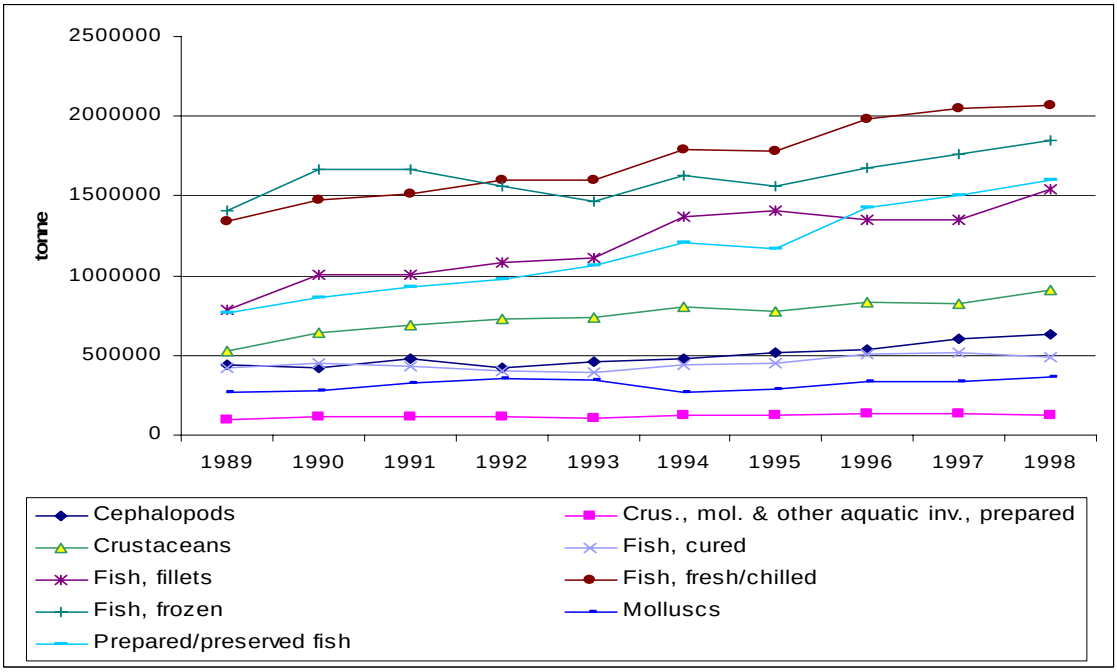


**Figure Annex 5-19: Food use imports by OECD groups of commodities EUR-28 from 1989 to 1998**

Among other prepared and canned fish, herring species are the principal product (Motte, 1999). Most of these products are directed to Germany, with Poland the principal supplier. Processed sardines are imported from Morocco and to a lesser extent, Peru and Namibia.

Imports of fresh, breaded or frozen fillets also represent significant volumes of traded products. The principal importers are Italy, Germany and France, with the major suppliers being Germany, Denmark and the Netherlands.

Detailed tables of imports by FAO groups of species and by OECD groups of commodities are available in Annex 14.

*Non-food use imports 1989-1998*

EUR-28 imports of non-food use products have decreased over the last decade. The volume has passed form 4.1 Mt to 3 Mt (-27 percent). The most spectacular decrease is within the EU-15 where imports dropped by 45 percent to reach a level of 2 Mt in 1998. EUR-6 NC maintained a stable volume of imports during the same period with an annual average of 80 000 tonnes. EUR-7 NC, along with Norway, increased its level of imports to support the growth of aquaculture production. Imports have more than doubled in 10 years reaching a million tonnes in 1997.

Imports are mainly fishmeal and fish oil composed of small pelagic species and other fish for reduction (Norwegian pout, sandeels). These two kinds of commodities have had a common evolution during the period 1989-1998. From 1989 to 1992, the decreased consumption of the EU-15 was greater than the aquaculture demand in Norway: slopes are decreasing. Between 1993 and 1995, the boom in salmon production in Norway more than compensated for the diminishing use of fishmeal and oil in the EU-15: positive sense of slopes. During the last period, 1996-1998, the demand occasioned by the growth of Norwegian aquaculture was not sufficient to maintain overall imports at the 1995 level. Restrictions on inputs in Norway have

also contributed to the reduction of fishmeal uses for salmon feeding purposes.

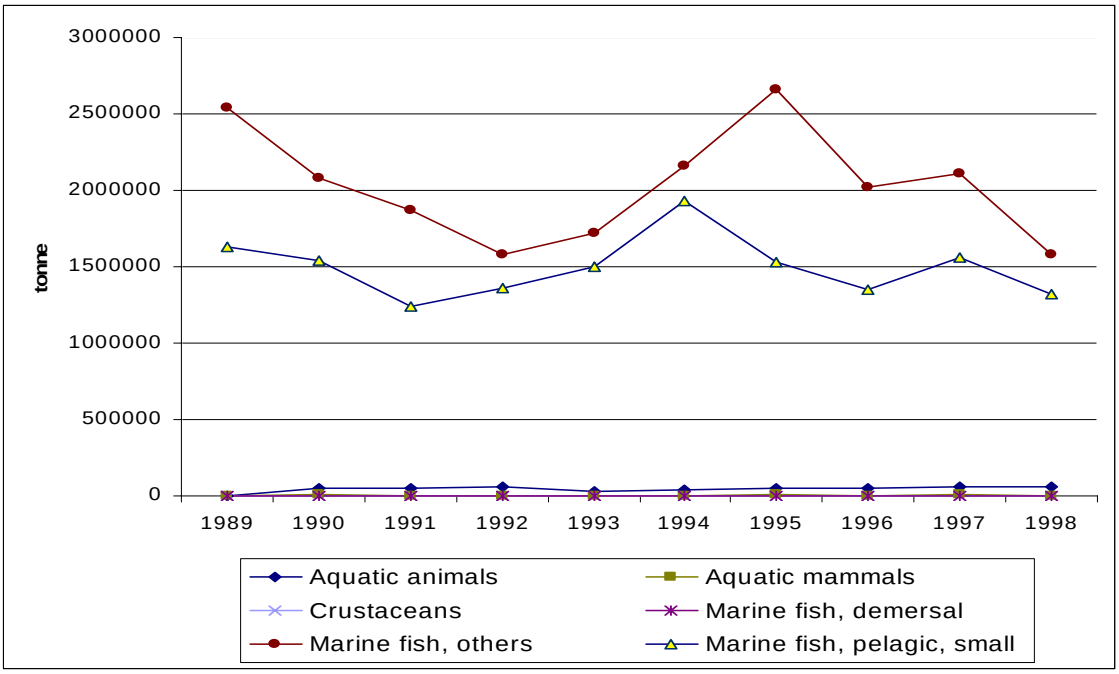


**Figure Annex 5-20: EUR-28 non-food use imports per species from 1989 to 1998**

The main provider countries of the EU-15 and Norway are Iceland, Chile and Peru. On average (1995-1997), Iceland, with more than 1 Mt of exports (live weight equivalent) coming from the capelin catches, exported 95 percent of its production to the EU-15 and Norway and 5 percent to North America. Chile, which produces about 5 Mt a year of fishmeal, exported 20 percent of its production to EU-15 and Norway. Peru, with 8 Mt on average (1995-1997) of fishmeal production form anchovy, exported 1.8 Mt to EU-15 and only a few thousand tonnes to Norway. Peru is the main fishmeal provider of the EUR-28.

See annex 10 for detail tables per country, by FAO groups of species and by OECD groups of commodities.

### *Exports 1989-1998*

Between 1989 and 1998, there was a significant increase in exports from the EUR-28 countries, growing from 7 million to 10.7 million tonnes. Norway was the biggest exporter, representing almost 21 percent of the total exported in 1998 (2.4 million), followed by the Netherlands (10 percent), Denmark (9 percent), Spain, Germany and the United Kingdom. This growth in exports from EUR-28 countries is largely attributable to growth in Norway, where trade more than doubled between 1989 and 1998 (Faehn & Grunfeld, 1999). Spanish and English exports also demonstrated strong growth during the period, with increases of 85 percent and 48 percent respectively.

The figure below presents the exports of food use commodities from the EUR-28 countries. The significant increase of the food use exports is due to three factors. The first one is the facilitation of the buying process in the EU through electronic auctions. The second one is the diminution of the transport costs inside the EU. The third one is the increasing demand from outside of Europe, i.e. Japan.

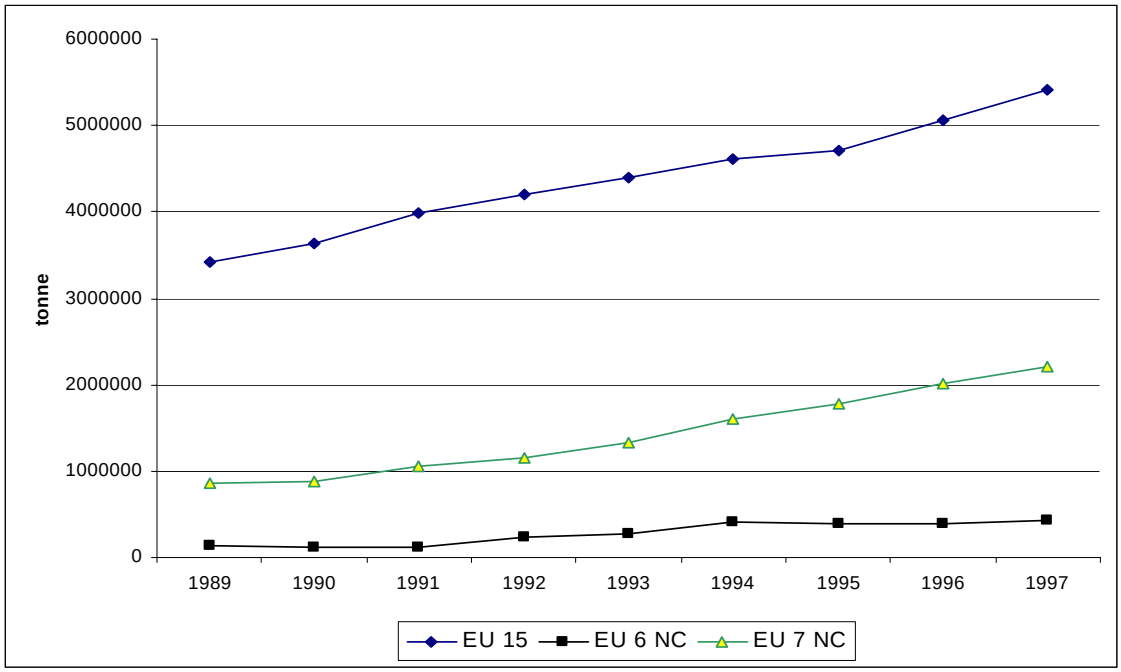


**Figure Annex 5-21: Evolution of food use exports from 1989 to 1998**

Non-food use exports didn't follow the same pattern as food-use exports in the sense that they declined after 1996. The majority of EU-15 non-food use exports are within the EU or to Norway. The growth of the aquaculture in Norway didn't sustain the EU-15 exports after 1996, since Norway significantly increased its production of fishmeal during the same period.

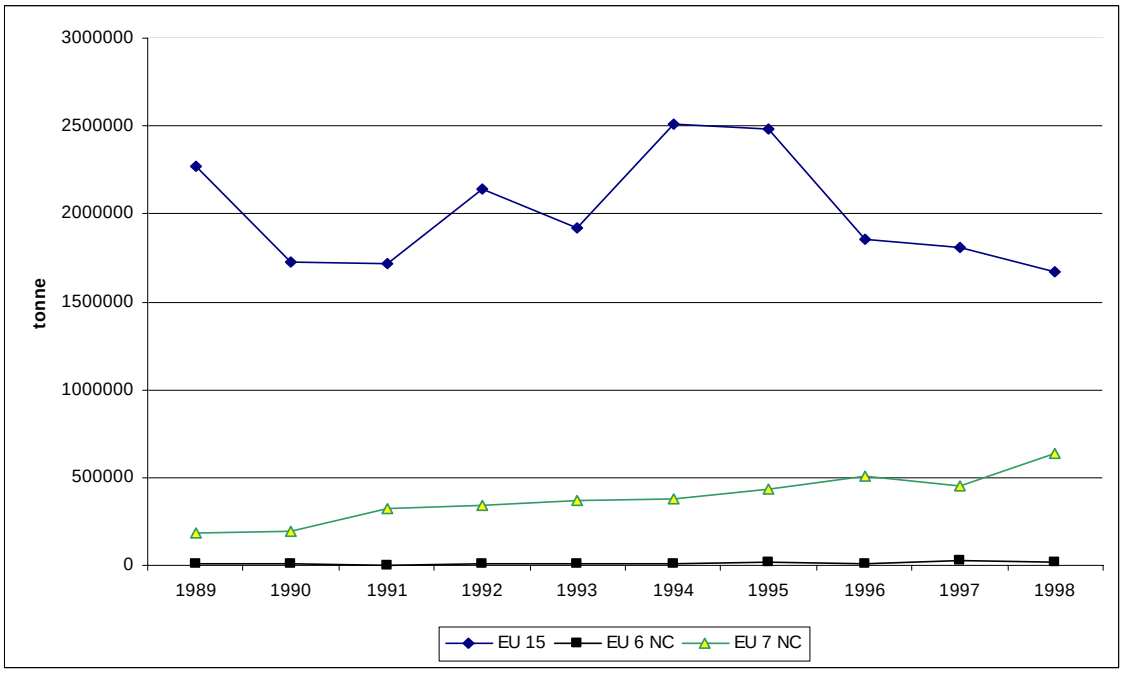


**Figure Annex 5-22: Evolution of non-food use exports from 1989 to 1998**

*Food use exports 1989-1998*

Main EU-15 exporters are Denmark, Spain and the Netherlands. Most exports from the EU-15 are directed to neighbouring countries, but more recently Asian countries (particularly Japan) have become major customers for high quality products. Exports from the EU-15 group to Eastern European countries, already weak at the end of the 1980s, dropped still further. However, Norway increased its exports to Russia during this period.

**Table Annex 5-7: Food use exports per country from 1989 to 1988**

(tonnes)

| Country | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 841 | 982 | 1126 | 2128 | 2103 | 2570 | 7212 | 4908 | 3980 | 3837 | 2969 |
| Belgium-Luxembourg | 67844 | 76918 | 73282 | 69227 | 78620 | 105033 | 111617 | 118661 | 148043 | 159867 | 100911 |
| Denmark | 652140 | 699833 | 778078 | 791831 | 803457 | 840819 | 779016 | 856771 | 893763 | 915058 | 801076 |
| Finland | 3969 | 4509 | 2070 | 3104 | 3122 | 8648 | 8457 | 13499 | 21336 | 17243 | 8596 |
| France | 343448 | 380493 | 372948 | 396751 | 427514 | 460786 | 472164 | 475354 | 479346 | 453746 | 426255 |
| Germany | 291681 | 336711 | 401178 | 389339 | 369959 | 413582 | 420141 | 503744 | 502101 | 508974 | 413741 |
| Greece | 35135 | 24371 | 23858 | 40705 | 47141 | 38366 | 44960 | 65716 | 86958 | 87218 | 49443 |
| Ireland | 215176 | 219571 | 297172 | 327866 | 385576 | 294215 | 406753 | 403081 | 381272 | 379050 | 330973 |
| Italy | 132547 | 118158 | 119431 | 133829 | 143165 | 165943 | 146570 | 170513 | 168334 | 166223 | 146471 |
| Netherlands | 676251 | 774664 | 771333 | 815128 | 806036 | 826102 | 782924 | 806869 | 942844 | 932983 | 813513 |
| Portugal | 89631 | 95007 | 105128 | 95388 | 106913 | 107323 | 129095 | 116119 | 122187 | 123076 | 108987 |
| Spain | 424085 | 397202 | 429262 | 346632 | 453506 | 517828 | 579379 | 692867 | 779422 | 823799 | 544398 |
| Sweden | 139713 | 145075 | 135930 | 192727 | 201873 | 247702 | 244547 | 280173 | 304342 | 325676 | 221776 |
| United Kingdom | 356731 | 363238 | 468138 | 594962 | 566768 | 591924 | 584809 | 545502 | 584917 | 667737 | 532473 |
| **Total EU-15** | **3429192** | **3636732** | **3978933** | **4199617** | **4395751** | **4620843** | **4717644** | **5053778** | **5418844** | **5564487** | **4501582** |
| Cyprus | 14 | 12 | 929 | 446 | 1324 | 369 | 422 | 459 | 296 | 473 | 474 |
| Czech Republic | | | | | 13263 | 16349 | 13841 | 14417 | 10637 | 12144 | 13442 |
| Estonia | | | | | 91822 | 125853 | 127948 | 128360 | 178220 | 188781 | 140164 |
| Hungary | | | 3601 | 2383 | 1750 | 3051 | 3119 | 3316 | 2953 | 4501 | 3084 |
| Poland | 133738 | 124875 | 121864 | 220928 | 154092 | 254860 | 237791 | 241430 | 239808 | 187303 | 191669 |
| Slovenia | | | | 4905 | 3674 | 4026 | 2539 | 3643 | 3188 | 3010 | 3569 |
| **Total EUR-6 NC** | **133752** | **124887** | **126394** | **228662** | **265925** | **404508** | **385660** | **391626** | **435102** | **396213** | **289273** |
| Bulgaria | | | | | 9121 | 9950 | 8264 | 10238 | 7685 | 4332 | 8265 |
| Latvia | | | | 38532 | 37213 | 60277 | 82107 | 132315 | 146648 | 97368 | 84923 |
| Lithuania | | | | 20610 | 8566 | 27479 | 61273 | 80099 | 72879 | 87451 | 51194 |
| Malta | 83 | 924 | 615 | 434 | 1274 | 1014 | 643 | 1398 | 1594 | 1599 | 958 |
| Norway | 855692 | 886050 | 1062742 | 1097007 | 1272758 | 1498873 | 1624889 | 1794852 | 1981224 | 1821960 | 1389605 |
| Romania | 9655 | 54 | 241 | 402 | 29 | 182 | 6 | 278 | 638 | 1359 | 1284 |
| Slovakia | | | | | 118 | 325 | 508 | 753 | 887 | 1047 | 606 |
| **Total EUR-7 NC** | **865430** | **887028** | **1063598** | **1156987** | **1329078** | **1598100** | **1777690** | **2019932** | **2211554** | **2015116** | **1492451** |
| **Total EUR-28** | **4428373** | **4648647** | **5168925** | **5585266** | **5990754** | **6623451** | **6880994** | **7465336** | **8065500** | **7975816** | **6283306** |

Source: Database

Exports of human consumption products increased from 65 percent of the total in 1989 to 75 percent in 1998. Human consumption products in the EU-15 also represented 75 percent of trade in 1989. During the 1990s, exports of human consumption products from the 28 countries increased by 75 percent, while exports for non-human consumption only increased by 7 percent. Denmark is the largest exporter of product for non-human foodstuff (48 percent of the total non-human food in 1998) while Norway is the largest exporter for human consumption (22 percent of the total human consumption in 1998).

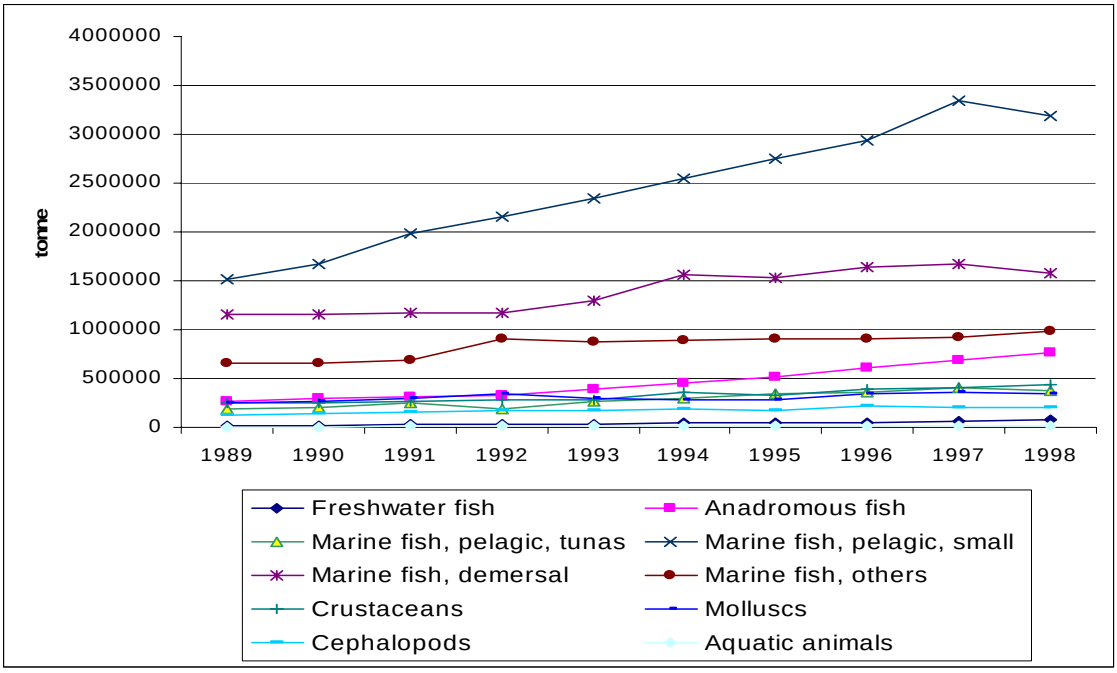


**Figure Annex 5-23: Food use exports by FAO groups of species EUR-28 from 1989 to 1998**

Exports from Spain and the Netherlands are in some cases re-exportations of fish of Norwegian (cod, salmon) or Argentinean (hake) provenance. Frozen fish is the main category of their exports.

Exports for human consumption are comprised mainly of salmon, cod, herring, shrimp and prawn species. Other exports consist of saithe, haddock, mackerel, tuna (mainly canned) and hake (Real, 2000).

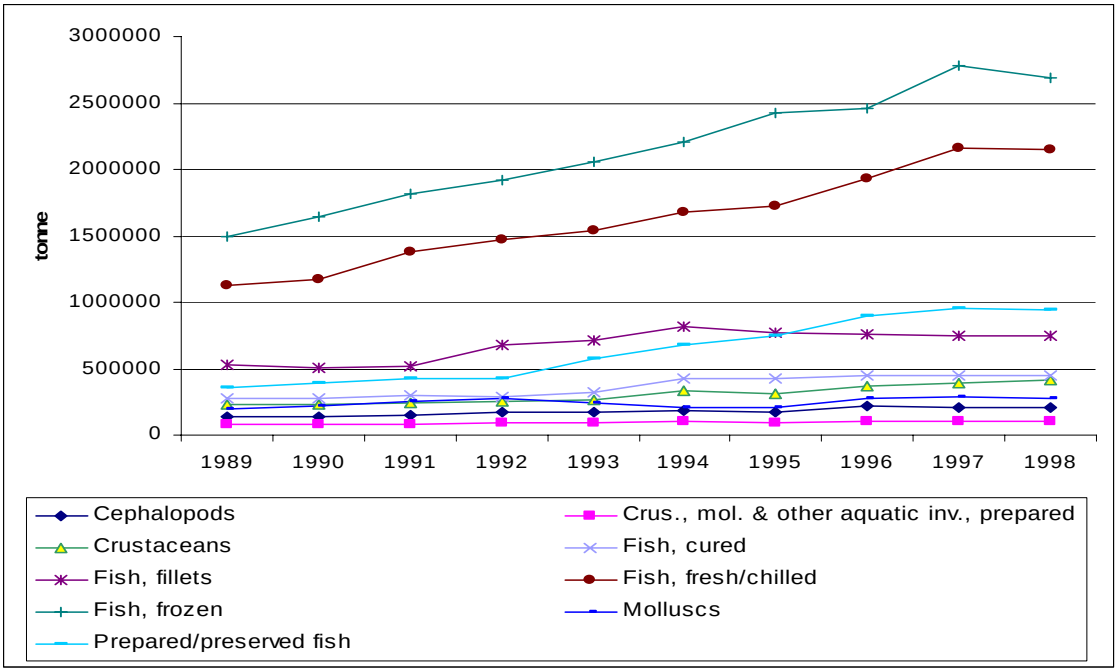


**Figure Annex 5-24: Food use exports by OECD groups of commodities EUR-28 from 1989 to 1998**

Detailed tables of food use exports by FAO groups of species and OECD group of commodities are presented in Annex 14.

*Non-food use exports 1989-1998*

Exports of non-foodstuff from the EU are mainly driven by the level of production, and to a lesser extent by imports from Iceland, Chile and Peru, and their subsequent re-exportation. The value of small pelagics and demersal fish for reduction (marine fish, others in the graph below) fluctuated in parallel between 1989 and 1998, converging at 1.2 Mt at the end of the period.

Denmark and Germany were the two main EU-15 countries that exported fishmeal during the period 1989-1998, exporting on average 65 percent and 15 percent respectively. Danish exports were oriented first to Norway, Italy, Netherlands, Greece, Thailand and Japan while Germany exported mainly to its neighbouring countries like Hungary, France, Netherlands, Austria, and Belgium. Norway on its side had exports oriented quasi-exclusively to the EU-15, with more than half of it going to the UK.

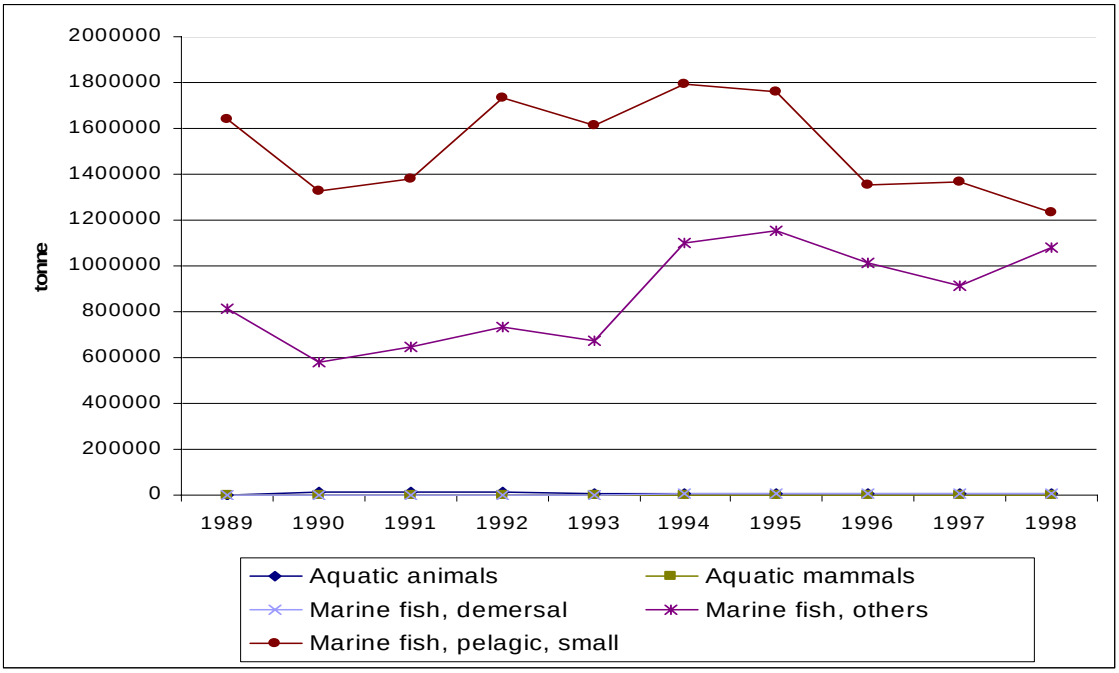


**Figure Annex 5-25: EUR-28 Exports of non-food use products from 1989 to 1998**

See annex 10 for detail tables per country, by FAO groups of species and by OECD groups of commodities.

### *Intra-EU Trade 1989-1998*

The main trade flows within the EU are directed north to south. As the major centres of primary production, the UK, Denmark and the Netherlands export large quantities of primary and processed products to southern states within the EU where consumption rates and demand are particularly high (Corre *et al*., 1999). France performs a similar function but often acts as an intermediary, importing products from northern European countries such as the UK and Denmark, processing them and then exporting them to southern European customers such as Spain or Italy. Trade flows between the southern EU countries are less significant, the most important being the export of tuna products from Spain to Italy.

Whereas trade between EU and non-EU states may reflect political links and historic trade flows, new trading relationships that have evolved within the EU may reflect contemporary trends in production, processing and demand between states (Filhol, 1995). Several key bilateral trading links have evolved in this way over the last decade. In general, analysis of bilateral trade within the EU in the 1990s shows France, Spain and, to a lesser extent, Italy to be the major recipients of products from the major exporters in the EU (France, Spain, the UK and Norway).

Overall, intra-EU trade represents 60 percent of the total EU trade, which means that only 40 percent of what is exported or imported is leaving or coming into the EU-15 (Paquotte, 1999a). The intra-trade within the former Soviet countries is also important and accounts for more than 80 percent of the trade flows. The trade route from the Baltic States and to a lesser extent from Poland to Russia is still the one that drains 80 percent of the products.

**Food use net supply 1989-1998**

The net supply of aquatic products is the sum of total production and imports minus exports and can be divided into net supply for human consumption or food use (FU) and for non-human foodstuff or non-food use (NFU).

For the 28 countries combined, the net supply of fish products (FU and NFU) in 1998 was approximately 14 million tonnes. This volume is very similar to that in 1989. The net supply for human consumption, which was equivalent to 65 percent of the total in 1989, currently represents approximately 75 percent of the total. This increase is due to a growth in human consumption up to 10 percent over the period, and to a fall in the supply of non-human foodstuff by 20 percent.

***Food use net supply by country from 1989 to 1998***

Currently, with 15 member states, Europe comprises a very large market of approximately 370 million consumers of relatively high income. In 1998, apparent consumption or net supply was approximately 9.5 million tonnes with six countries (France, Spain, Italy, United Kingdom, Germany and Portugal) representing 84 percent of the overall consumption.

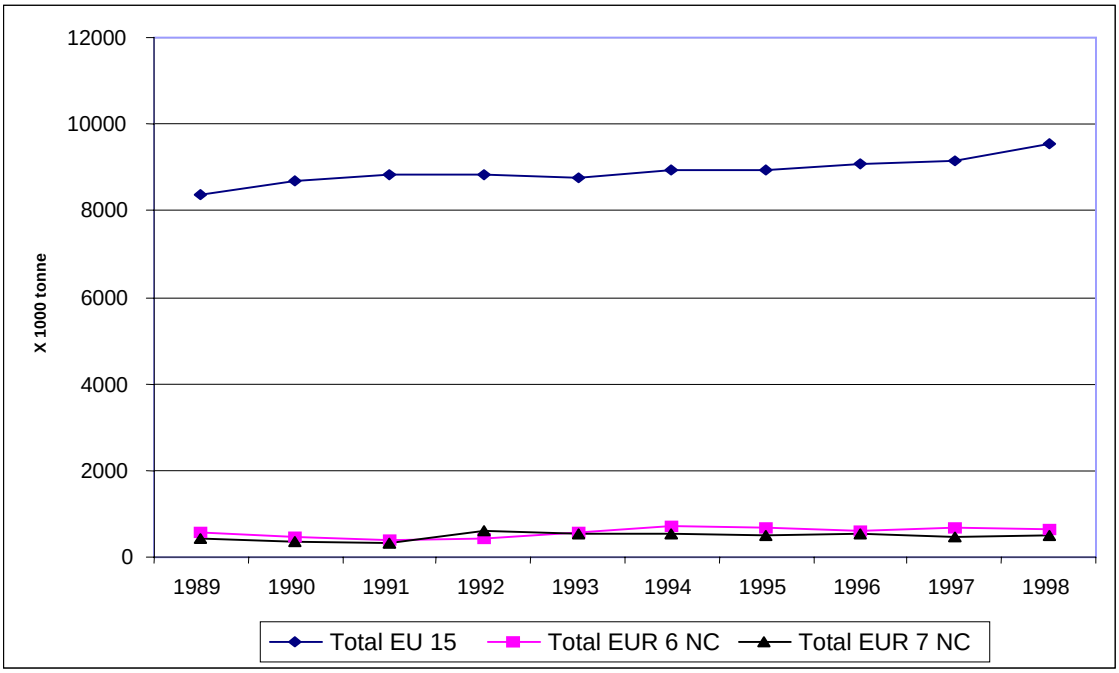


**Figure Annex 5-26: Food use net supply, EU-15, EU 6NC and EUR-7 NC from 1989 to 1998 (live weight)**

Apparent consumption increased in the 1980s to stabilize around its current level of 9 million tonnes. During the 1980s, the market developed by 21 percent in volume, from 7 million tonnes to approximately 8.5 million tonnes in 1989. This increase mirrored the development of world production that increased by more than a third from 75 to over 100 million tonnes over the same period. Since 1989, the net supply has been stable at around 9 million tonnes (except in 1998 when it was at 9.5 million tonnes). By contrast, the actual average unit value of product consumed decreased in the 1990s, whereas the nominal value in 1995 was equivalent to the value a decade earlier.

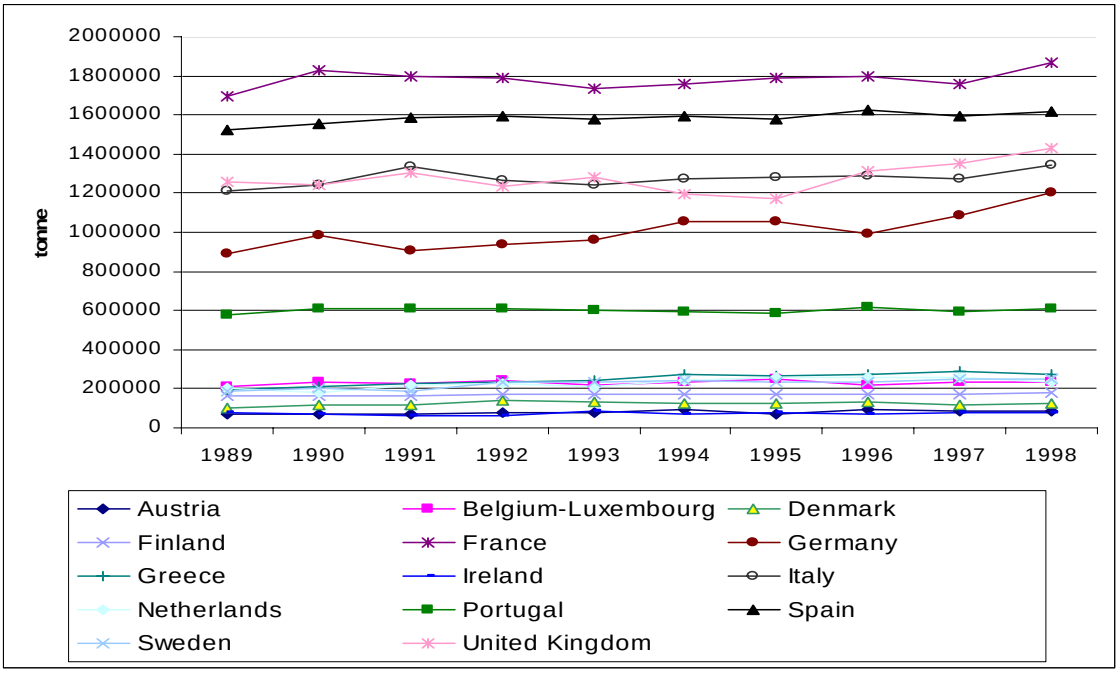


**Figure Annex 5-27: Food use net supply EU-15 from 1989 to 1998 (t. live weight)**

At the end of the 1980s and the beginning of the 1990s, the separation of many Eastern countries from the Soviet regime led to a dramatic drop in catches: difficulties of accession to coastal states' fishing grounds (West Africa and Russia mainly), suppression of subsidies (especially fuel). The net supply of these Eastern Europe countries diminished consequently. The two figures below show the net supply of fish for respectively the 6 and 7 new countries.

In 1998, France, Spain, the United Kingdom and Italy recorded the most significant net supply of human consumption. Norway, the United Kingdom, Germany and Spain recorded the largest net supply of non-human consumption foodstuffs in 1998.

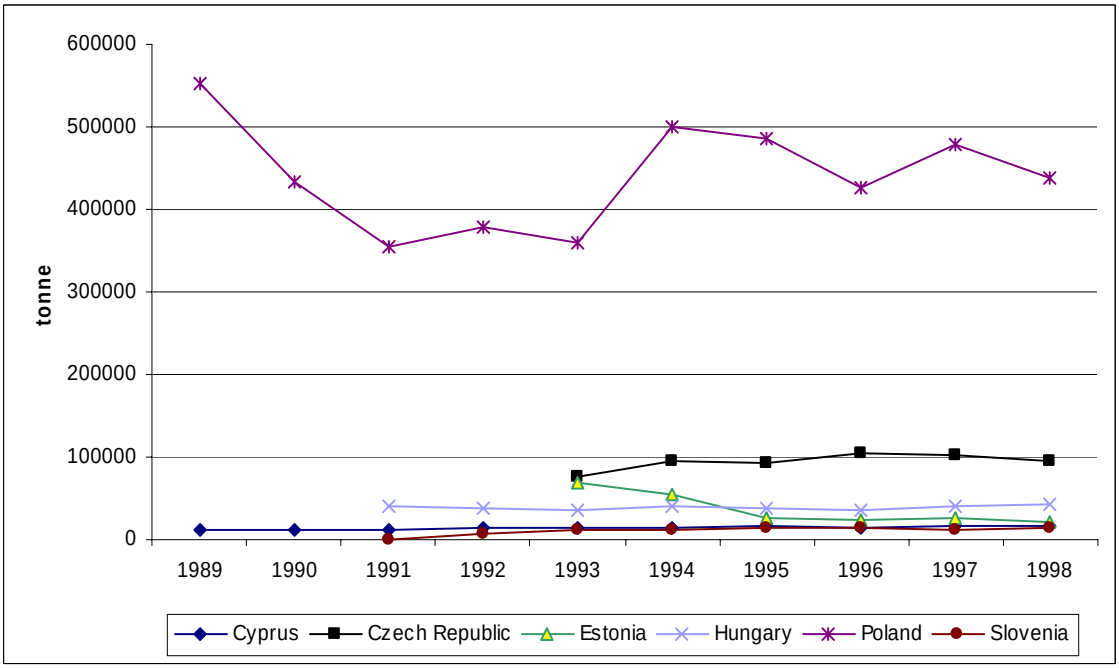


**Figure Annex 5-28: Food use net supply of the EUR-6 new countries (t. live weight), from 1989 to 1998**

In the mid-90s, the transition to a market economy led the Baltic States to implement reforms aimed at developing aquaculture, and the capture fisheries in the Baltic Sea. These developments slowed down the yearly rate of net supply lost.

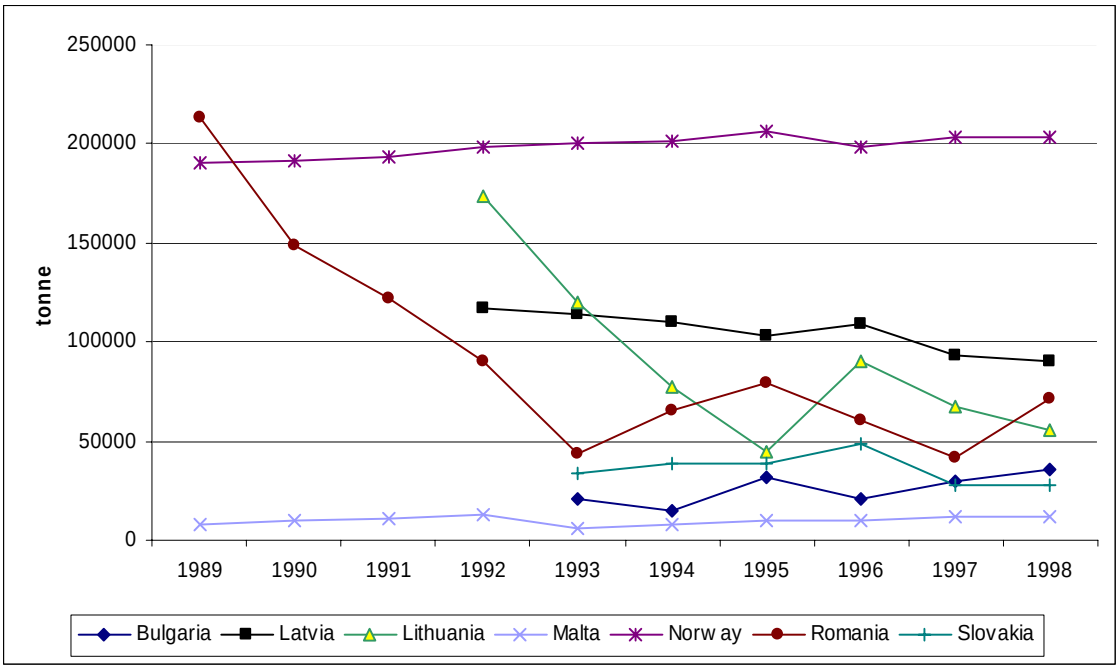


**Figure Annex 5-29: Food use net supply of the EUR-7 new countries (t. live weight), from 1989 to 1998**

Romania didn't have of the opportunity to develop new fishing grounds: its net supply decreased sharply from 200 000 tonnes in 1989 to only 75 000 tonnes in 1998. Norway maintained its 200 000 of fish supply over the period 1989-1998.

### *Food use net supply by OECD type of commodities 1989-1998*

Over the period 1989-1998, the net supply of fish for human consumption at the EU-15 level showed 3 tendencies:

- stable: crustaceans, molluscs and other aquatic products prepared, fish cured, fish fresh/chilled, cephalopods, molluscs, crustaceans;
- increase: fish fillets and prepared/preserved fish;
- decrease: fish frozen.

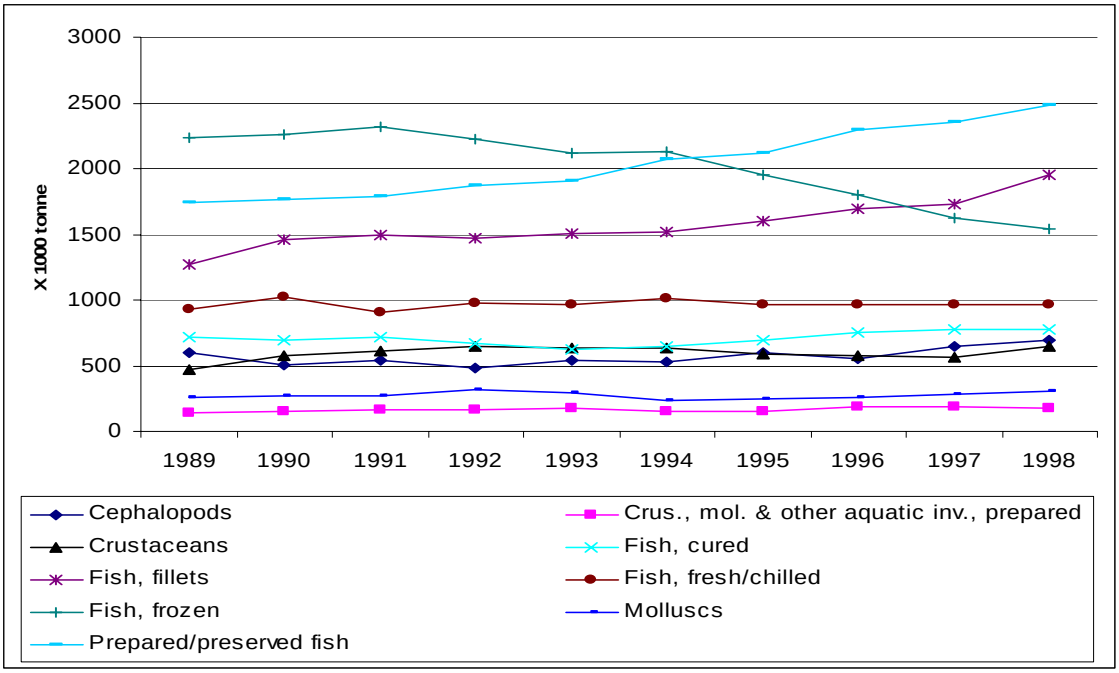


**Figure Annex 5-30: EU-15 food use net supply by OECD type of commodities (live weight)**

As the figure below shows, the 3 tendencies we can observe for the EUR-6 NC are mainly:

- stability, with certain fluctuations of cephalopods, crustaceans, molluscs and other prepared aquatic invertebrates;
- erratic fluctuation of fish fillets and frozen fish which in 1998 were more or less at the same level as in 1990;
- an increase in the prepared/preserved fish net supply.

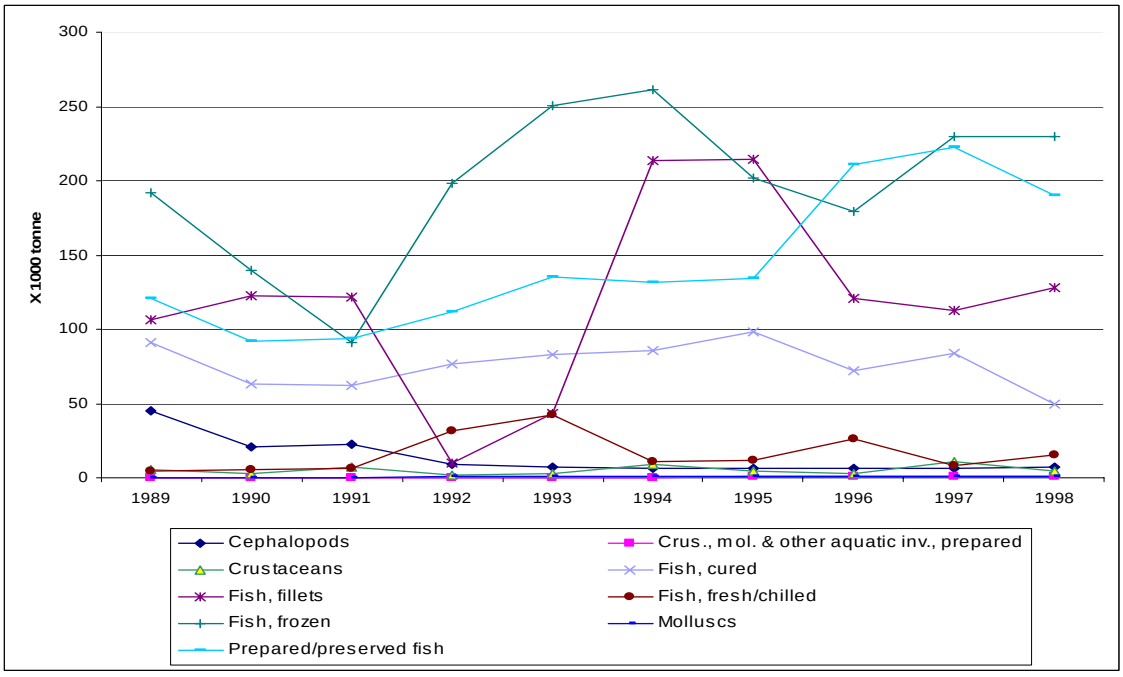


**Figure Annex 5-31: EUR-6 NC Commodities net supply (live weight)**

Regarding the EUR-7 NC, the main observed tendencies are:

- light increase of prepared/preserved fish net supply and frozen fish (with an important augmentation in 1992 and a decrease since 1996);
- important increase of the fish fillet net supply, especially from 1997 to 1998;
- stability of the other commodities.

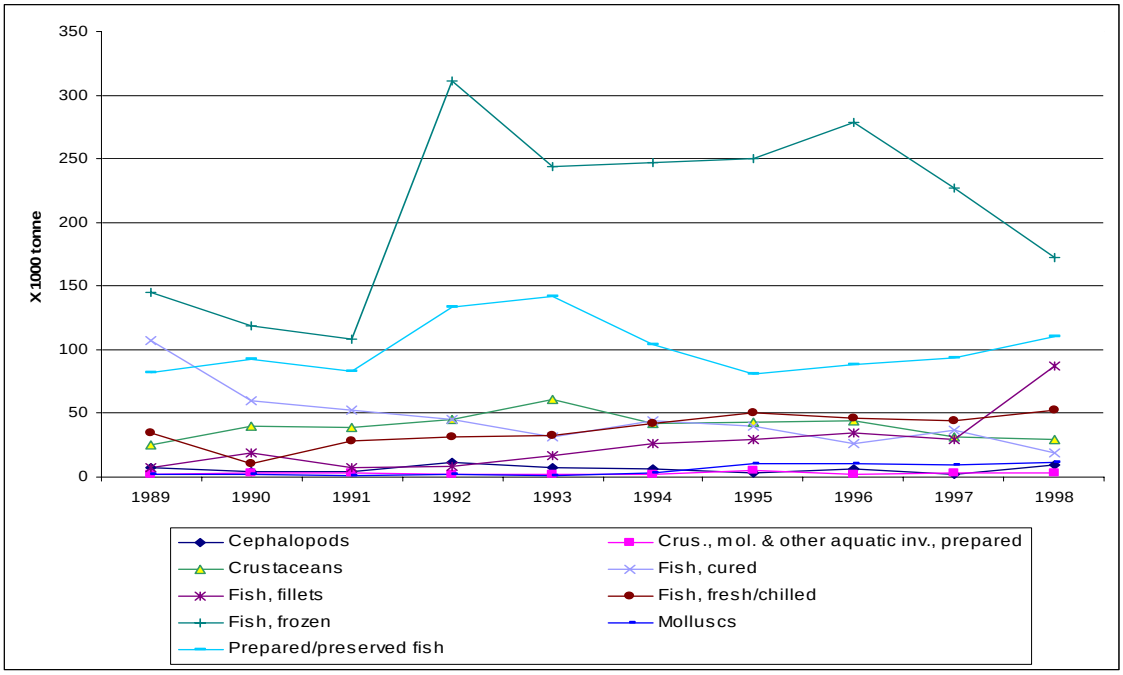


**Figure Annex 5-32: EUR-7 NC Commodities net supply (live weight)**

The table below shows the net supply by FAO groups of species (net supply in net weight is presented in Annex 8).

**Table Annex 5-8: Food use net supply in live weight by FAO groups of species from 1989 to 1998**

(x 1000 tonnes)

| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Freshwater fish | 39 | 43 | 34 | 35 | 49 | 63 | 72 | 95 | 95 | 111 | 64 |
| Diadromous fish | 432 | 495 | 540 | 560 | 517 | 581 | 623 | 670 | 688 | 700 | 581 |
| Marine fish, pelagic, tunas | 1416 | 1562 | 1435 | 1451 | 1417 | 1393 | 1463 | 1461 | 1444 | 1595 | 1464 |
| Marine fish, pelagic, small | 1430 | 1395 | 1412 | 1405 | 1360 | 1482 | 1420 | 1287 | 1247 | 1149 | 1359 |
| Marine fish, demersal | 2133 | 2241 | 2253 | 2204 | 2265 | 2321 | 2182 | 2321 | 2282 | 2357 | 2256 |
| Marine fish, others | 1439 | 1461 | 1551 | 1552 | 1516 | 1522 | 1571 | 1666 | 1700 | 1799 | 1578 |
| Crustaceans | 493 | 605 | 640 | 697 | 699 | 665 | 615 | 605 | 598 | 678 | 630 |
| Molluscs | 372 | 383 | 395 | 422 | 390 | 354 | 355 | 391 | 409 | 429 | 390 |
| Cephalopods | 597 | 503 | 544 | 487 | 538 | 526 | 603 | 554 | 642 | 694 | 569 |
| Aquatic animals | 15 | 17 | 18 | 11 | 15 | 14 | 19 | 24 | 32 | 21 | 19 |
| **Total EU-15** | **8365** | **8704** | **8822** | **8824** | **8767** | **8923** | **8922** | **9075** | **9137** | **9533** | **8907** |
| Freshwater fish | 0 | 0 | 18 | 20 | 39 | 29 | 32 | 31 | 37 | 35 | 24 |
| Diadromous fish | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 7 | 8 | 3 |
| Marine fish, pelagic, tunas | 1 | 1 | 1 | 3 | 5 | 5 | 8 | 9 | 10 | 14 | 6 |
| Marine fish, pelagic, small | 93 | 66 | 60 | 162 | 171 | 282 | 334 | 140 | 157 | 205 | 167 |
| Marine fish, demersal | 5 | 4 | 5 | 7 | 10 | 20 | 14 | 33 | 39 | 61 | 20 |
| Marine fish, others | 415 | 350 | 292 | 234 | 327 | 363 | 269 | 394 | 408 | 290 | 334 |
| Crustaceans | 5 | 2 | 7 | 2 | 3 | 9 | 5 | 2 | 11 | 5 | 5 |
| Molluscs | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 1 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cephalopods | 45 | 21 | 23 | 9 | 7 | 7 | 6 | 7 | 6 | 7 | 14 |
| Aquatic animals | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| **TotalEUR-6 NC** | **565** | **446** | **406** | **440** | **564** | **718** | **672** | **619** | **676** | **628** | **573** |
| Freshwater fish | 0 | 0 | 0 | 0 | 5 | 6 | 6 | 6 | 4 | 4 | 3 |
| Diadromous fish | 41 | 44 | 28 | 13 | 17 | 9 | 4 | 3 | 23 | 15 | 20 |
| Marine fish, pelagic, tunas | 1 | 8 | 7 | 7 | 4 | 5 | 7 | 6 | 6 | 8 | 6 |
| Marine fish, pelagic, small | 4 | 2 | 9 | 47 | 37 | 123 | 85 | 193 | 131 | 158 | 79 |
| Marine fish, demersal | 3 | 9 | 41 | 21 | 3 | 11 | 10 | 53 | 20 | 111 | 28 |
| Marine fish, others | 328 | 237 | 194 | 442 | 400 | 309 | 339 | 212 | 246 | 146 | 285 |
| Crustaceans | 26 | 43 | 42 | 47 | 63 | 44 | 48 | 46 | 34 | 32 | 42 |
| Molluscs | 2 | 3 | 1 | 2 | 1 | 4 | 11 | 11 | 10 | 12 | 6 |
| Cephalopods | 7 | 4 | 4 | 12 | 8 | 6 | 3 | 6 | 2 | 9 | 6 |
| **TotalEUR-7 NC** | **412** | **350** | **326** | **592** | **538** | **518** | **513** | **538** | **476** | **495** | **476** |
| **Total EUR-28** | **9342** | **9499** | **9554** | **9856** | **9870** | **10158** | **10107** | **10232** | **10288** | **10655** | **9956** |

Source: database

### Non-food use net supply 1989-1998

The non-food use net supply shows differing tendencies depending on the group of EU countries observed. EU-15 member states use less and less fishmeal and fish oil: the apparent consumption was almost halved between 1989 and 1998 (3.8 Mt in 1989 to 2.3 Mt in 1998). EUR-6 NC presents a flat evolution of the non-food use net supply, whilst EUR-7 NC, largely due to Norway (see Annex 10) has increased its apparent consumption from 1 Mt in 1989 to 1.5 Mt in 1998. The rise in aquaculture production is the reason behind this positive trend.

The three slopes in the graph below have the same shape as the ones for imports and exports, which suggests a positive correlation between these three components and indicates that European production doesn't have a significant impact on the apparent consumption. Overall, there is a slight a propensity to increase re-exports both for the EU-15 and for Norway.

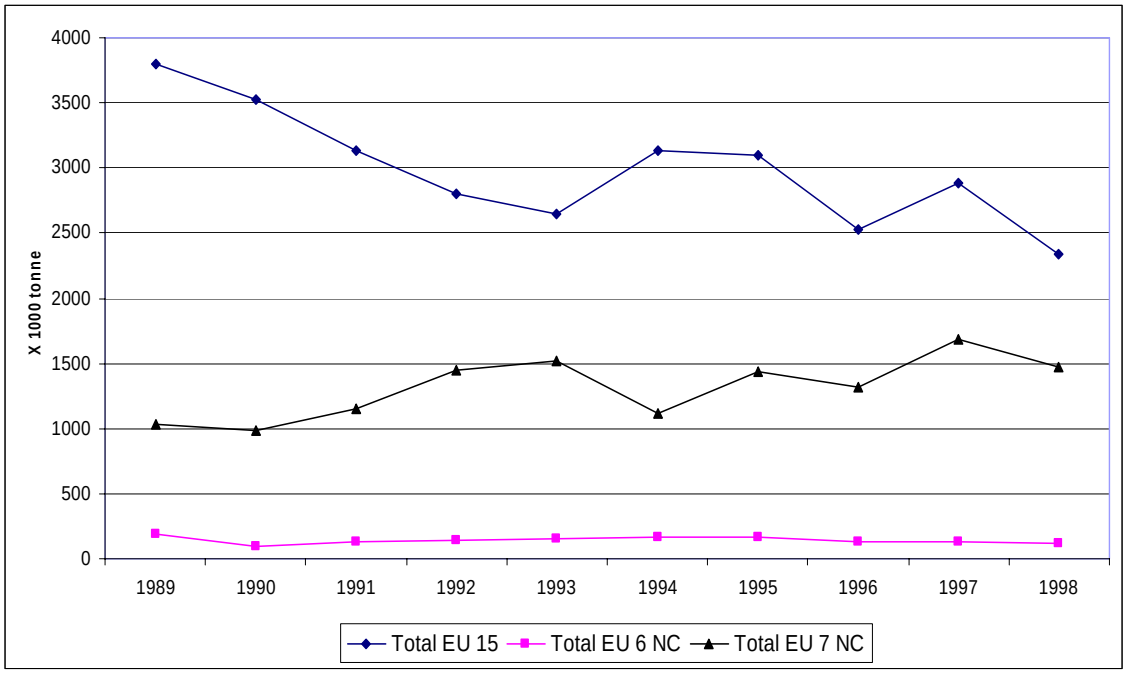


**Figure Annex 5-33: Non-food use net supply EU-15, EUR-6 NC, and EUR-7 NC (live weight)**

All graphs showing net supply per country and by FAO groups of species and OECD group of commodities are presented in Annex 10.

## Consumption 1989-1998

### *Overview 1989-1998*

For the EU-15, consumption of fish went up 20 percent during the period 1979 to 1998, but was relatively stable over the last decade (an increase of only 8 percent). Moreover, the variety of products available to the consumer also increased significantly. This increase in quantity and diversity of consumption goods is due to a number of factors including the development of transport infrastructure, shifts in consumption behaviour, the availability of new forms of prepared and conditioned products, and the development of aquaculture (Nauman *et al.*, 1995).

Historically, seafood consumption was limited to coastal areas because of the high perishability of marine products and the incapacity of transport systems to deliver fresh products of high quality inland. The development of transport facilities allowed the distribution of aquatic products to inland regions. These improvements also contributed to a wider range of species available. Better communications have brought centres of production and centres of consumption closer together.

In addition, the emergence and growth of the supermarkets' share in the distribution of seafood, together with other products for current human consumption, continues to facilitate a greater penetration of seafood products in areas remote from the coast. Changes in diets and eating habits have generated an increased demand for ready-to-cook or ready-to-eat products and increased health consciousness has also changed consumption behaviour (Neubacher, 1999). The processing industry has benefited from these changes by providing a broader variety of cooked dishes and demonstrating its ability to adapt and innovate for new markets (Karasawa, 2000).

The development of aquaculture has also contributed by expanding supplies of fish to national markets. From a production of about 800 000 tonnes in the middle of the 1980s, aquaculture in European Member States has expanded to supply the market with almost 1.4 million tonnes in 1998.

Europeans have always been fish eaters, but the recent rise in health consciousness has also led to a worldwide up trend in fish consumption. This is because it has become widely recognized that fish is ideal for a balanced diet, being full of essential amino acids and minerals and high in unsaturated fatty acids, particularly EPA, which is useful in protecting against heart disease, and DHA, which is important to the development process of the brain (Anon., 2001c; O'Donnell, 1991).

### *Consumption per capita 1989-1998*

From 1989 to 1998, consumption per capita grew in the EU-15 countries, but decreased overall in the EUR-28 countries by approximately 9 percent. This fall is mainly due to reduced consumption caused by a fall in purchasing power in countries from the old communist block (Baltic States, Romania, Slovakia and Poland).

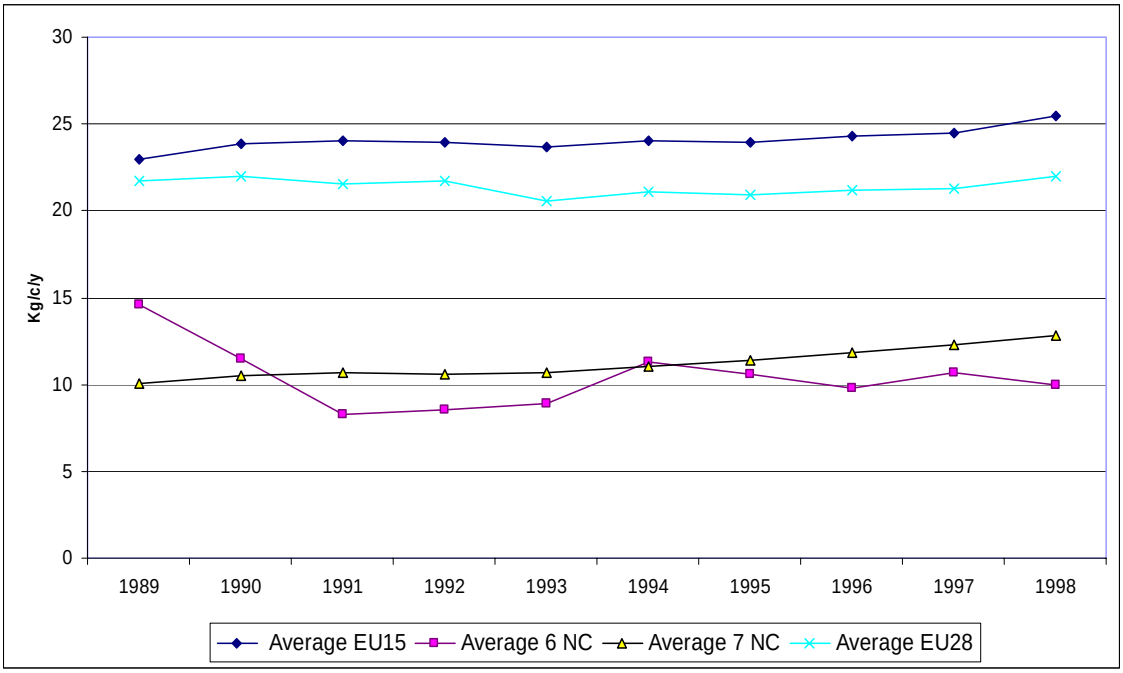


**Figure Annex 5-34: Average fish consumption for EU-15, EU 6NC and EU 7NC, from 1989 to 1998**

Portugal has the largest per capita consumption in Europe, and experienced a slight increase of some 3 percent between 1989 and 1998. Norway is the second highest consumer per capita, followed by Spain. There are five countries with a per capita consumption higher than 30 kg/c/yr, eight countries with a consumption per capita ranging between 20 and 30 kg/c/yr, six countries between 10 and 20 kg/c/yr and five countries with less than 10 kg/c/yr (see table below).

Overall, EU-15 production has been relatively stable over the last decade. The Portuguese continue to eat salt dried cod as much as they did in the past and maintain their consumption at around 60 kg. Spaniards keep their consumption at 40 kg/c/yr, with a wide range of products and species consumed. Finns and the French are just above 30 k/y/c with different patterns of consumption: Finns concentrate their consumption on fresh and marinated fish (herring, Rainbow trout, salmon) while the French consume the same large variety of species and products (from tuna to mussels) as the Spanish. Swedes are just below the bar of the 30 kg/c/yr, with fish eating oriented to prepared/preserved marine and diadromous fish. Irish and British customers, with respectively 21 and 22 kg/c/yr, present almost the same pattern of fish consumption due to their high consumption of marine fish, like cod and haddock (mainly outside their home). Greek and Italian consumers, with 26 and 23 kg/c/yr respectively in 1998, have a great choice of fish species and products (mainly consumed fresh) due to the high variety of catches in the Mediterranean Sea.

Belgian consumers have a preference for mussels, flat fish, salmon and tuna, which gives a consumption that fluctuates around 22 kg/c/yr. Consumption by the Dutch shares some characteristics with their neighbours' as flat fish and mussels are amongst their most popular choices. The rest of the 15 kg/c/yr in 1998 is mainly composed of shrimp and herring. Danish consumers are more oriented to North Sea species like cod, saithe, halibut and Alaska pollack, with an evident preference for scallops. If their consumption increased at the beginning of the 1990s, it came back to its previous level at the end of the period. Austria and Germany are the EU-15 countries that present the lower consumption level. German consumers have increased their consumption from 11 to 15 kg/c/yr in one decade while Austrians have maintained their

consumption at around 10 kg/y. Both countries rely on imports to supply their market in the marine fish that have increasingly replaced the traditional cured and fresh freshwater fish.

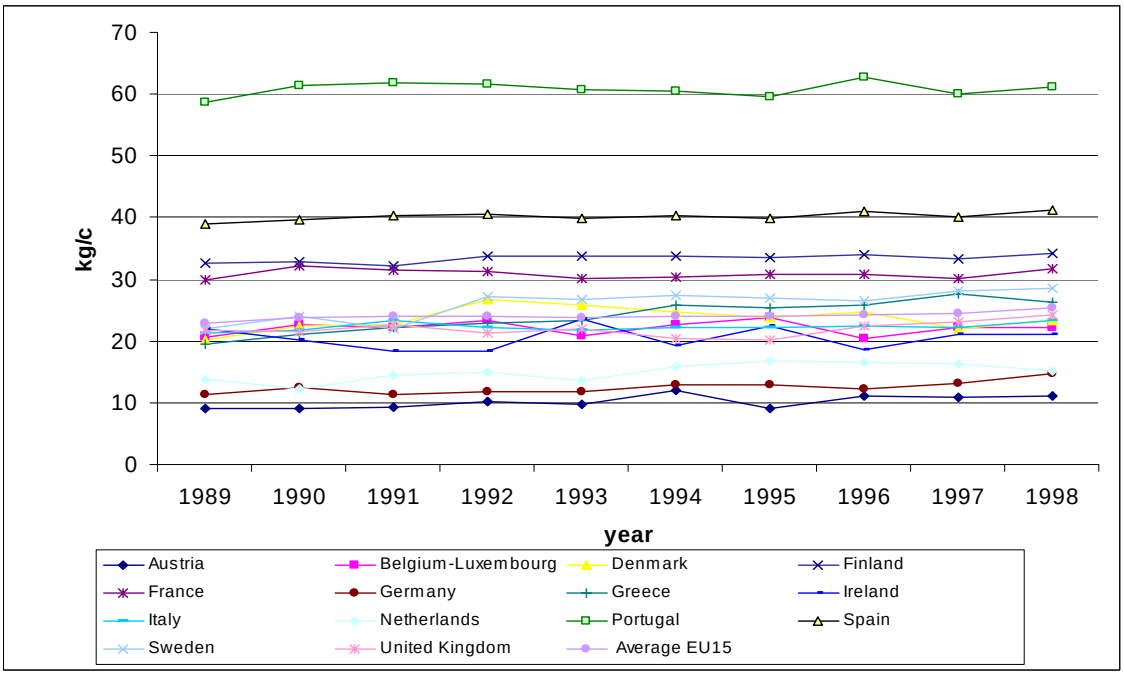


**Figure Annex 5-35: Fish consumption EU-15 (from 1989 to 1998)**

Consumption in the landlocked countries of the EUR-6 NC that were part of the Soviet system, has not changed[45]. Slovenia, the Czech Republic and Hungary opened their economy to Western European products and consequently altered their consumption habits by eating more prepared/preserved and marine fish to the detriment of the traditionally consumed carp, trout and other freshwater species.

Poland, which experienced the collapse of Russian subsidies (fuel, other inputs) and a consequent decline in its production of cod and small pelagic species for human consumption, has counterbalanced this by elevating its imports. The positive growth of its economy allowed this shift form national production to imports. The result is a stable consumption level over the last decade of around 11 kg/c/yr. By contrast, Estonian consumers have seen their consumption drop dramatically from 45 to 18 kg/c/yr in two years. Estonia, which was highly dependent on foreign fishing grounds and the Soviet negotiation process, lost nearly all of its distant water fleet and consequently its main supply source. Fisheries of the Baltic Sea also suffered from the political separation and contributed to the diminution of the national supply from captures.

Cyprus is a country that presents the same consumption pattern as Greece: a large range of species consumed mainly fresh. Coastal fisheries play an active role in the Cypriot market supply.

[45] The absence of data and information before 1993 limits the presentation of historical trends for these countries.

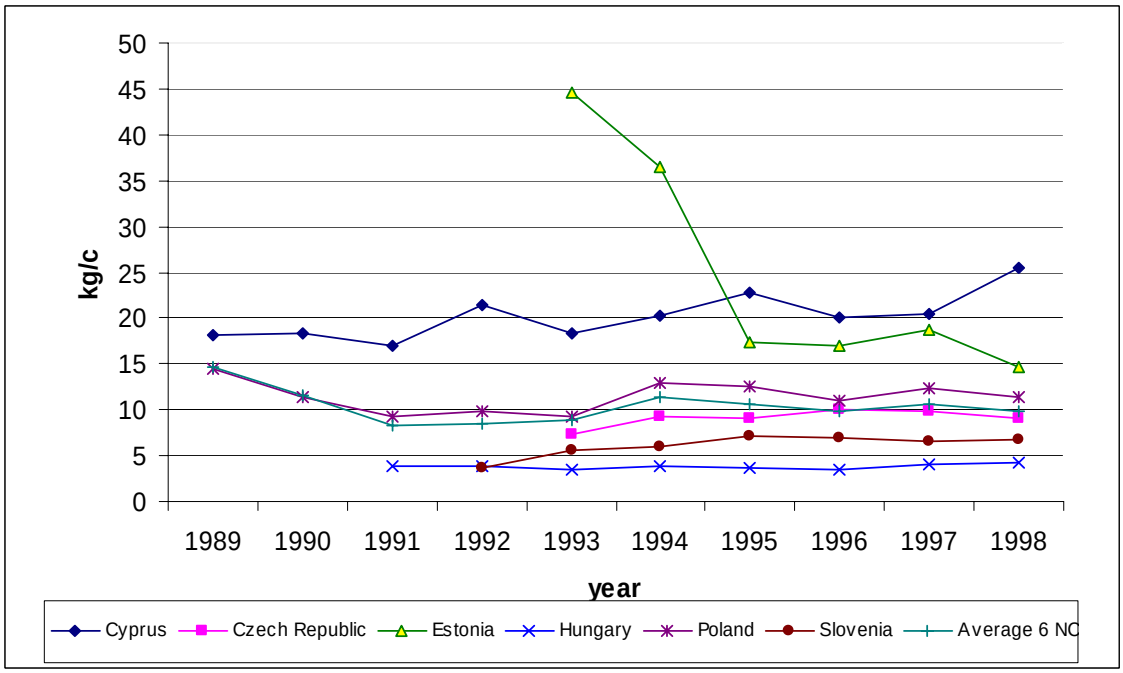


**Figure Annex 5-36: Fish consumption EUR-6 NC (from 1989 to 1998)**

The EUR-7 NC group present different consumption patterns. Norway and Latvia had the highest consumption levels at around 45 kg/c/yr and 37 kg/c/yr in 1998 respectively. Norwegian consumers have kept their eating habits during the period 1989-1998 by purchasing cod (mainly fresh), herring in various forms, fresh saithe and haddock, and fresh and smoked salmon. Latvia experienced the same collapse of its catches as Estonia and Lithuania due to its orientation on distant water fisheries. Nevertheless, its consumption per capita did not fall as Estonia's did, even if the country exported most of the high commercial value species and covered its domestic demand by low valued Baltic catches like herring, sprat and flounder (GLOBEFISH, 1994) (herring, sprat, flounder).

Lithuania suffered from the same malaise as its Baltic neighbours and its consumption trend followed the Estonian one. From 45 kg/c/yr in 1992, national consumption dropped to only 15 kg/c/yr in 1998. One explanation is the fact that the price of fish and fish products rose twice as fast as other food product between 1992 and 1995 (Jakstiene, 1997).

Historically, Bulgaria, Romania and Slovakia have not been large consumers of fish. Since gaining their independence at the beginning of the 1990s, consumption of fish products went into decline until 1996, and then seemed to recover (although not to their 1989 level). Freshwater fish were the main species consumed in these three countries, with fish commodities imported from the former USSR. In 1998, their consumption was around 5 kg/c/yr.

Malta relies on local landings for its market supply. It presents a situation similar to that of Cyprus or Greece. Fluctuation over the period around an average of 25 kg/c/yr is mainly due to the decline in landings that fell from 6 500 tonnes in 1992 to only 2 500 tonnes in 1993 and subsequent years. After 1994, imports replaced missing landings.

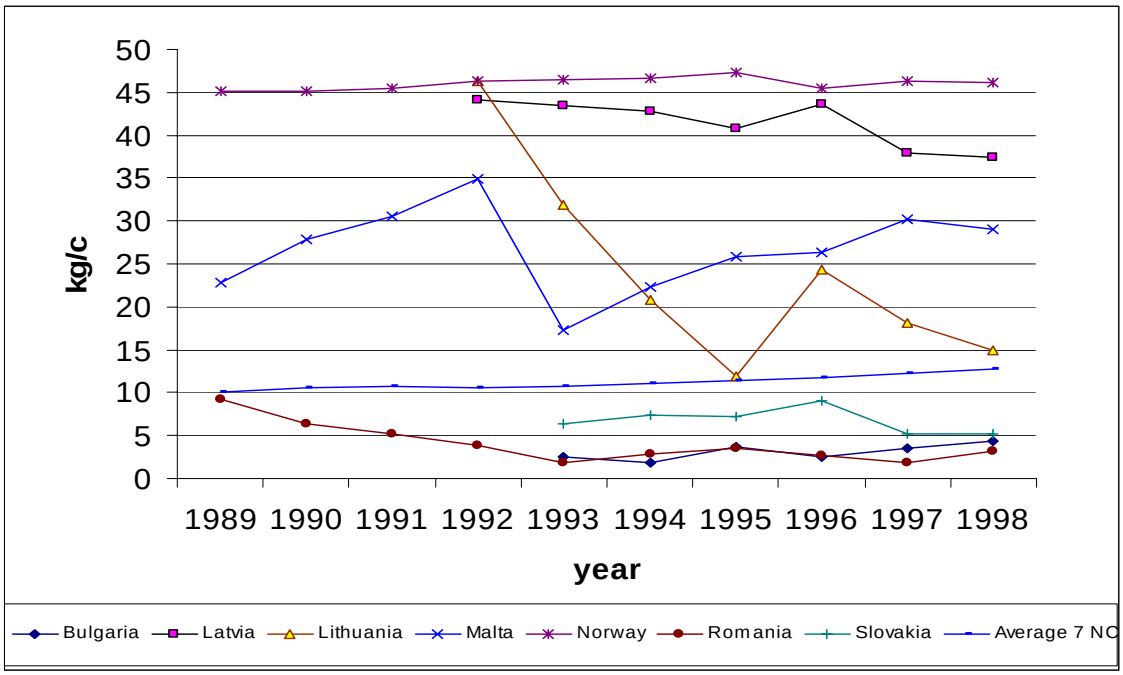


**Figure Annex 5-37: Fish consumption EUR-7 NC (from 1989 to 1998)**

The table below presents for the 28 countries the evolution of their fish consumption per capita[46].

**Table Annex 5-9: Consumption per capita (kg live weight/capita/year), from 1989 to 1998**

| Country | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 9 | 9 | 9 | 10 | 10 | 12 | 9 | 11 | 11 | 11 | 10 |
| Belgium-Luxembourg | 21 | 23 | 22 | 23 | 21 | 23 | 24 | 20 | 22 | 22 | 22 |
| Denmark | 20 | 22 | 23 | 27 | 26 | 25 | 24 | 25 | 22 | 23 | 24 |
| Finland | 33 | 33 | 32 | 34 | 34 | 34 | 34 | 34 | 33 | 34 | 33 |
| France | 30 | 32 | 32 | 31 | 30 | 30 | 31 | 31 | 30 | 32 | 31 |
| Germany | 11 | 12 | 11 | 12 | 12 | 13 | 13 | 12 | 13 | 15 | 12 |
| Greece | 20 | 21 | 22 | 23 | 23 | 26 | 25 | 26 | 28 | 26 | 24 |
| Ireland | 22 | 20 | 18 | 18 | 24 | 19 | 23 | 19 | 21 | 21 | 20 |
| Italy | 21 | 22 | 23 | 22 | 22 | 22 | 22 | 23 | 22 | 23 | 22 |
| Netherlands | 14 | 12 | 14 | 15 | 14 | 16 | 17 | 17 | 16 | 15 | 15 |
| Portugal | 59 | 61 | 62 | 62 | 61 | 60 | 60 | 63 | 60 | 61 | 61 |
| Spain | 39 | 40 | 40 | 40 | 40 | 40 | 40 | 41 | 40 | 41 | 40 |
| Sweden | 22 | 24 | 22 | 27 | 27 | 27 | 27 | 26 | 28 | 29 | 26 |
| United Kingdom | 22 | 21 | 23 | 21 | 22 | 20 | 20 | 22 | 23 | 24 | 22 |
| **Average EU-15** | **23** | **24** | **24** | **24** | **24** | **24** | **24** | **24** | **24** | **25** | **25** |
| Cyprus | 18 | 18 | 17 | 21 | 18 | 20 | 23 | 20 | 20 | 25 | 20 |
| Czech Republic | | | | | 7 | 9 | 9 | 10 | 10 | 9 | 9 |
| Estonia | | | | | 45 | 37 | 17 | 17 | 19 | 15 | 25 |
| Hungary | | | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 |
| Poland | 15 | 11 | 9 | 10 | 9 | 13 | 13 | 11 | 12 | 11 | 11 |
| Slovenia | | | | 4 | 6 | 6 | 7 | 7 | 7 | 7 | 6 |
| **Average EUR-6 NC** | **15** | **11** | **8** | **9** | **9** | **11** | **11** | **10** | **11** | **10** | **10** |

[46] The average of the EU-15, EUR-6 NC and EUR-7 NC is the result of the sum of net supply divided by the total inhabitants of the group of countries. It cannot therefore be calculated by adding the average country consumption and divide this number per the number of countries.

| Country | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Bulgaria | | | | | 2 | 2 | 4 | 2 | 4 | 4 | 3 |
| Latvia | | | | 44 | 43 | 43 | 41 | 44 | 38 | 37 | 41 |
| Lithuania | | | | 46 | 32 | 21 | 12 | 24 | 18 | 15 | 24 |
| Malta | 23 | 28 | 31 | 35 | 17 | 22 | 26 | 26 | 30 | 29 | 27 |
| Norway | 45 | 45 | 45 | 46 | 47 | 47 | 47 | 45 | 46 | 46 | 46 |
| Romania | 9 | 6 | 5 | 4 | 2 | 3 | 4 | 3 | 2 | 3 | 4 |
| Slovakia | | | | | 6 | 7 | 7 | 9 | 5 | 5 | 7 |
| **AverageEUR-7 NC** | **42** | **39** | **43** | **45** | **32** | **37** | **39** | **42** | **44** | **40** | **40** |
| **Average EUR-28** | **22** | **22** | **22** | **22** | **21** | **21** | **21** | **21** | **21** | **22** | **21** |

Source: Database

### *Main species and commodities consumed 1989-1998*

More than 100 species are consumed daily (see list in Annex 5). In 1998, the main species consumed in the EU-15 were tuna (3.2 kg/year/capita), followed by cod (2.3 kg/c/yr), salmon (1.6 kg/c/yr), shrimp (1.2 kg/c/yr), herring (1.2 kg/c/yr), hake (1.0 kg/c/yr), Alaska pollack (1.0 kg/c/yr).

In terms of total quantity consumed, small pelagic fish are the main species group (herring, sardine, anchovy, and pilchards) and represent 15 percent of overall consumption. However, the market share of the pelagic species in terms of value is relatively low, due to their low unit price. By contrast, demersal species, and in particular the whitefish species group, are the predominant species group in terms of consumption value and the principal species in this group include cod, hake, haddock and whiting. In 1998, this group accounted for 15 percent of consumption by volume, but a proportion appreciably higher in terms of the share of market value. These species are consumed fresh or used by the primary and secondary processing industries.

However, the significance of the whitefish species group in terms of apparent consumption has decreased with time (Asche *et al.*, 1998b). In 1989, cod, hake, whiting and haddock were included in the ten principal consumed species and represented 2 million tonnes and 23 percent of the market. In 1998, consumption of these species was reduced to 1.2 million tonnes and only 13 percent of share of market. This decline was partially due to the exhaustion of cod and hake stocks and was only partly compensated for by greater availability of alternative species for industrial use such as Alaska pollock (190 000 tonnes in 1998) and Blue whiting (127 000 tonnes in 1998).

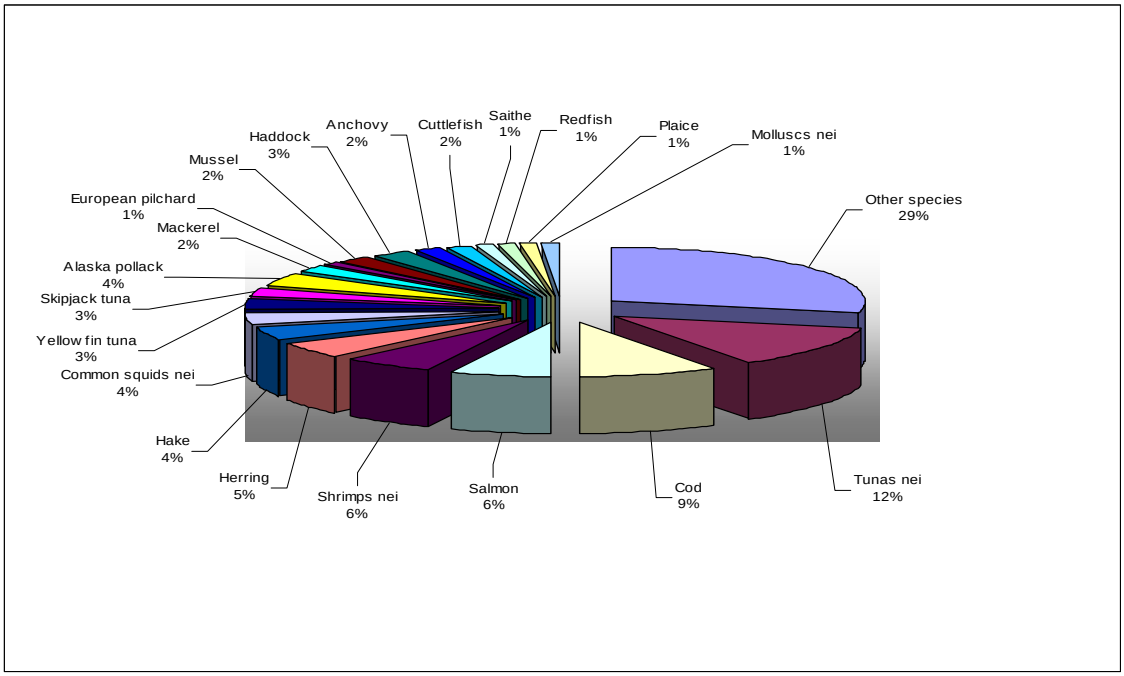


**Figure Annex 5-38: Main species consumed in EU-15, 1998 (kg/cap./year)**

An important proportion of the ten main species (in terms of quantity consumed) comes from aquaculture. For example, 80 percent of the aggregate output of mussels is produced by aquaculture. Similarly, 57 percent of the aggregate output of salmon and trout comes from aquaculture. With respect to the EU-15, the proportion coming from aquaculture is very high due to the extremely high productivity of Norway (Anon., 2001f). The expansion of market share in volume for farmed species has corresponded to the increased aggregate output of Norway (7 percent in 1970, 11 percent in 1984 and 30 percent in 1998). In France, for example, the market share of farmed products increased noticeably between 1978 and 1995, from 19 percent to 29 percent for quantity, and from 18 percent to 30 percent in value (Grel, Corre and Tuncel, 1998). The higher consumption of farmed salmon is mainly due to increased availability in various product forms and to a falling unit price as large-scale aquaculture operations have led to significant reductions in farmed salmon prices.

EUR-6 NC is largely characterized by the consumption of herring, clupeoids, mackerel and other low commercial value species and commodities. Due to the large population of Poland (38 M) compared to the combined population of the other five countries in this group (23 M), the share of the consumption per species reflects the consumption pattern in Poland more than those of the other countries. The Czech Republic, Hungary and Slovenia are mainly orientated to freshwater fish such as carp (still regarded as a traditional product), and canned small pelagics. Although in recent times consumption of carp has been increasingly restricted to the festive seasons in these countries, attempts are being made to reverse this trend. In contrast, trout has been able to develop a more consumer-friendly image, enabling the trout sector to keep up with developments in other competing food products. However, notwithstanding these developments, effective promotion of salmon from marine aquaculture makes it a serious competitor.

Cyprus can be characterized by its high level of fresh demersal fish consumption coming from surrounding waters, which is not reflected in the figure below due to the low number of Cypriot inhabitants (700 000).

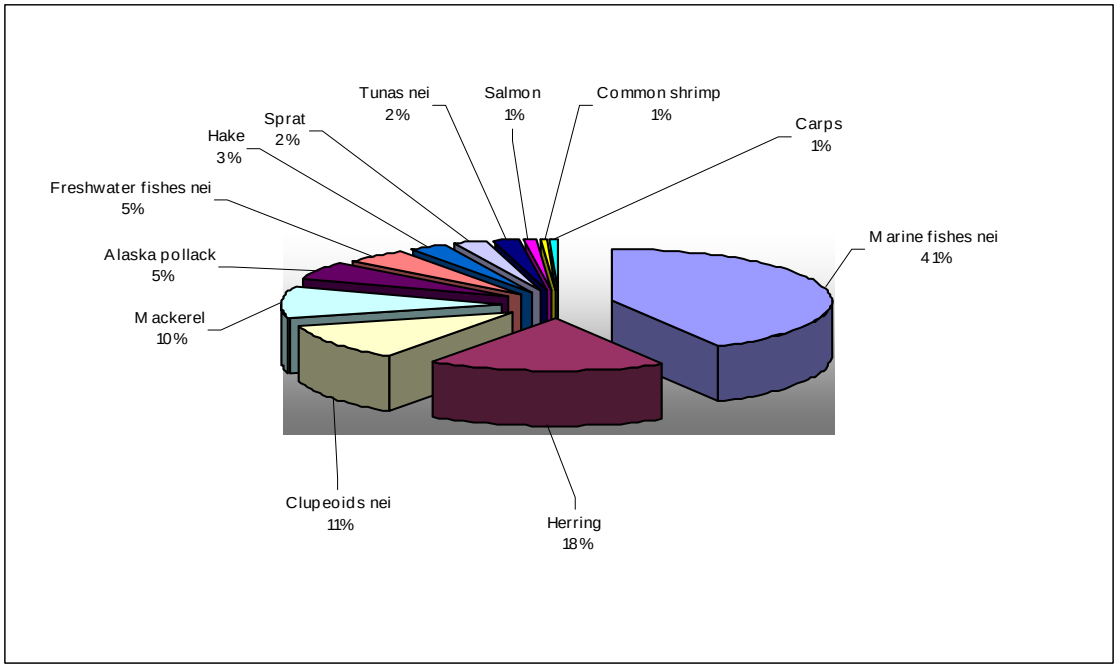


**Figure Annex 5-39: Main species consumed in EUR-6 NC, 1998 (kg/caput/year)**

For the group of EUR-7 NC, mackerel, cod and clupeoids are the three main species consumed. Romania, with its 22.5 M inhabitants, should impose its consumption pattern on the rest of the group and therefore hide the other countries' consumption. However, because of its low 1998 net supply level compared to Norway (respectively 71 000 tonnes and 203 000 tonnes) and Latvia (90 000 tonnes), there no real overweighing.

The figure below reflects the consumption pattern oriented both toward low commercial valued species with clupeoids and herring and high value species like white fish, molluscs, shrimps and salmon. Norway is the main consumer of high value species while the Baltic states and landlocked countries are the principal consumers of low value species (Anon., 2001d).

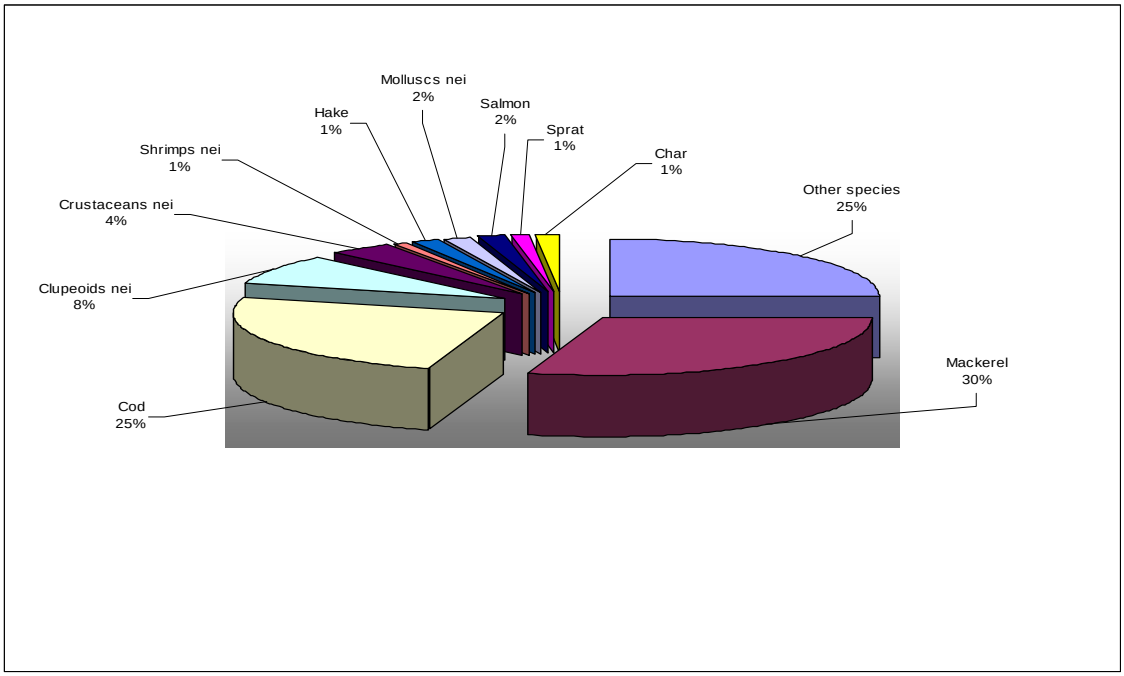


**Figure Annex 5-40: Main species consumed in EUR-7 NC, 1998 (kg/caput/year)**

### *Fish consumption and European consumers*

The demand structure of processed products mainly reflects social preferences and practices and there have been substantial changes in demand for foodstuffs during the 1990s, including fish products.

There is now an increased awareness of the possible health benefits of eating seafood such as oily fish. This has led to an increased demand for certain products, and a fall in demand for other meat. At the same time, various health scares relating to beef, veal, caprine, chicken and pork (for example BSE in beef, salmonella in poultry, etc.) have had a positive impact on the demand for seafood. The figure below illustrates the share of consumption between meat and fish for some European countries.

Source: Papageorgiou and Girard (2000)

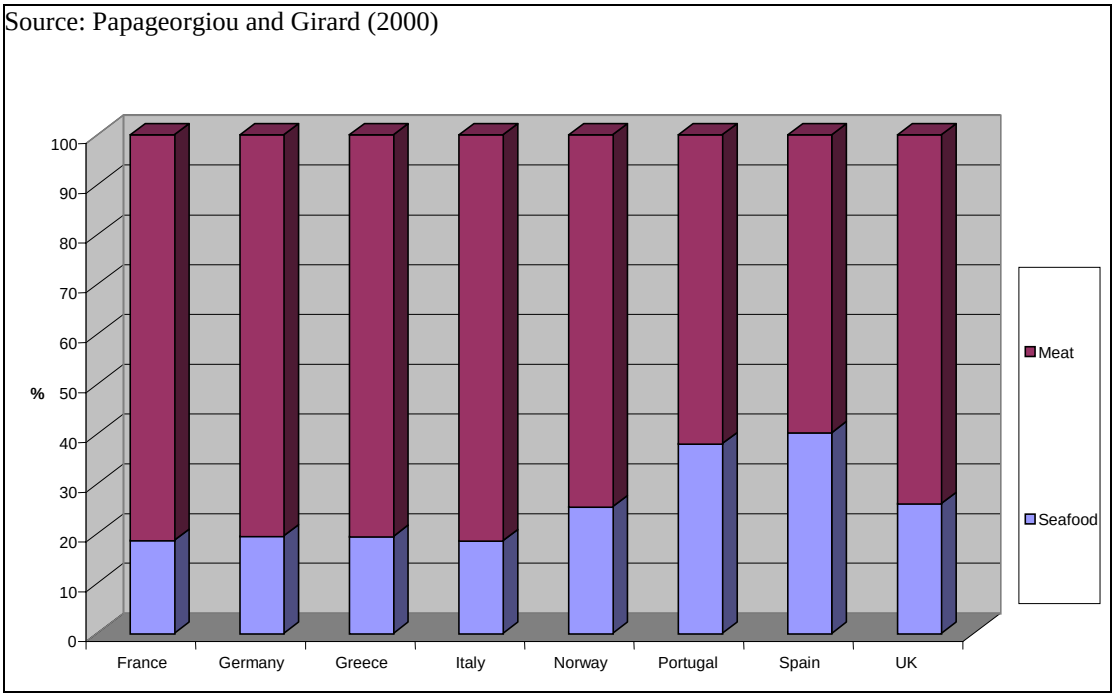


**Figure Annex 5-41: Share of meat/fish consumption in some member States**

Changes in lifestyle mean that today's consumers are more exacting in what they buy, and there is greater demand for products that are easy to prepare and cook. This is reflected in the rise in demand for ready-to-eat meals (requiring little or no preparation and served in minutes), demonstrating changing fashions and new consumer attitudes to marine products and food in general (Sheal *et al.*, 1998). Following these changes in consumer preference, the European fish processing industry has seen production increase by more than 50 percent since the 1980s.

The increase in demand and supply of processed fish products is obvious in each country. In France, consumption of fresh fish remained relatively stable while the consumption of frozen, prepared and transformed fish increased. In the same way, fresh fish consumption in Spain remained relatively stable from the middle of the 1980s, while consumption of other product types increased noticeably (Jaffry *et al.*, 1997). In the United Kingdom, expenditure on seafood products as a whole increased by 8 percent between 1984 and 1998, although not all individual categories experienced growth. During this period, consumption per head of fresh fish decreased appreciably, but this decrease was more than compensated for by an increase in volume and value of prepared fish (including seafood products with high added value) consumption per head (Sheal et al, 1998).

Social and demographic changes and increased health awareness are not the only factors that explain the increase in seafood consumption. Income growth and globalization of markets have made additional products more freely available and increased the range of choice, all of which affect consumption models.

### *Distribution chains*

The increasing importance of supermarkets in fish distribution had a substantial impact on consumption of fish products, and, in particular, on the consumption of processed products. In Spain, it was estimated that traditional fish markets generated less than 40 percent of the retail sales of the market in 1998, and that they will continue to lose market share in the future

(CFCE, 1999). In the United Kingdom, fishmongers had 51 percent of the market share for fresh fish in 1986, compared with 15 percent of the market share for supermarkets. By 1996, the fishmongers' share had fallen to 30 percent, with supermarkets increasing their share to approximately 50 percent (Sea Fish Authority, 1999a). In the same way, in France, supermarkets are dominating retail fish sales and account for 60 percent of total seafood sales (Le Grel, Corre and Tuncel, 1998).

Supermarkets often support the introduction of new fish species and provide information leaflets on preparation to encourage consumers to try new products and new methods of cooking. Supermarkets have also changed their supply strategies. Supermarkets require regular and substantial supplies of products. In many cases, this has meant an increased need for imported goods. Some supermarkets have created buying associations and put buyers in charge of providing their stores with products in sufficient quantities and utilizing sources such as imports by airfreight, national fish markets and national wholesalers.

Fish consumption has increased in the EU-15 and the pattern of demand has changed substantially. The growth of the aquaculture industry, in parallel with the decline of wild species, is one of the fundamental reasons for changes in demand and fish consumption throughout Europe (Anon., 2001h).

### *Fish for health*[47]

Heart disease and strokes are the primary causes of death and serious illness among European man and women, with poor diet recognized as one of the established contributory factors. In Ireland, the Food Advisory Committee of the Department of Health recommends reducing the amount of fat consumed, avoiding excess salt and sugar, and increasing the amount of fibre rich food in the diet.

In recent years, following extensive research into its role in preventing heart disease and other illnesses, the main reason for extolling the benefits of increased fish consumption has been its importance as a source of the long chain n-3 polyunsaturated fatty acids (known as PUFAs), eicosapentaenoic acid (EPA) and docasaheaxaenoic acid (DHA).

There is only one form of living organism that can readily make long chain n-3 PUFAs - marine algae. As fish feed on algae, they become rich sources of such fatty acids. This is particularly true of the flesh of oil-rich fish such as mackerel, salmon and herring, as well as the livers of any white fish (e.g. cod).

Fish is also a reliable source of protein, iron, selenium and iodine. The flesh of oil-rich fish and particularly the livers of lean white fish are good sources of vitamins A and D. When the bones are small and soft and can be eaten (e.g. in sardines, pilchards, tinned salmon) fish is also a useful dietary source of calcium.

[47] This section on Nutrition is based on the documentation on "Nutritional Aspects of Fish" prepared by the Irish Sea Fisheries Board. See http://www.feap.info/consumer/nutrition/fishindiet_en.asp

***Heath and safety considerations***[48]

In 2001, based on a report by the European Parliament's Directorate General for Research - STOA (Scientific and Technological Assessment), the European Commission and Council have ruled that fish caught by Finland and Sweden in the Baltic Sea can only be sold for consumption in those countries and cannot be exported to other EU Member States. British fishermen had feared a similar blow. The Directorate General for Research Working Paper (STOA 101 EN) examines the effects on the fisheries industry of the Commission's proposals (SANCO) on Dioxin content of fish, fish oil and fishmeal as part of animal feed regulations. The report notes that among the 15 EU Member States, Germany will have a problem with dioxins in 20 percent of its herring catch; Denmark, with the biggest industrial fishery in the EU, has a significant problem with more than 200 000 tonnes of fish classed as 'high conflict potential', mainly involving sandeel, sprat, herring and Blue whiting; Finland has a major problem with 100 000 tonnes of its catch classed as 'high conflict potential' involving sprat and herring; Sweden has a massive 270 000 tonnes of catch classed as 'high conflict potential' mainly involving sprat, herring, mackerel, sandeel and Blue whiting; Spain, Italy and Greece each have fairly significant quantities of catch classed as 'medium conflict potential' involving sardines; The UK is classed as having "no significant conflict potential for the British industrial fisheries industry." The report has been circulated to a Project Steering Group for comments prior to full publication later this year.

The problem that emerged after the dioxin scandal in 1999 has left European consumers perplexed regarding seafood products that have been deemed healthy and safe. In other words, the fishing industry is as vulnerable to the problems associated with food scares as the poultry and livestock industries are.

[48] Based on Stevenson, text available on:
http://www.scottishtorymeps.org.uk/stevenson/issues/briefings/archive_2001/briefing28.htm
1. Limits on dioxin content in food and feed came into force on 1 July 2002. These apply to in human food (Commission Regulation (EC/466/2001 on maximum levels for certain contaminants in foodstuffs). Animal feeds (under Council Directive 1999/29/EC) will be subject to dioxin limits from 1 July 2003. Finland and Sweden have derogation on dioxin levels in fishery products for human consumption until 2006.

## ANNEX 6: EUROPEAN MARKET

### *The Common organisation of the market*[49]

In 1999, the European Council of Ministers for Fisheries adopted a new basic Regulation for the Common Organisation of the Market (OCM) in fishery and aquaculture products (Gariazzo, 2000). The new Regulation was in response to the extensive changes that these markets had undergone in recent years. These changes included depleted fish stocks, changes in consumer habits, globalization of the markets and the growing dependency of the EU on imports of both fresh products and raw materials for the processing industry. By 1999, a reform of the existing Regulation had become essential if the sector were to adapt to the current market.

Essentially, the purpose of the new Regulation was to achieve a better match between supply and demand, to strengthen the competitiveness of the processing industry, and to improve the information available to consumers regarding fish products available on the market (GIRA/SIFA/Roche, 2000). Expenditure on the COM increased slightly from 20 million € in 1999, to 22 million € in 2001. However, by 2006, the budget is expected to fall to 16 million €.

The COM in fishery and aquaculture products has been an integral part of the Common Fisheries Policy since 1970. The COM's objectives include:

- Applying common marketing standards;
- Establishing producers' organizations (POs);
- Instituting a price support system based on intervention mechanisms (withdrawal prices, carry-over aid and private storage aid) or compensation mechanisms (tuna for canning); and
- Establishing a system for trade with non-member countries.

Given the nature of fishing and the unpredictable and fluctuating character of production, some disparity between supply and demand is inevitable, especially with respect to seasonal species. The Community recognizes these constraints and has attempted to create mechanisms to correct the most damaging effects of these fluctuations. These intervention mechanisms include Community support for removing unsold products from markets (withdrawal) and for carry-over measures (storing or processing fish products with a view to putting them back on the market when demand increases). These mechanisms apply to products seen as representative of Community production.

Market intervention mechanisms are activated when the prices of products placed on the market fall below withdrawal prices. These prices are based on guides according to average prices registered over the preceding three years in representative ports and are declared annually.

[49] From the DG-Fish Website:
http://europa.eu.int/comm/fisheries/news_corner/doss_inf/info76_en.htm

These market mechanisms are implemented by recognized producers' organizations, which receive funding to support the mechanisms' administration. These organizations also qualify for financial support for the introduction of plans to improve the quality of their products.

*Trade with non-member countries*

The objective of the COM is to promote competitiveness within the fishing industry. Products originating from within the Community are given priority on the market and the common customs tariff is the basic tool for the application of the principle of Community preference. However, Community demand for fisheries products exceeds Community supply and to meet demand, the EU market must import almost 60 percent of its fisheries and aquaculture products. This deficit is largely related to the demand for raw material by the processing industry and this industry may need to import fish at reduced duty rates if it is to remain competitive.

The common customs tariff contains many exceptions that mean that almost two thirds of Community imports are covered by special rules. These are the results of bilateral agreements or provisions under the Lomé IV Convention 3 and the European Economic Area (EEA). There are also unilateral reductions such as the generalized system of preferences (GSP).

In addition to these exceptions, there is also a system of autonomous tariff quotas and suspensions of customs duties. With these tariff quotas, limited quantities of a product may be imported into the Community at a reduced rate of duty. The full customs duty is reinstated when the quota is exhausted. Suspension of customs duties allows import into the Community of unlimited quantities of a product at a reduced duty rate.

Although various strategies are applied to protect the EU seafood market, and despite the fact that the exact form of tariffs and duties will form a central part of discussions for future policy on trade (see below), it is unclear to what extent current policy actually affects prices, supply and competitiveness for EU producers and processors. Several recent studies, for instance, suggest that protection measures have greater impact on imports of processed products and shellfish than they do on primary products (see for instance, Guillotreau and Péridy, 2000). In addition, it seems likely that other factors dictate levels of trade between EU and non-EU countries, particularly the costs of transport (distance between countries) and international exchange rates.

*The objectives of the new Regulation*

The new Regulation reinforces other parts of the Common Fisheries Policy (CFP) seeking to establish a lasting balance between fishing capacity and available resources. It is hoped that the market will now increasingly contribute to the responsible management of resources. The new market regulation aims to:

- Encourage the fishing industry to fish only what can be sold, in order to avoid waste;
- Strengthen industry organizations, particularly Producers' Organizations, and make them more competitive;
- Provide information on products to consumers;
- Ensure a better match between supply and demand; and

- Protect employment in the catching and processing industries.

To achieve these aims, a number of changes needed to be made. The main innovations include:

- The obligation for Producers' Organizations to set up fishing programmes to adapt supply to demand;
- Support for the development of inter-professional organizations;
- Updating the intervention mechanisms;
- The obligation for retailers to provide better information to consumers; and
- Improving supply conditions for the processing industry.

*A new role for Producers' Organizations (POs)*

Producers' Organizations are set up by fishermen or fish-farmer associations to ensure the optimal marketing conditions for their products and they are strategically placed between primary production and the market. Because of this key position, they can implement measures relating to rational resource management, add value to fisheries products and contribute to the stabilisation of the market. Allowing POs to take greater responsibility for self-regulation in the management of available resources will help ensure that market requirements are better met and that stocks are under less pressure.

One of the objectives of the PO system is to avoid catching fish for which there is little or no demand by encouraging the planning of fishing activities. In order to conserve fish stocks and remain competitive, producers must anticipate market needs in terms of quantity but also of quality and regularity of supply. Under the new Regulation, POs will have to annually draft and implement operational fishing programmes indicating the measures taken to adapt catches to market demand. This will apply not only to fish caught at sea but also to aquaculture products.

POs can, in agreement with their members, spread their vessels' fishing activities over time. This avoids the race for quotas and allows producers to spread landings over the year, avoiding drastic drops in prices and ensuring a more steady supply to the market. More regular and better quality landings will benefit producers in terms of prices, merchants in terms of supply and consumers in terms of value for money.

Each Member State must ensure that POs operating in their country are managed according to the guidelines and POs that fail to fulfill their duties could lose access to financial support. Problems are not expected, however, since these measures aim to strengthen the role of POs and the means at their disposal. Moreover, the consultation process has shown that some of the measures in the reform have already been undertaken by a number of Community POs.

*Development of inter-professional organizations*

Divisions between the various branches of the fishing sector have traditionally weakened the industry, but attitudes have begun to change. The Community believes that fisheries, like other sectors, should establish recognised inter-professional organizations. The objective is to promote the development of partnerships in projects of common interest. In this respect, the

new Regulation provides an exception to the competition rules in the EC Treaty 5, so that agreements, decisions and concerted practices will be allowed by recognised inter-branch organizations in the fisheries sector (within certain limits and provided that they have been checked in advance by the Commission).

Representatives of the catching, retailing and processing industries from different regions could collaborate to carry out measures to benefit the entire industry. These measures could be aimed at:

- Improving awareness and transparency of production and the market;
- Helping to co-ordinate the marketing of fishery products, principally through market surveys and research;
- Preparing standard contracts compatible with Community rules;
- Assisting the development of fishery products;
- Providing information and research needed to adapt production more closely to market requirements and consumer tastes and aspirations, mainly with regards to product quality and protection of the environment;
- Developing processes and instruments for enhancing product quality;
- Developing and protecting quality labels and geographical information to the consumer;
- Promoting environmentally-sensitive production methods; and
- Drawing up more stringent production and marketing rules than those currently applicable under Community and national arrangements.

*Changes in the intervention mechanisms*

To ensure a set revenue for fishermen, POs may take fish and shellfish products off the market when prices fall below withdrawal prices and depending on the products concerned, members receive compensation from their POs which, in turn, apply for Community aid.

To qualify for financial compensation, withdrawn products must conform to official quality criteria and withdrawals must be limited to occasional excess production. The level of compensation is directly linked to the quantities of fish withdrawn; the higher the volume taken off the market, the lower the compensation paid. Products taken off the market are usually, but not automatically, destroyed. POs can take other steps to ensure that fish are not wasted and may sell them for production of animal feed, for instance.

*Less aid for final withdrawal*

As stated above, the objective of the reform is to decrease the quantities of fish products taken off the market and thus avoids waste of resources. Final withdrawal, which involves taking fish products off the market for human consumption, must only be seen as an occasional safety net. The volumes eligible for financial compensation have therefore been reduced, from 14 percent to 8 percent of the POs' production or landings.

Special conditions will apply to pelagic species. Pelagic landings generally represent high volumes but relatively low value which often result in fluctuating markets and so a higher potential for the need of intervention. Eligible quantities for pelagic species have also been reduced but to a lesser extent than for other species, and will be 10 percent of the quantities put up for sale annually by the PO (cf. Annex 4).

The rate of financial compensation from the Community to POs will also be reduced for all species. Until now, financial compensation for quantities withdrawn has been 87.5 percent of

the withdrawal price for up to 7 percent of the quantities put up for sale each year. As shown in the table in Annex II, the rate is now reduced to 85 percent for up to 4 percent of the quantities put up for sale.

For quantities exceeding 4 percent, aid will decrease gradually: For the 2001 fishing year, financial compensation will be equal to 75 percent of the withdrawal price for quantities between 4 percent and 10 percent for pelagic species and between 4 percent and 8 percent for other species. For the 2002 and 2003 fishing years the compensation will diminish to 65 percent and 55 percent respectively (cf. Annex 4).

*More aid for carry-over operations*

At the same time as changes to withdrawal arrangements, measures that add value to products for later sales, are to be encouraged. One such measure is the "carry-over" mechanism - the storing and processing of fish before placing it on the market when there is more demand. The quantities eligible for community financial support in the event of carry-over have been substantially increased from 6 percent to up to 18 percent (in the case of POs that do not practice permanent withdrawal). In addition, marinating has been added to the list of permitted processing methods and other new measures will also be applied to facilitate the use of the carry-over mechanism[50], such as increasing the supply financial support for storage, for instance.

**Table Annex 6-1: Financial compensation for withdrawals**

| Quantities withdrawn (1) | Financial compensation (2) received by the PO | | | PO Co-responsibility (2) | Compensation received by the PO member (2) | | |
|---|---|---|---|---|---|---|---|
| | 2001 | 2002 | 2003 | | 2001 | 2002 | 2003 |
| 0 to 4 % | 85 | 85 | 85 | 10 | 95 | 95 | 95 |
| 4 to 8 % * | 75 | 65 | 55 | 10 | 85 | 75 | 65 |
| 4 to 10 % ** | | | | | | | |
| > 8 % * | 0 | 0 | 0 | 10 | 10 | 10 | 10 |
| > 10 % ** | | | | | | | |

Source: DG-Fish

(1) As a % of marketed quantities.
(2) As a % of withdrawal prices applied by the PO, that is the EC price ± 10 %.
* For species other than pelagic.
** For pelagic species.

*Emergency mechanism*

There are times, however, when exceptional circumstances result in serious disturbances in the market and a collapse in prices. An emergency provision for intervention has been introduced into the new Regulation to deal with such events which would allow for an increase in the quantities eligible for final withdrawal for up to six months.

[50] Available up to a rate of 18% of the quantities put on the market (if 0% of withdrawal).

*Compensatory allowance for tuna*

The compensation allowance for tuna, a mechanism that was originally introduced to compensate tuna producers for the reduction in tuna tariffs, has been reduced and the level at which the mechanism is activated has been lowered from 91 percent to 87 percent of the Community producer price. The purpose of this change is to prevent the mechanism from being triggered as soon as prices start to fall.

*Better information to consumers*

The new Regulation introduces rules for better labelling and information for consumers on live, fresh and chilled fishery products. The name of the species, the method of production (inland, sea fishing or aquaculture) and the area where the fish was produced will have to be provided.

This might stimulate demand, as consumers are encouraged to purchase products they have information of, and consumers are less likely to be misled on the origin and the value of fisheries products which can be the case with non-packaged fish products. This measure will also enable consumers to avoid buying fish which may have been produced or marketed in a non-sustainable way (fish under the minimum landing sizes, for example). In addition, the details about the origins of the fish will enable inspectors in charge of monitoring to cross-check the data with those collected on board vessels or during landing.

*Improvement of supply conditions for the processing industry*

The EU processing industry depends on stable and reliable landings to remain competitive and secure employment. However, Community landings cannot supply enough fish products to satisfy demand and the processing industry must therefore import supplies from third countries at competitive prices (Kindermann, 1996).

*Tariff suspensions*

The new Regulation provides for a tariff regime that is more in line with the needs of the market without penalizing Community fish producers (Hatcher, 1997; Buisman and Smit, 1997; Anon., 1998a). For instance, common customs tariffs and duties can be suspended for certain products intended for the processing industry. Suspension may be partial (a cut in customs duty) or total (duty reduced to 0 percent) (European Commission, 1998b).

Until the introduction of the new Regulation, the system only allowed import at reduced rates for limited quantities but these quantities may be insufficient to supply processors (Hough, 1996). This is the case, for example, with cod.

Through the reform, an unlimited amount of these products may be imported at a reduced or 0 percent duty rate, for an indefinite period of time (Filhol, 2000). In 1999, for example, the Community was allowed to import 75 000 tonnes of fresh, chilled or frozen cod at a reduced rate of 3 percent. From 2001, an unlimited amount of cod may be imported at the reduced rate of 3 percent, indefinitely.

For deepwater prawn (*Pandalus borealis*), the quota in 1999 was 12 000 tonnes for duty free import but in future there will be an unlimited amount of imports allowed free of duty.

The duty for Alaska Pollock was reduced from 4 percent in 1999 to 0 percent (for an indefinite period of time).

*Tariff quotas*

However, to ensure that duty free imports do not threaten jobs in the catching sector, some products such as tuna loins and herring, have been excluded from the new tariff suspensions. Instead, a multi-annual autonomous tariff quota has been agreed for these species for three years. This means that the duty reduction will only apply to a certain amount of imports.

In 1999, 1 200 tonnes of tuna loins could be imported at a reduced duty rate of 6 percent. Under the new agreement, for the period 2001-2003, 4 000 tonnes per year may be imported at that reduced rate.

Large herring is not always available in Community waters. In 1999, 20 000 tonnes of fresh, chilled and frozen herring for processing was imported at 0 percent duty. Now, 20 000 tonnes may be imported at a rate of 0 percent each year during 2001-2003, between 1 November and 31 December. At this time of the year, there is a risk that Community fishermen will have exhausted their quotas and that the need for imported fish is greater than at other periods.

The multi-annual quota for cod (salted or in brine, but not dried or smoked) has been set at 0 percent for a yearly quantity of 10 000 tonnes; in 1999, the duty rate was 2.5 percent for a maximum of 8 000 tonnes.

***Prices***

*Guide prices*

The European Commission has adopted its annual proposal to set Community guide prices for fresh and frozen fisheries products and tuna for processing in 2002, and the relevant Council Regulation was adopted before the end of this year.

The price trend continued to be positive for white fish because of a supply deficit from the Community fleet and increasing consumer demand. In fact, average prices rose steadily over the period 1999-2001 in contrast to the previous three-year period during which prices fell. The market situation improved considerably for pelagic species with marked price increases as overall demand increased.

The Commission therefore proposes: an increase in the guide prices of between 1 percent and 2.5 percent for most white fish species (except spotted dogfish), an increase for pelagic species of between 1 percent (for anchovy) and 3 percent (for mackerel), and no change in current prices for hake, megrim and flounder.

The aim of the guide prices system is to help secure producers' income by contributing to the stabilisation of prices while enhancing the competitiveness of Community fisheries businesses in world markets. The Commission's proposals are based on Member States' average market prices over the previous three years but other important factors are also taken into account when proposing new guide prices such as changes in production levels (quotas) and market demand, consumer interests, and the need to avoid withdrawals. Proposals for 2002 guide prices can be summarized as follows:

- White fish – As a result of a general supply deficit and high consumer demand, prices of white fish have continued to be pushed upwards with average increases of between 1% and 26% for the period 1999-2001 (with the exception of prices for hake, saithe, plaice and spotted dogfish). In the light of this favourable market, the Commission is proposing a moderate increase in guide prices for most white fish.

- Pelagics – A modest increase has been proposed for pelagic species, which have shown a marked improvement on previous years. Prices for the period 1999-2001 have improved on prices for the period 1998-2000 by between 4% and 64%.

- Crustaceans – A less favourable market situation due to buoyant supply and limited demand has led the Commission to propose maintaining current guide prices for crustaceans.

- Frozen products – Prices for frozen products have tended to go up on the international markets, with the exception of hake, cuttlefish and octopus for which the Commission is proposing either to maintain the current price (hake) or to reduce the guide price (cuttlefish and octopus).

- Tuna for processing – The average Community price for tuna intended for the canning industry continued to fall over the period 1999-2001, although there was a slight improvement in the situation in the first six months of 2001. The Commission is therefore proposing a 1% reduction in the Community producer price for the 2002 fishing year.

**Table Annex 6-2: Guide price proposal for fishery products in 2002**

| **Fresh products** | | **Price 2001** **€/t** | **Price 2002** **% change** | **€/t** |
|---|---|---|---|---|
| Herring | *Clupea harengus* | 252 | 3 | 260 |
| Sardines | *Sardina pilchardus* | 550 | 1.5 | 558 |
| Dogfish | *Squalus acanthias* | 1079 | 2 | 1101 |
| Spotted dogfish | *Scyliorhinus* spp. | 814 | -3 | 790 |
| Redfish | *Sebastes* spp. | 1154 | 1.5 | 1171 |
| Cod | *Gadus morhua* | 1560 | 2 | 1591 |
| Coalfish | *Pollachius virens* | 782 | 1 | 790 |
| Haddock | *Melanogrannus aeglefinus* | 1052 | 2.5 | 1078 |
| Whiting | *Merlangius merlangus* | 911 | 1.5 | 925 |
| Ling | *Molva* spp. | 1196 | 1.5 | 1214 |
| Mackerel | *Scomber scombrus* | 287 | 3 | 296 |
| Spanish Mackerel | *Scomber japonicus* | 306 | 3 | 315 |
| Anchovy | *Engraulis* spp. | 1197 | 1 | 1209 |
| Plaice (Jan-Apr) | *Pleuronectes platessa* | 1052 | 1 | 1063 |
| Plaice (May-Dec) | *Pleuronectes platessa* | 1448 | 1 | 1462 |
| Hake | *Merluccius merluccius* | 3695 | 0 | 3695 |
| Megrim | *Lepidorhombus* spp. | 2382 | 0 | 2382 |
| Dab | *Limanda limanda* | 923 | 1.5 | 937 |
| Common flounder | *Platichthys flesus* | 552 | 0 | 552 |
| Albacore (whole) | *Thunnus alalunga* | 2145 | 1.5 | 2177 |
| Albacore (gutted with head) | *Thunnus alalunga* | 2452 | 1 | 2477 |
| Cuttlefish | *Sepia officinalis/Rossia macrossoma* | 1589 | 1.5 | 1613 |
| Monkfish (whole) | *Lophius* spp. | 2826 | 1 | 2854 |
| Monkfish (without head) | *Lophius* spp. | 5840 | 1.5 | 5928 |
| Shrimps | *Crangon crangon* | 2429 | 2 | 2478 |

| Fresh products | | Price 2001 €/t | Price 2002 % change | Price 2002 €/t |
|---|---|---|---|---|
| Norway prawns (cooked) | *Pandalus borealis* | 6547 | 0 | 6547 |
| Norway prawns (fresh) | *Pandalus borealis* | 1707 | 0 | 1707 |
| Edible crab | *Cancer pagurus* | 1784 | 0 | 1784 |
| Lobster (whole) | *Nephrops norvegicus* | 5337 | 0 | 5337 |
| Lobster (tails) | *Nephrops norvegicus* | 4280 | 1 | 4323 |
| Sole | *Solea* spp. | 6518 | 2 | 6648 |
| **Frozen products** | | | | |
| Greenland halibut | *Reinhardtius hippoglossoides* | 1937 | 2 | 1976 |
| Hake (whole) | *Merluccius* spp. | 1277 | 0 | 1277 |
| Hake (filets) | *Merluccius* spp. | 1530 | 0 | 1530 |
| Sea bream | *Dentex dentex et Pagellus* spp. | 1556 | 2 | 1587 |
| Sword fish | *Xipkias gladius* | 4000 | 2 | 4080 |
| Cuttlefish | *Sepia officinalis,Rossia macrosoma,Sepiola rondeleti* | 1928 | -1 | 1909 |
| Octopus | *Octopus* spp. | 1987 | -1 | 1967 |
| Squid (loligo) | *Loligo patagonica* | 1133 | 2 | 1156 |
| Squid | *Ommastrephes sagittatus* | 961 | 0 | 961 |
| Illex | *Illex argentinus* | 839 | -1 | 831 |
| Prawns (*Parapenaeus*) | *Parapenaeus longirostris* | 4078 | 1 | 4119 |
| Prawns (other *Penaeidae*) | Other *Penaeidae* | 7903 | 2 | 8061 |
| **Tuna destined for the processing industry** | | | | |
| Yellowfin tuna | *Thunnus albacares* | 1172 | -1 | 1160 |

Source: DG-Fish

### *Price trends 1989-1998*[51]

The most valuable species were Dover sole at approximately US$9 000 per tonne, Swordfish at nearly US$8 000 per tonne, and Norway lobsters and the common shrimp both at around

US$ 5 000 per tonne. The least expensive species were sand eels and the Norway pout, at less than 100 US$ per tonne.

Overall, prices have been relatively stable over the last decade. The increasingly significant recourse to exports and aquaculture to meet the needs for the European market mean that altogether the prices remain stable.

*Cephalopods price trends 1989-1998*

Cephalopod prices are defined internationally. They reflect firstly the matching between world supply and demand and secondly the level of the Japanese demand, taking into account current inventories, since Japan is the major importer of cephalopods. European cephalopods imports from outside of Europe (1995-1997) are from Morocco, India, Thailand and USA.

[51] Price index figures are based on F. Asche and F. Stenn (1998).

Squid is by far the main cephalopod species produced, with a 71 percent share of the total cephalopod production (1.7 million Mt in 1998), followed by cuttlefish (14 percent) and octopus (10 percent). Squid production was 2.5 Mt on average for the period 1989-1998 with the only important fluctuation in landings occurring in 1998. The market result is a stable evolution of price over the period 1989-1996. Some seasonality can be observed as the price drops down every second quarter due to a significant increase of imports at this time of the year (Asche and Stenn, 1998).

Octopuses depend strongly on the natural variability of the environment, especially the upwelling quality (Caverivière *et al.*, 2002). For that reason, prices can fluctuate from one year to another. In the 80s price and quantity indexes were following the same positive trend due to a continuous augmentation of the Japanese and European demand (Doglia, 2000). But in 1991-1993, the quantity caught in the North-West African waters (70 percent of the world octopus production) first declined and then remained stable for two years. The decline of the Moroccan and Spanish production after 1994 resulted in a continuing augmentation of the price over the same period (Failler, 2002); mainly due to the concurrence between the Japanese and European market (Italy, Spain, France).

Cuttlefish import prices have been stable during the last decade between 2 and 2.5 € per kilo (Globefish, 2001a). The decrease of the European production (Spain, Portugal and Italy) from 30 000 tonnes in 1989 to only 10 000 tonnes in 1998 has been partially compensated for by a slight increase in imports. The drop of the cuttlefish price index after 1994 is mainly attributable to the huge European inventories from 1992 catches.

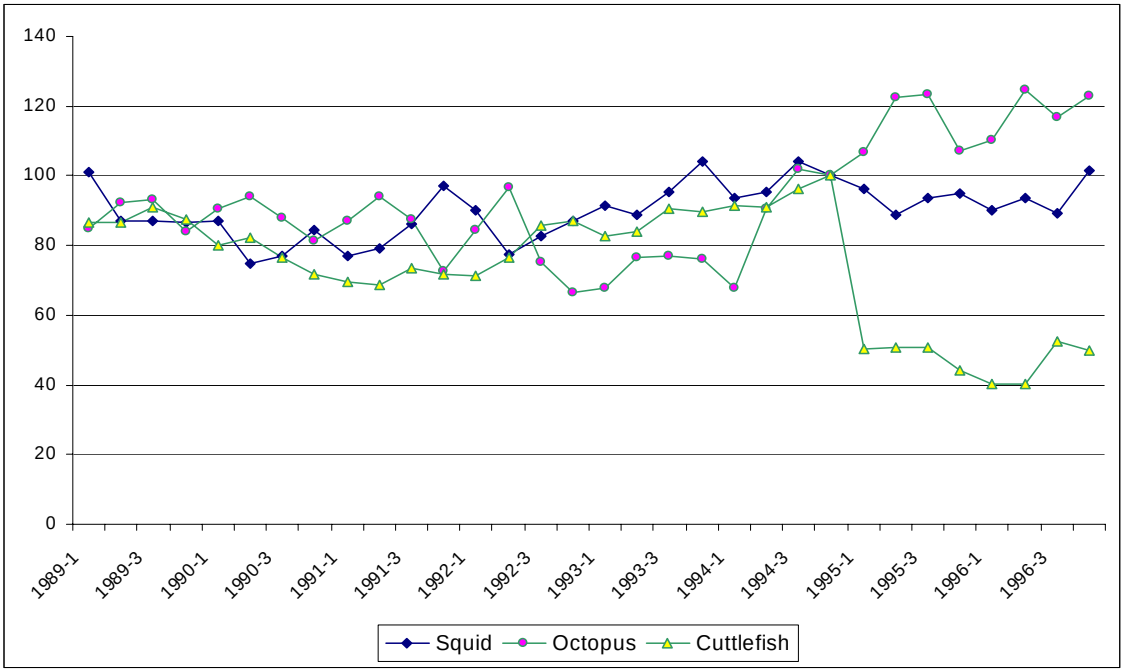


**Figure Annex 6-1: Index price for cephalopods (index 100 in 1994-1)**

*Demersal fishes price trends 1989-1998*

Groundfish prices have increased and this growth is especially strong from August 1997. The groundfish price level in December 1998 was about 25 percent higher than the average level in 1993. This is much higher than the increase in the wholesale price level in the countries most involved in groundfish import in that period. Imported quantities, except for some seasonal movements, are always higher than 1993 average.

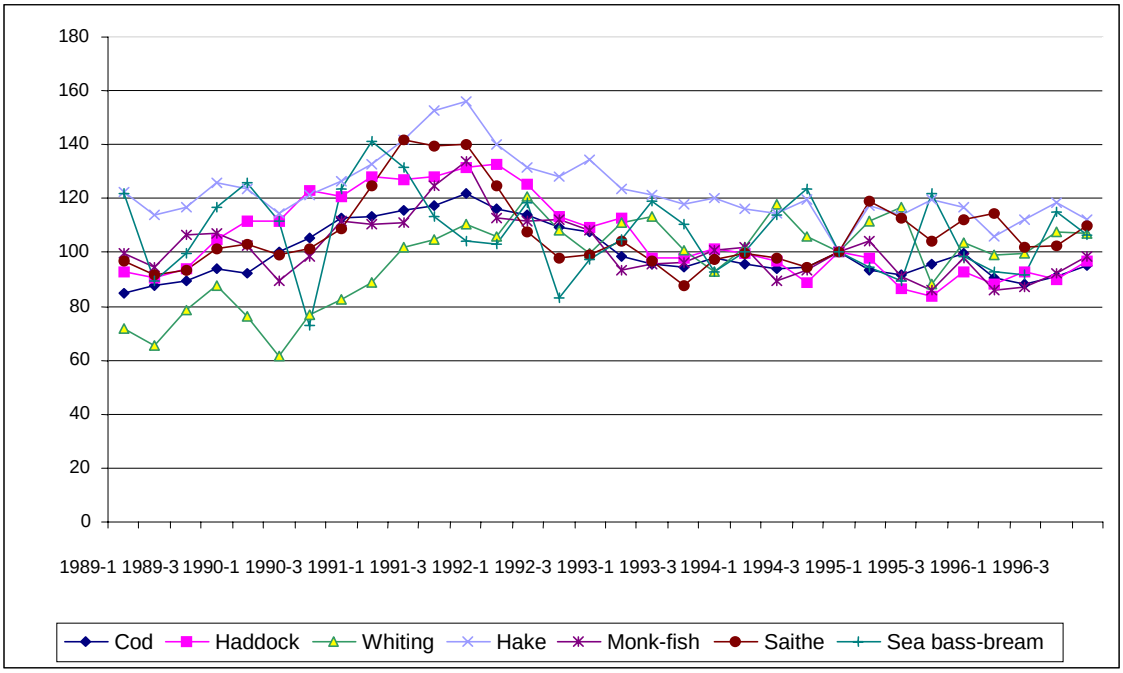


**Figure Annex 6-2: Index price for whitefish (index 100 in 1994-1)**

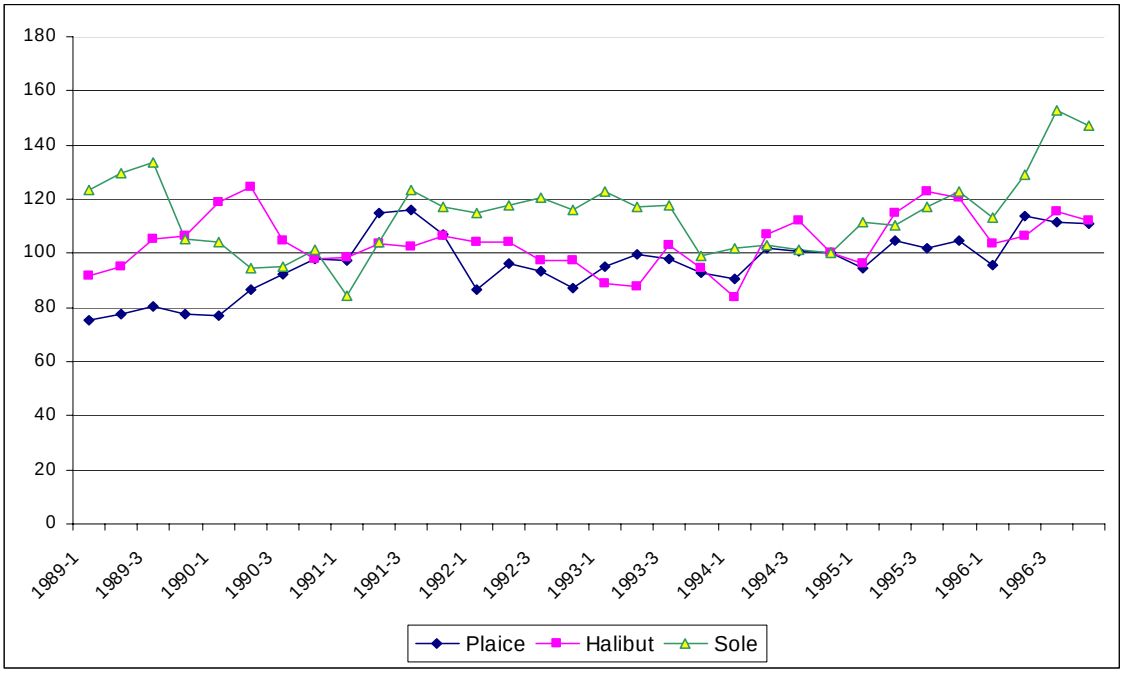


**Figure Annex 6-3: Index price for flatfish (index 100 in 1994-1)**

Price trends for the most recent period are presented in the table below. If some species have benefited from an increase in their price, like the common sole due to a rarefaction of good fishing grounds in the English Channel, most of the demersal species have seen their price stay relatively stable from 1994 to 1998.

**Table Annex 6-3: Price trend for marine demersal fishes**

(€)

| Species | 1994 | 1995 | 1996 | 1997 | 1998 | Average € | Average US$ |
|---|---|---|---|---|---|---|---|
| American Plaice | 1491 | 1593 | 1511 | | | 1113 | 1263 |
| Angler (Monk) | 2849 | 2708 | 2928 | 3199 | | 2912 | 3305 |
| Atlantic cod | 1404 | 1260 | 1228 | 1343 | | 1387 | 1574 |
| Atlantic redfish's | 1387 | 1417 | 1336 | 1884 | 1659 | 1459 | 1656 |
| Bogue | 312 | 345 | | | | 325 | 369 |
| Common sole | 6203 | 6666 | 7943 | 10120 | 10270 | 7986 | 9065 |
| European hake | 3316 | 3074 | 3693 | 4581 | 4749 | 3859 | 4380 |
| European plaice | 1526 | 1484 | 1748 | 1805 | 1453 | 1610 | 1828 |
| Grey gurnard | 1138 | 1220 | 1204 | 1167 | | 979 | 1111 |
| Haddock | 961 | 887 | 851 | 895 | 1123 | 1071 | 1216 |
| Whiting | 556 | 677 | 720 | 813 | 975 | 770 | 874 |
| Ling | 924 | 939 | 897 | 1039 | | 945 | 1072 |
| Megrim | 2473 | 2110 | 2255 | 2746 | 3091 | 2541 | 2884 |
| Picked (Spiny) dogfish | 672 | 697 | 748 | 1261 | | 809 | 919 |
| Saithe (Pollock) | 728 | 726 | 673 | 749 | 1111 | 822 | 933 |

Source: MARSOURCE, Market price

*Tuna and sardine price trends 1989-1998*

Tuna, like cephalopods, are part of a world market where the main producers are Japan, Taiwan Province of China, Spain, Indonesia, Philippines and France (Douglas, 1999). Tuna catches grew from 2.5 Mt in 1989 to reach almost 4 Mt in 1998. In EU-15, Spain and France have a long history of tuna fishery along the West African coasts since the middle of the 20$^{th}$ century and in the Indian Ocean since 1984 (Failler, 2003b).

Tuna prices have moved alternately up and down, generally following a slightly decreasing path, while tuna quantities have gradually increased and the price of canned tuna shows a gently growing trend (GLOBEFISH, 2001b).

**Table Annex 6-4: Price trend for large pelagic species**

| Species | 1994 | 1995 | 1996 | 1997 | 1998 | Average € | Average US$ |
|---|---|---|---|---|---|---|---|
| Albacore | 978 | 572 | 731 | 3579 | | 1602 | 1819 |
| Skipjack tuna | 994 | 1477 | 1098 | 960 | 3778 | 1489 | 1690 |
| Swordfish | 6210 | 5366 | 6851 | 8715 | 9521 | 7025 | 7974 |
| Yellowfin tuna | 1584 | 1682 | 1401 | 2120 | | 1543 | 1752 |

Source: MARSOURCE, Market price

Sardine, which like tuna is a species that is sold fresh, frozen and canned, had the specificity o have a price index that followed the quantity index over the period 1989-1996 (Asche and Stenn, 1998). An important augmentation of catches by Spanish vessels in the beginning of the 1990s was accompanied by a price increase partially resulting from a drop in imports form Morocco. The latest period 1993-1996 shows a stabilization of the price at the same level as the 1990 one.

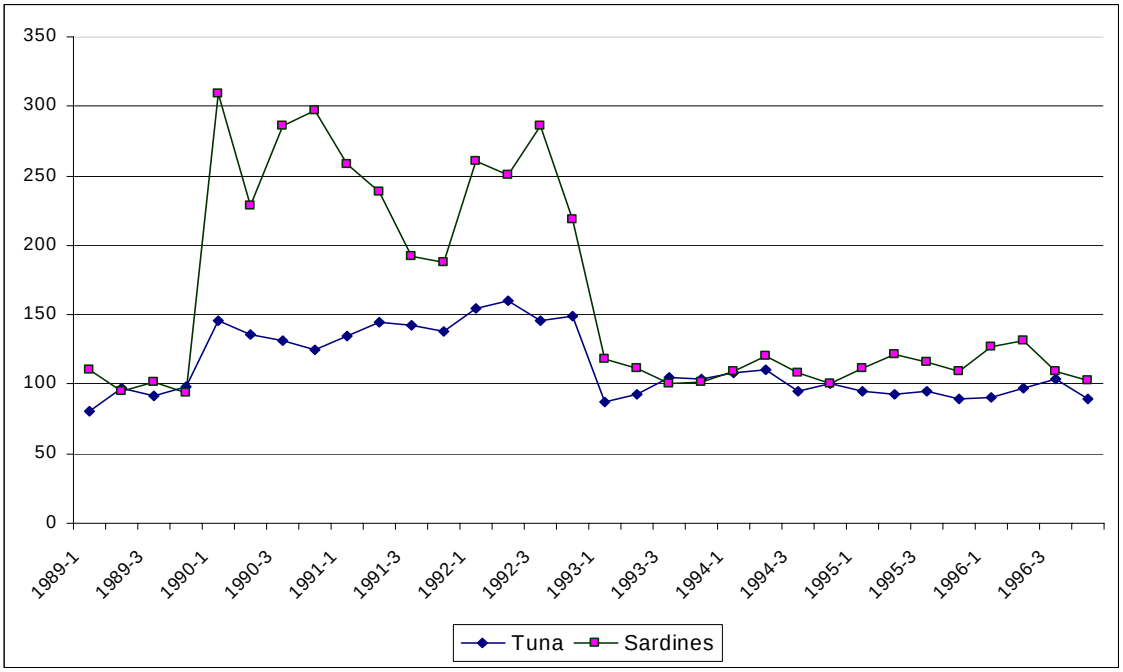


**Figure Annex 6-4: Index price for pelagic fish (index 100 in 1994-1)**

*Small pelagics and industrial species price trends 1989-1998*

The canned small pelagic index shows moderate variations in the price level that has changed less than the average increase in wholesale prices in the main countries involved in their import. European fresh and frozen small pelagic prices grew until November 1996 and then declined, falling to below the 1993 level in the first months of 1999.

**Table Annex 6-5: Price trend for small pelagic fishes and industrial species**

| Species | 1994 | 1995 | 1996 | 1997 | 1998 | Average € | Average US$ |
|---|---|---|---|---|---|---|---|
| Atlantic herring | 157 | 139 | 166 | 170 | 140 | 155 | 176 |
| Atlantic horse mackerel | 202 | 165 | 123 | 111 | | 167 | 189 |
| Atlantic mackerel | 149 | 187 | 323 | 428 | 326 | 262 | 298 |
| Chub mackerel | 331 | 278 | | | | 302 | 342 |
| European anchovy | 1362 | 1232 | 1575 | 1740 | 1323 | 1510 | 1714 |
| European pilchard | 319 | 383 | 522 | 542 | 479 | 416 | 472 |
| European sprat | 80 | 79 | 86 | 105 | 119 | 92 | 105 |
| Norway pout | 67 | 74 | 80 | 98 | | 78 | 88 |
| Blue whiting | 120 | 103 | 109 | 81 | 74 | 129 | 146 |
| Sand eels | 70 | 72 | 84 | 96 | | 78 | 88 |

Source: MARSOURCE, Market price

*Crustaceans and molluscs price trends 1989-1998*

Crustacean and molluscs index prices are seasonally fluctuated but stable over the period 1989-1996 even if the EU-15 net supply was considerably increased. On the most recent period (see table below), prices seem to follow a more erratic tendency.

Mussels show the biggest inter-annual seasonality with a peak every fourth quarter and some price volatility over the period since there is no direct relationship between price and quantity (Monford, 1998d). Crustacean quantities increased considerably over the period whereas the price remained stable (Asche and Stenn, 1998). Prawns have a rather stable price over the period 1989-1996 even if the quantities supplied to national markets significantly increased (more than doubled). Lobster does not present any clear trend over the period 1989-1996, nor for the most recent one 1994-1998 (see table below).

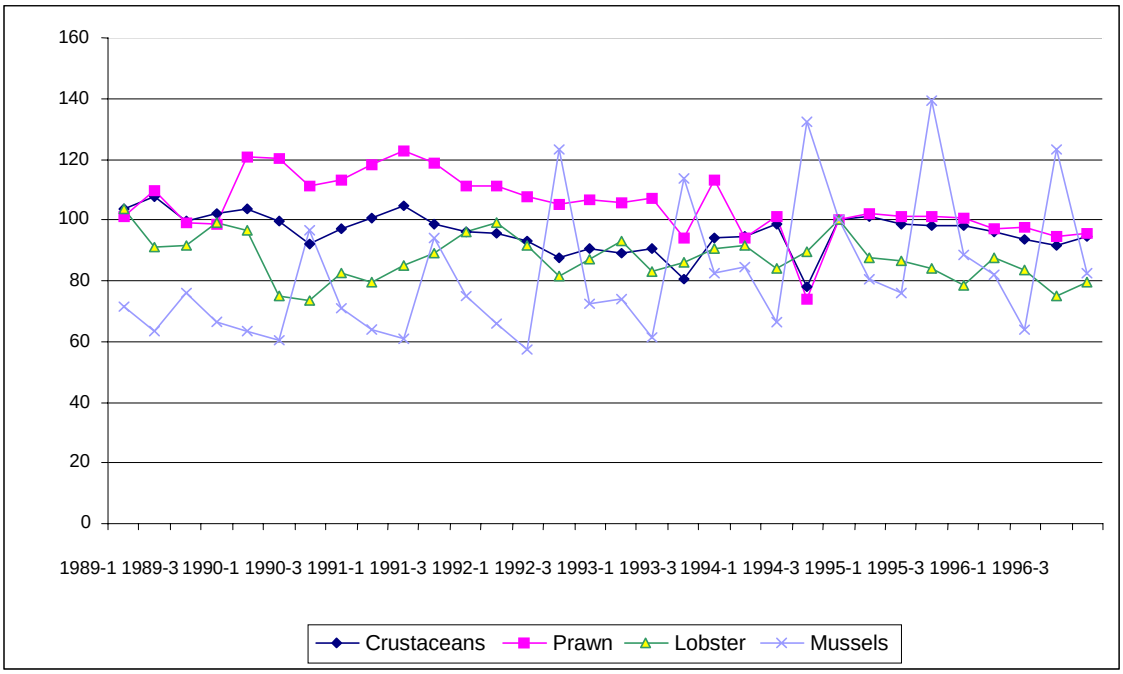


**Figure Annex 6-5: Index price for crustaceans and molluscs (index 100 in 1994-1)**

European prices also alternate between periods of increase and decrease and the price level has always remained higher than the average for 1993. The quantity of shrimp imported to

Europe seems to be rising due to an improvement of imports' heath and safety standards (San Clazada, 1999; Schouten, 1996).

**Table Annex 6-6: Price trend for molluscs**

| Species | 1994 | 1995 | 1996 | 1997 | 1998 | Average € | Average US$ |
|---|---|---|---|---|---|---|---|
| Blue mussel | 99 | 240 | 197 | 197 | | 173 | 197 |
| Common cockle | 271 | 318 | 817 | 201 | | 368 | 418 |
| Striped venus | 224 | 1464 | 1911 | | | 963 | 1093 |
| Common shrimp | 3066 | 3027 | 2674 | 1695 | | 2546 | 2890 |
| Edible crab | 1200 | 1135 | 1258 | 2040 | 1884 | 1443 | 1638 |
| Norway lobster | 4699 | 4429 | 4782 | 5342 | 4987 | 5073 | 5758 |

Source: MARSOURCE, Market price

*Diadromous fishes price trends 1989-1998*

Salmon is the only commodity that shows a strong continuously decreasing trend in prices, which fell by 25 percent during the period studied. Alongside this reduction in prices there have been large increases in the quantities imported with peaks rising to more than three times 1993 average imports.

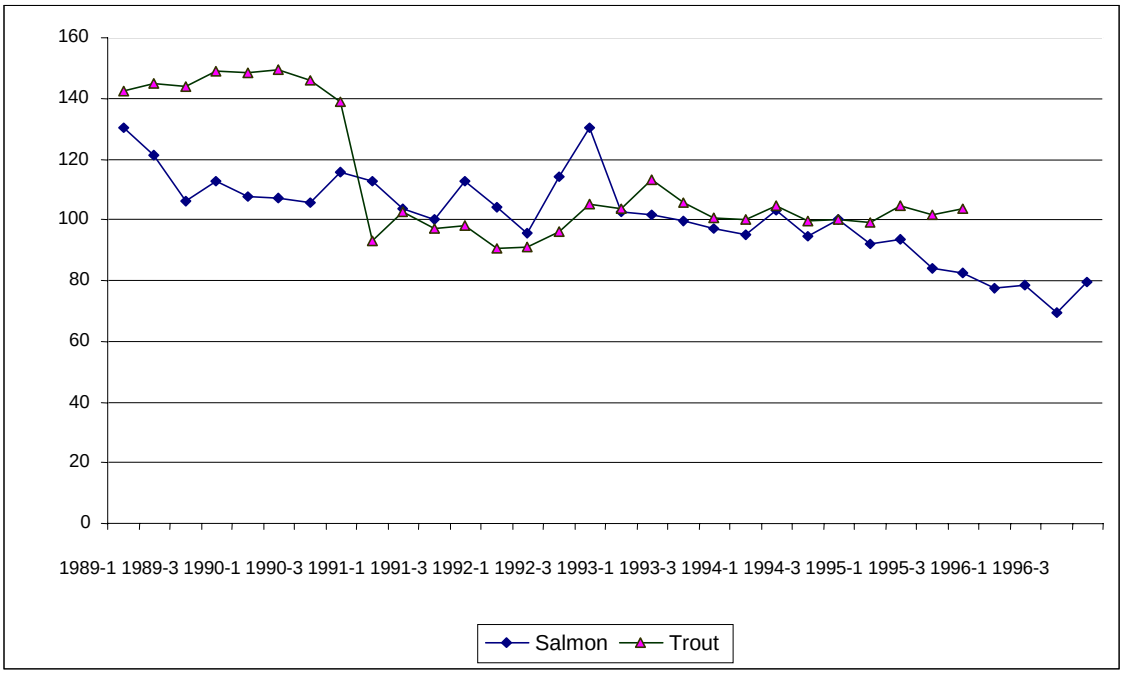


**Figure Annex 6-6: Index price for diadromous fish (index 100 in 1994-1)**

### *Price, revenues and demand elasticity*

The "law of demand," namely that the higher the price of a good, the less consumers will purchase, has been termed the "most famous law in economics, and the one that economists are most sure of." To predict consumer behaviour, economists use well-defined techniques evaluating the sensitivity of consumers to changes in price. Such techniques, pioneered by the great British economist Alfred Marshall (1842-1924) in the early part of the last century, are the foundations of microeconomics.

The most commonly used measure of consumers' sensitivity to price is known as "price elasticity of demand." It is simply the proportionate change in demand given a change in price. Where a one-percent drop in the price of a product produces a one-percent increase in demand for the product, the price elasticity of demand is said to be one. Hundreds of studies have been done over the years calculating long-run and short-run price elasticity of demand[52]. For most consumer goods and services, price elasticity tends to be between .5 and 1.5. As the price elasticity for most products clusters around 1.0, it is a commonly used rule of thumb. A good with a price elasticity stronger than negative one is said to be "elastic;" goods with price elasticities smaller (closer to zero) than negative one are said to be "inelastic." Goods that are more essential to everyday living, and that have fewer substitutes, typically have lower elasticities; staple foods are a good example. Goods with many substitutes, or that are not essential, have higher elasticities. Goods that are considered luxuries, or whose purchase can be easily postponed, often have elastic demand.

For the fishery market, consumption variations can be explained by variation in prices, incomes and other consumer characteristics:

- For the demand for farmed salmon and, to a lesser extent the demand for other fish, provide estimates of demand price elasticity. Certain values, gathering a broad consensus, must be taken into account. An assumption of –1.0, for the demand price elasticity for all the species except for trout, carp, eel and mussels is plausible and not far removed from available empirical estimations. For trout, carp, eel and mussels a value of –0.5 is likely. Under these conditions the demand for aquatic products does not appear to be elastic relative to price.
- Income elasticity compared to demand can be established at a value of 1.0. This assumption, supposing that the rise of the salmon consumption corresponds to an increase in incomes, is probably realistic since there are signs indicating that farmed salmon could lose its image as a luxury good and be perceived as an "oven-ready chicken fish". Thus, income elasticity demonstrates the rise in demand when incomes increase.
- In general, one expects the total demand for a food product to develop proportionally with population growth. However, large total shifts in total population can hide major changes within its structure and these demographic characters may have significant implications for patterns of food demand.

Therefore, the majority of changes regarding the structure of fish consumption translate from behavioural and demographic variables that are more subtle and complex than a simple analysis of income and population.

### *Labelling and traceability*[53]

Since 1 January 2002, fish retailers have been obliged to give additional product information on certain fish and seafood products when offering them for sale to the final consumer. The idea behind this is to provide the consumer with more detailed knowledge on the type of fish he is buying, where it comes from, or how it was produced. However, this EU directive is

[52] For a review of elasticity analysis in fishery, see Ashe and Bjorndal (2002).

[53] See also proceedings of the FAO Committee on Fisheries; Sub-Committee on Fish Trade, eighth session, Bremen, Germany, 12-16 February 2002, Traceability of products from fisheries and aquaculture at http://www.fao.org/docrep/meeting/004/y3015E.htm.

being viewed rather controversially since it only affects the retail sector. For hotels, restaurants and the processing industry it's "business as usual".

The range of fish, shellfish and crustaceans on offer today is huge – and this can be very confusing (Fjord *et al.*, 2001). There are already a good 200 species that are regularly caught or produced in Europe, and to these have to be added hundreds of others that come from all over the world. Perhaps it was this confusion that the Council of the European Union wanted to clear up when it designed Directive 104/2000 in December 1999. The directive requires that certain fish and seafood products, when offered for retail sale, have to be marked with the correct species' name (including the scientific name), the production method (whether caught at sea, in inland waters, or farmed), and the catch area. The new regulations also include traceability provisions requiring that the labelling information, from the scientific name to the catch area, is available at all stages of the marketing chain. Directive 2065/2001 provided for the establishment of these requirements in European law.

The directive's aim was to achieve greater clarity and transparency on the fish market but, due to its striking lack of consistency, it was initially met with amazement. Within the retail sector it is only the fishmonger who is obliged to label his products according to the new regulations. Restaurant owners can continue to think up sales-effective, imaginary names for their menus. What was it that made the Brussels politicians limit the new labelling requirements to primary processed products from whole fish to fillets, whilst processed products such as sardines or delicatessen salads are not affected? In fact, in individual cases, this can lead to some very curious situations. In Germany, for example, giant prawns often used to be sold as scampi. According to the new directive, however, scampi can only be used for Nephrops norvegicus and species of the order Metanephrops. So at a fishmonger's which also runs a snack-bar, tiger prawns now have to be offered for sale under the name shrimp or prawn whereas the same product can continue to be called scampi once it has been grilled and is served in the snack-bar just a few feet away.

Even prior to the new directive there was no lack of rules and regulations governing the labelling of foods in the EU. Directive 79/112/EEC of 18 December 1978 and the subsequent amendments regulate more or less everything that has anything to do with the correct labelling, presentation and advertising of foods. It includes, for example, the requirement that product labelling has to use simple wording that is understandable to the consumer. It should prevent deception in trade, and protect the consumer against faked products. The objective of all these directives is to avert health risks for the consumer and ensure the rights of industry and trade.

- The following information had to be given on food labels even before the new labelling directive:

- The name under which the product is sold.

- The list of ingredients including all the ingredients in descending order of weight as recorded at the time of their use in the manufacture of the foodstuff, preceded by a suitable heading which includes the word ingredients.

- The net quantity of prepackaged foodstuffs in metric units (litre, centilitre, millilitre) for liquids and (kilogram, gram) for non-liquids.

- The date of minimum durability consisting of day, month and year in that order and preceded by the words ‘best before’ or ‘best before end’ or the ‘use by’ date for highly perishable goods.

- Any special storage conditions or conditions of use.

- The name or business name and address of the manufacturer, packer or EU seller.

- Particulars of the place of origin or provenance in the cases where failure to give such particulars might mislead the consumer as to the true origin or provenance of the foodstuff.

- Instructions of use when it would be impossible to make appropriate use of the foodstuff in the absence of such instructions.

Whilst the above requirements apply to almost all foods, the new directive by no means applies to all fish products but mainly to products in which the fish is more or less left in its natural state, and enters trade without additional processing. These products include smoked products, fresh fish, primary processed frozen products (e.g. fillets) as well as raw and primary processed, fresh and frozen shellfish and crustaceans.

- Fish, fresh or chilled

- Fish, frozen

- Fish fillet and other processing forms of fish meat (including minced), fresh, chilled or frozen

- Fish products, dried, salted or in brine

- Fish, smoked, also cooked prior to or during smoking

- Crustaceans, including crustaceans without shell, live, fresh, chilled, frozen, dried, salted or in brine

- Crustaceans in their shells cooked by boiling in water or steaming, also chilled, frozen, dried, salted or in brine

- Molluscs and other invertebrate aquatic organisms, also without shell, live, fresh, chilled, frozen, dried, salted or in brine

The labelling directive does not apply, on the other hand, to processed and prepared seafood products whose value has been further enhanced by means of crumbs, marinades, sauces, toppings or other recipe components. For example, the new labelling directive does not apply to the following products:

- Breaded fish products

- Fish-in-sauce products
- Fish marinades

- Canned fish products
- Fish fillets with toppings
- Breaded crustacean and mollusc products
- Caviar and caviar substitute

Before this directive can finally take effect throughout Europe it has to be translated into the national law of the individual member states. However, the prerequisite for this are lists of the binding commercial or common names under which individual fish and seafood species are permitted to enter trade. This task is rather difficult and time-consuming, for some species are known by more than one name. Sea bass or sea bream, for example, can refer to at least two dozen different fish species across Europe. It was consequently not easy for national committees to choose the common species for the lists and find binding, generally recognized names for them. And they didn't always make the most fortunate choice, as the German commercial name list shows. With just a few exceptions all warm water prawn species were grouped together as prawns or shrimps. The grounds for this very strong simplification were presumably that the consumer cannot differentiate between the individual Penaeus-, Meta-, Para-, and Plesiopenaeus species anyway. On the other hand, this naturally has a blurring effect on differences in quality and price. And whereas, in the case of prawns, the path of simplification was chosen, fine distinctions were made for shellfish. It can probably be justifiably doubted whether the German consumer is in a position to distinguish between the ten abalone species listed, particularly since this product group is without significance in the German market anyway. The number of amendments and subsequent improvements that are already breaking in on traders every month proves just how imperfect and impractical the lists still are.

The preparation of the lists of commercial names probably caused similar problems in other European countries, too. Information on production methods is a slightly more simple and understandable area. In the case of sea fish it is quite enough if the label contains the information "caught in…". In the case of fish from freshwater lakes and rivers the term is "from inland fisheries", and fish from aquaculture have to be marked "farmed in…" or "from aquaculture". With regard to aquaculture products it is decisive in which country the product underwent final development (COPA/COGECA, 1996). If the seed for French bouchot mussels, for example, came from Holland or the UK this does not necessarily have to be stated. But here, too, the authorities have a rather strict view of things, at least in Germany, where the formulation "Norwegian farmed salmon", for example, is not permitted as a means of naming production method and place of origin. The correct label would be: "Salmon, farmed in Norway". This kind of hair-splitting hardly serves to increase the acceptance of the new labelling directive.

In contrast, information on catch area is considerably more liberal. For catches from the Atlantic and its bordering waters it is sufficient to name one of the following FAO fishing regions (decisive here are the regions named in EC directive No. 2065/2001):

- North-West Atlantic
- North-East Atlantic
- Central-Western Atlantic
- Central-Eastern Atlantic

- South-West Atlantic
- South-East Atlantic
- Baltic Sea
- Mediterranean Sea
- The Indian Ocean, the Antarctic and even the huge Pacific Ocean are each seen in whole as one fishing region.

***EU and WTO***

It is more and more clear that fish will be regarded as an industrial product in the forthcoming rounds of negotiations at the WTO (Scott, 1998). However, even if fish retains its status as an industrial product, there is widespread uncertainty around the outcome of the next WTO negotiations where fish is concerned, and the relationship between the WTO and the increasing numbers of regional trade blocks that are emerging across the globe. Fish export volume is increasing at a solid rate on a world basis, and now has a value of 50 billion €. The fisheries nations are looking for a change in the anti-dumping regulations for fish, but are cautious in their approach.

The Norwegian fisheries industry will take on a leading role in order to secure market access with respect with WTO rules. The WTO is very concerns with the solid development of regional trade agreements and European fishing agreements with 27 different countries. So, the WTO is at a standstill while the various regional arrangements are in constant development. In a new round of WTO negotiations, fish could come into conflict with agricultural interests in several countries (Olsen, 2001).

## ANNEX 7: CONSOLIDATED RESULTS UP TO 2030

Note: FU = Food use
NFU = Non food use

**Table Annex 7-1: Consolidated results from 2005 to 2030**

(tonnes live weight)

| Country | Nature | Average 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|---|
| Austria | Exports FU | 4502 | 3837 | 3837 | 3837 | 3837 | 3837 | 3837 |
| Belgium-Luxembourg | Exports FU | 128644 | 159867 | 159867 | 159867 | 159867 | 159867 | 159867 |
| Denmark | Exports FU | 857085 | 915058 | 915058 | 915058 | 915058 | 915058 | 915058 |
| Finland | Exports FU | 13837 | 17243 | 17243 | 17243 | 17243 | 17243 | 17243 |
| France | Exports FU | 468279 | 454438 | 454943 | 455459 | 455984 | 456521 | 457068 |
| Germany | Exports FU | 469709 | 508974 | 508974 | 508974 | 508974 | 508974 | 508974 |
| Greece | Exports FU | 64643 | 87218 | 87218 | 87218 | 87218 | 87218 | 87218 |
| Ireland | Exports FU | 372874 | 384160 | 387991 | 391984 | 396150 | 400499 | 405043 |
| Italy | Exports FU | 163517 | 166321 | 166399 | 166483 | 166575 | 166674 | 166782 |
| Netherlands | Exports FU | 858345 | 933808 | 934406 | 935013 | 935628 | 936251 | 936882 |
| Portugal | Exports FU | 119560 | 123076 | 123076 | 123076 | 123076 | 123076 | 123076 |
| Spain | Exports FU | 678659 | 823799 | 823799 | 823799 | 823799 | 823799 | 823799 |
| Sweden | Exports FU | 280488 | 325676 | 325676 | 325676 | 325676 | 325676 | 325676 |
| United Kingdom | Exports FU | 594978 | 673975 | 678532 | 683177 | 687912 | 692739 | 697661 |
| Cyprus | Exports FU | 404 | 473 | 473 | 473 | 473 | 473 | 473 |
| Czech Republic | Exports FU | 13478 | 12144 | 12144 | 12144 | 12144 | 12144 | 12144 |
| Estonia | Exports FU | 149832 | 188781 | 188781 | 188781 | 188781 | 188781 | 188781 |
| Hungary | Exports FU | 3388 | 4501 | 4501 | 4501 | 4501 | 4501 | 4501 |
| Poland | Exports FU | 232238 | 187655 | 187922 | 188205 | 188502 | 188815 | 189145 |
| Slovenia | Exports FU | 3281 | 3010 | 3010 | 3010 | 3010 | 3010 | 3010 |
| Bulgaria | Exports FU | 8094 | 4332 | 4332 | 4332 | 4332 | 4332 | 4332 |
| Latvia | Exports FU | 103743 | 97368 | 97368 | 97368 | 97368 | 97368 | 97368 |
| Lithuania | Exports FU | 65836 | 87451 | 87451 | 87451 | 87451 | 87451 | 87451 |
| Malta | Exports FU | 1249 | 1599 | 1599 | 1599 | 1599 | 1599 | 1599 |
| Norway | Exports FU | 1744360 | 1841286 | 1855374 | 1869703 | 1884278 | 1899102 | 1914180 |
| Romania | Exports FU | 493 | 1359 | 1359 | 1359 | 1359 | 1359 | 1359 |
| Slovakia | Exports FU | 704 | 1047 | 1047 | 1047 | 1047 | 1047 | 1047 |
| **Total EUR-28** | | **7402219** | **8008455** | **8032381** | **8056836** | **8081841** | **8107413** | **8133575** |
| Austria | Imports FU | 88250 | 93846 | 96872 | 100201 | 103865 | 107905 | 112362 |
| Belgium-Luxembourg | Imports FU | 327049 | 366120 | 370663 | 375952 | 382032 | 388953 | 396769 |
| Denmark | Imports FU | 564041 | 610941 | 614054 | 617348 | 620836 | 624532 | 628450 |
| Finland | Imports FU | 67561 | 71622 | 74650 | 78110 | 82062 | 86576 | 91731 |
| France | Imports FU | 1382082 | 1545030 | 1582132 | 1620991 | 1661715 | 1704417 | 1749224 |
| Germany | Imports FU | 1222634 | 1382762 | 1422901 | 1465856 | 1511762 | 1560766 | 1613020 |
| Greece | Imports FU | 118116 | 157688 | 161706 | 165993 | 170569 | 175457 | 180682 |
| Ireland | Imports FU | 35377 | 44525 | 44771 | 45025 | 45290 | 45565 | 45853 |
| Italy | Imports FU | 877741 | 995492 | 1027111 | 1061091 | 1097642 | 1136991 | 1179390 |
| Netherlands | Imports FU | 572331 | 592280 | 596981 | 601888 | 607009 | 612352 | 617927 |
| Portugal | Imports FU | 486304 | 514084 | 514861 | 515864 | 517113 | 518629 | 520437 |
| Spain | Imports FU | 1041343 | 1150508 | 1135216 | 1122518 | 1112234 | 1104200 | 1098268 |
| Sweden | Imports FU | 185820 | 216458 | 217351 | 219104 | 221727 | 225248 | 229715 |
| United Kingdom | Imports FU | 742943 | 808445 | 826942 | 846328 | 866657 | 887985 | 910371 |
| Cyprus | Imports FU | 13162 | 15616 | 16401 | 17274 | 18244 | 19322 | 20521 |
| Czech Republic | Imports FU | 78179 | 81166 | 86404 | 92389 | 99210 | 106966 | 115774 |
| Estonia | Imports FU | 48532 | 78919 | 78846 | 78870 | 78999 | 79239 | 79600 |
| Hungary | Imports FU | 22654 | 29374 | 31909 | 34837 | 38221 | 42136 | 46667 |

| Country | Nature | Average 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|---|
| Poland | Imports FU | 319405 | 388487 | 414312 | 443123 | 475293 | 511242 | 551452 |
| Slovenia | Imports FU | 13470 | 14053 | 14615 | 15234 | 15917 | 16669 | 17501 |
| Bulgaria | Imports FU | 11741 | 25269 | 28437 | 32030 | 36109 | 40741 | 46007 |
| Latvia | Imports FU | 47917 | 45685 | 46730 | 47991 | 49516 | 51364 | 53610 |
| Lithuania | Imports FU | 82809 | 116224 | 123641 | 131684 | 140414 | 149901 | 160218 |
| Malta | Imports FU | 9168 | 11141 | 11773 | 12449 | 13175 | 13951 | 14784 |
| Norway | Imports FU | 303377 | 369583 | 371454 | 373478 | 375671 | 378051 | 380636 |
| Romania | Imports FU | 28075 | 62892 | 70090 | 78290 | 87656 | 98384 | 110707 |
| Slovakia | Imports FU | 34179 | 29741 | 32086 | 34693 | 37589 | 40809 | 44387 |
| **Total EUR-28** | | **8724262** | **9817953** | **10012909** | **10228612** | **10466526** | **10728352** | **11016063** |
| Austria | Production FU | 3386 | 2624 | 2222 | 1882 | 1594 | 1350 | 1143 |
| Belgium-Luxembourg | Production FU | 35413 | 33632 | 33632 | 33632 | 33632 | 33632 | 33632 |
| Denmark | Production FU | 417241 | 435656 | 438628 | 441685 | 444831 | 448068 | 451398 |
| Finland | Production FU | 119320 | 125530 | 125637 | 125746 | 125856 | 125969 | 126082 |
| France | Production FU | 879250 | 823438 | 823480 | 823522 | 823567 | 823612 | 823659 |
| Germany | Production FU | 324543 | 380772 | 381661 | 382557 | 383460 | 384370 | 385287 |
| Greece | Production FU | 221634 | 213001 | 214444 | 215909 | 217394 | 218900 | 220428 |
| Ireland | Production FU | 412100 | 418663 | 423024 | 427563 | 432289 | 437210 | 442338 |
| Italy | Production FU | 578547 | 564930 | 571979 | 579138 | 586408 | 593790 | 601287 |
| Netherlands | Production FU | 536994 | 587275 | 589724 | 592230 | 594792 | 597413 | 600095 |
| Portugal | Production FU | 233554 | 218783 | 218783 | 218783 | 218783 | 218783 | 218783 |
| Spain | Production FU | 1238827 | 1273644 | 1278736 | 1283901 | 1289141 | 1294457 | 1299851 |
| Sweden | Production FU | 337006 | 361288 | 361288 | 361288 | 361288 | 361288 | 361288 |
| United Kingdom | Production FU | 1143541 | 1316200 | 1320897 | 1325636 | 1330417 | 1335239 | 1340105 |
| Cyprus | Production FU | 3310 | 3668 | 3668 | 3668 | 3668 | 3668 | 3668 |
| Czech Republic | Production FU | 33275 | 31500 | 31500 | 31500 | 31500 | 31500 | 31500 |
| Estonia | Production FU | 131982 | 130269 | 130269 | 130269 | 130269 | 130269 | 130269 |
| Hungary | Production FU | 19760 | 20844 | 20844 | 20844 | 20844 | 20844 | 20844 |
| Poland | Production FU | 378462 | 269883 | 270370 | 270861 | 271356 | 271854 | 272356 |
| Slovenia | Production FU | 3069 | 3061 | 3061 | 3061 | 3061 | 3061 | 3061 |
| Bulgaria | Production FU | 23063 | 18815 | 18815 | 18815 | 18815 | 18815 | 18815 |
| Latvia | Production FU | 156966 | 142795 | 142795 | 142795 | 142795 | 142795 | 142795 |
| Lithuania | Production FU | 49956 | 35991 | 35991 | 35991 | 35991 | 35991 | 35991 |
| Malta | Production FU | 2290 | 2907 | 2907 | 2907 | 2907 | 2907 | 2907 |
| Norway | Production FU | 1643608 | 1678962 | 1694462 | 1710345 | 1726621 | 1743301 | 1760395 |
| Romania | Production FU | 36221 | 18385 | 18385 | 18385 | 18385 | 18385 | 18385 |
| Slovakia | Production FU | 2796 | 1984 | 1984 | 1984 | 1984 | 1984 | 1984 |
| **Total EUR-28** | | **8966115** | **9114498** | **9159187** | **9204897** | **9251646** | **9299454** | **9348344** |
| Austria | Fish supply FU | 87134 | 92634 | 95258 | 98246 | 101622 | 105417 | 109669 |
| Belgium-Luxembourg | Fish supply FU | 233818 | 239885 | 244427 | 249717 | 255797 | 262717 | 270533 |
| Denmark | Fish supply FU | 124197 | 131540 | 137624 | 143976 | 150610 | 157542 | 164790 |
| Finland | Fish supply FU | 173045 | 179909 | 183044 | 186612 | 190675 | 195302 | 200570 |
| France | Fish supply FU | 1793053 | 1914031 | 1950669 | 1989055 | 2029297 | 2071509 | 2115815 |
| Germany | Fish supply FU | 1077468 | 1254561 | 1295588 | 1339439 | 1386249 | 1436162 | 1489333 |
| Greece | Fish supply FU | 275107 | 283470 | 288932 | 294683 | 300744 | 307139 | 313891 |
| Ireland | Fish supply FU | 74604 | 79028 | 79804 | 80604 | 81428 | 82276 | 83148 |
| Italy | Fish supply FU | 1292772 | 1394100 | 1432691 | 1473746 | 1517475 | 1564107 | 1613894 |
| Netherlands | Fish supply FU | 250981 | 245747 | 252299 | 259105 | 266173 | 273515 | 281140 |
| Portugal | Fish supply FU | 600298 | 609791 | 610568 | 611572 | 612820 | 614336 | 616144 |
| Spain | Fish supply FU | 1601512 | 1600354 | 1590153 | 1582621 | 1577577 | 1574859 | 1574320 |
| Sweden | Fish supply FU | 242337 | 252070 | 252963 | 254716 | 257338 | 260859 | 265327 |
| United Kingdom | Fish supply FU | 1291507 | 1450670 | 1469306 | 1488787 | 1509162 | 1530485 | 1552815 |
| Cyprus | Fish supply FU | 16069 | 18811 | 19596 | 20469 | 21439 | 22517 | 23716 |
| Czech Republic | Fish supply FU | 97977 | 100521 | 105760 | 111745 | 118565 | 126322 | 135130 |
| Estonia | Fish supply FU | 30682 | 20407 | 20334 | 20358 | 20487 | 20727 | 21088 |
| Hungary | Fish supply FU | 39026 | 45717 | 48251 | 51179 | 54564 | 58478 | 63009 |

| Country | Nature | Average 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|---|
| Poland | Fish supply FU | 465628 | 470716 | 496759 | 525780 | 558147 | 594281 | 634663 |
| Slovenia | Fish supply FU | 13258 | 14104 | 14666 | 15285 | 15967 | 16720 | 17552 |
| Bulgaria | Fish supply FU | 26710 | 39752 | 42920 | 46514 | 50592 | 55225 | 60490 |
| Latvia | Fish supply FU | 101140 | 91112 | 92158 | 93419 | 94943 | 96791 | 99037 |
| Lithuania | Fish supply FU | 66929 | 64764 | 72181 | 80224 | 88954 | 98441 | 108758 |
| Malta | Fish supply FU | 10208 | 12449 | 13081 | 13758 | 14483 | 15260 | 16092 |
| Norway | Fish supply FU | 202625 | 207259 | 210542 | 214120 | 218015 | 222250 | 226851 |
| Romania | Fish supply FU | 63803 | 79918 | 87115 | 95315 | 104681 | 115410 | 127732 |
| Slovakia | Fish supply FU | 36271 | 30678 | 33023 | 35630 | 38526 | 41746 | 45324 |
| **Total EUR-28** | | **10288158** | **10923996** | **11139715** | **11376673** | **11636331** | **11920393** | **12230831** |
| Austria | Population | 8034 | 8220 | 8326 | 8384 | 8443 | 8502 | 8562 |
| Belgium-Luxembourg | Population | 10528 | 10812 | 10955 | 11056 | 11159 | 11263 | 11368 |
| Denmark | Population | 5245 | 5386 | 5452 | 5489 | 5526 | 5563 | 5601 |
| Finland | Population | 5122 | 5230 | 5290 | 5320 | 5350 | 5380 | 5411 |
| France | Population | 58250 | 60261 | 61387 | 62104 | 62831 | 63565 | 64307 |
| Germany | Population | 81798 | 83675 | 84854 | 84762 | 84670 | 84578 | 84486 |
| Greece | Population | 10509 | 10838 | 11079 | 11174 | 11269 | 11365 | 11462 |
| Ireland | Population | 3636 | 3732 | 3760 | 3834 | 3909 | 3986 | 4064 |
| Italy | Population | 57387 | 57604 | 57633 | 57085 | 56543 | 56005 | 55473 |
| Netherlands | Population | 15527 | 16231 | 16659 | 16929 | 17204 | 17483 | 17766 |
| Portugal | Population | 9878 | 10151 | 10293 | 10402 | 10513 | 10625 | 10737 |
| Spain | Population | 39533 | 39941 | 40372 | 40339 | 40307 | 40275 | 40242 |
| Sweden | Population | 8819 | 9038 | 9176 | 9322 | 9470 | 9620 | 9773 |
| United Kingdom | Population | 58689 | 59703 | 60146 | 60590 | 61038 | 61489 | 61943 |
| Cyprus | Population | 739 | 761 | 808 | 858 | 913 | 969 | 1029 |
| Czech Republic | Population | 10314 | 10335 | 10361 | 10386 | 10412 | 10438 | 10463 |
| Estonia | Population | 1461 | 1428 | 1448 | 1468 | 1489 | 1510 | 1531 |
| Hungary | Population | 10186 | 10149 | 10184 | 10219 | 10254 | 10289 | 10325 |
| Poland | Population | 38641 | 39500 | 39521 | 39606 | 39069 | 39153 | 39238 |
| Slovenia | Population | 1992 | 2011 | 2018 | 2026 | 2034 | 2042 | 2050 |
| Bulgaria | Population | 8417 | 8205 | 8208 | 8212 | 8215 | 8218 | 8222 |
| Latvia | Population | 2494 | 2435 | 2460 | 2486 | 2512 | 2538 | 2565 |
| Lithuania | Population | 3716 | 3760 | 3803 | 3847 | 3892 | 3937 | 3982 |
| Malta | Population | 381 | 411 | 419 | 427 | 436 | 445 | 453 |
| Norway | Population | 4369 | 4551 | 4663 | 4756 | 4851 | 4948 | 5046 |
| Romania | Population | 22652 | 23063 | 23473 | 23891 | 24320 | 24753 | 25194 |
| Slovakia | Population | 5366 | 5408 | 5414 | 5419 | 5425 | 5431 | 5436 |
| **Total EUR-28** | | **483683** | **492840** | **498164** | **500393** | **502054** | **504369** | **506728** |
| Austria | Per caput supply | 11 | 11 | 11 | 12 | 12 | 12 | 13 |
| Belgium-Luxembourg | Per caput supply | 22 | 22 | 22 | 23 | 23 | 23 | 24 |
| Denmark | Per caput supply | 24 | 24 | 25 | 26 | 27 | 28 | 29 |
| Finland | Per caput supply | 34 | 34 | 35 | 35 | 36 | 36 | 37 |
| France | Per caput supply | 31 | 32 | 32 | 32 | 32 | 33 | 33 |
| Germany | Per caput supply | 13 | 15 | 15 | 16 | 16 | 17 | 18 |
| Greece | Per caput supply | 26 | 26 | 26 | 26 | 27 | 27 | 27 |
| Ireland | Per caput supply | 21 | 21 | 21 | 21 | 21 | 21 | 20 |
| Italy | Per caput supply | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| Netherlands | Per caput supply | 16 | 15 | 15 | 15 | 15 | 16 | 16 |
| Portugal | Per caput supply | 61 | 60 | 59 | 59 | 58 | 58 | 57 |
| Spain | Per caput supply | 41 | 40 | 39 | 39 | 39 | 39 | 39 |
| Sweden | Per caput supply | 27 | 28 | 28 | 27 | 27 | 27 | 27 |
| United Kingdom | Per caput supply | 22 | 24 | 24 | 25 | 25 | 25 | 25 |
| Cyprus | Per caput supply | 22 | 25 | 24 | 24 | 23 | 23 | 23 |
| Czech Republic | Per caput supply | 9 | 10 | 10 | 11 | 11 | 12 | 13 |
| Estonia | Per caput supply | 21 | 14 | 14 | 14 | 14 | 14 | 14 |
| Hungary | Per caput supply | 4 | 5 | 5 | 5 | 5 | 6 | 6 |

| Country | Nature | Average 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|---|
| Poland | Per caput supply | 12 | 12 | 13 | 13 | 14 | 15 | 16 |
| Slovenia | Per caput supply | 7 | 7 | 7 | 8 | 8 | 8 | 9 |
| Bulgaria | Per caput supply | 3 | 5 | 5 | 6 | 6 | 7 | 7 |
| Latvia | Per caput supply | 41 | 37 | 37 | 38 | 38 | 38 | 39 |
| Lithuania | Per caput supply | 18 | 17 | 19 | 21 | 23 | 25 | 27 |
| Malta | Per caput supply | 27 | 30 | 31 | 32 | 33 | 34 | 36 |
| Norway | Per caput supply | 46 | 46 | 45 | 45 | 45 | 45 | 45 |
| Romania | Per caput supply | 3 | 3 | 4 | 4 | 4 | 5 | 5 |
| Slovakia | Per caput supply | 7 | 6 | 6 | 7 | 7 | 8 | 8 |
| **Total EUR-28** | | **590** | **595** | **600** | **608** | **618** | **630** | **643** |
| **EU-15 Average** | | **24.4** | **25.5** | **25.6** | **26.0** | **26.4** | **26.8** | **27.2** |
| **EUR-6 NC Average** | | **10.5** | **10.4** | **11.0** | **11.5** | **12.3** | **13.0** | **13.8** |
| **EUR-7 NC Average** | | **10.7** | **11.0** | **11.4** | **11.8** | **12.3** | **12.8** | **13.4** |
| **EUR-28 Average** | | **21.3** | **22.2** | **22.4** | **22.7** | **23.2** | **23.6** | **24.1** |
| Austria | Production NFU | | | | | | | |
| Belgium-Luxembourg | Production NFU | 553 | 422 | 422 | 422 | 422 | 422 | 422 |
| Denmark | Production NFU | 1393022 | 1257998 | 1257998 | 1257998 | 1257998 | 1257998 | 1257998 |
| Finland | Production NFU | 32963 | 10190 | 10190 | 10190 | 10190 | 10190 | 10190 |
| France | Production NFU | 83249 | 82521 | 82521 | 82521 | 82521 | 82521 | 82521 |
| Germany | Production NFU | 14704 | 16805 | 16805 | 16805 | 16805 | 16805 | 16805 |
| Greece | Production NFU | 5012 | 2083 | 2083 | 2083 | 2083 | 2083 | 2083 |
| Ireland | Production NFU | 59932 | 67243 | 67243 | 67243 | 67243 | 67243 | 67243 |
| Italy | Production NFU | 10576 | 11984 | 11984 | 11984 | 11984 | 11984 | 11984 |
| Netherlands | Production NFU | | | | | | | |
| Portugal | Production NFU | 23958 | 13990 | 13990 | 13990 | 13990 | 13990 | 13990 |
| Spain | Production NFU | 123360 | 155892 | 155892 | 155892 | 155892 | 155892 | 155892 |
| Sweden | Production NFU | 116900 | 123117 | 123117 | 123117 | 123117 | 123117 | 123117 |
| United Kingdom | Production NFU | 210145 | 159657 | 159657 | 159657 | 159657 | 159657 | 159657 |
| Cyprus | Production NFU | | | | | | | |
| Czech Republic | Production NFU | | | | | | | |
| Estonia | Production NFU | 3667 | 3454 | 3454 | 3454 | 3454 | 3454 | 3454 |
| Hungary | Production NFU | | | | | | | |
| Poland | Production NFU | 59531 | 52005 | 52005 | 52005 | 52005 | 52005 | 52005 |
| Slovenia | Production NFU | 15 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bulgaria | Production NFU | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Latvia | Production NFU | 16177 | 12528 | 12528 | 12528 | 12528 | 12528 | 12528 |
| Lithuania | Production NFU | 3880 | 3699 | 3699 | 3699 | 3699 | 3699 | 3699 |
| Malta | Production NFU | | | | | | | |
| Norway | Production NFU | 1049002 | 1312539 | 1312539 | 1312539 | 1312539 | 1312539 | 1312539 |
| Romania | Production NFU | 101 | 43 | 43 | 43 | 43 | 43 | 43 |
| Slovakia | Production NFU | | | | | | | |
| **Total EUR-28** | | **3206746** | **3286169** | **3286169** | **3286169** | **3286169** | **3286169** | **3286169** |
| Austria | Imports NFU | 25488 | 23363 | 23363 | 23363 | 23363 | 23363 | 23363 |
| Belgium-Luxembourg | Imports NFU | 82991 | 63963 | 63963 | 63963 | 63963 | 63963 | 63963 |
| Denmark | Imports NFU | 100018 | 100002 | 100002 | 100002 | 100002 | 100002 | 100002 |
| Finland | Imports NFU | 110098 | 98725 | 98725 | 98725 | 98725 | 98725 | 98725 |
| France | Imports NFU | 234361 | 203447 | 203447 | 203447 | 203447 | 203447 | 203447 |
| Germany | Imports NFU | 589282 | 568789 | 568789 | 568789 | 568789 | 568789 | 568789 |
| Greece | Imports NFU | 46844 | 55161 | 55161 | 55161 | 55161 | 55161 | 55161 |
| Ireland | Imports NFU | 35259 | 22167 | 22167 | 22167 | 22167 | 22167 | 22167 |
| Italy | Imports NFU | 187006 | 149642 | 149642 | 149642 | 149642 | 149642 | 149642 |
| Netherlands | Imports NFU | 587277 | 183316 | 183316 | 183316 | 183316 | 183316 | 183316 |
| Portugal | Imports NFU | 20023 | 20347 | 20347 | 20347 | 20347 | 20347 | 20347 |
| Spain | Imports NFU | 137000 | 129909 | 129909 | 129909 | 129909 | 129909 | 129909 |
| Sweden | Imports NFU | 36575 | 24647 | 24647 | 24647 | 24647 | 24647 | 24647 |
| United Kingdom | Imports NFU | 595119 | 455631 | 455631 | 455631 | 455631 | 455631 | 455631 |
| Cyprus | Imports NFU | 8966 | 8768 | 8768 | 8768 | 8768 | 8768 | 8768 |

| Country | Nature | Average 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|---|
| Czech Republic | Imports NFU | 22205 | 15613 | 15613 | 15613 | 15613 | 15613 | 15613 |
| Estonia | Imports NFU | 3741 | 1469 | 1469 | 1469 | 1469 | 1469 | 1469 |
| Hungary | Imports NFU | 49112 | 45506 | 45506 | 45506 | 45506 | 45506 | 45506 |
| Poland | Imports NFU | 4520 | 2776 | 2776 | 2776 | 2776 | 2776 | 2776 |
| Slovenia | Imports NFU | 5198 | 3414 | 3414 | 3414 | 3414 | 3414 | 3414 |
| Bulgaria | Imports NFU | 9392 | 6004 | 6004 | 6004 | 6004 | 6004 | 6004 |
| Latvia | Imports NFU | 3045 | 1272 | 1272 | 1272 | 1272 | 1272 | 1272 |
| Lithuania | Imports NFU | 12597 | 15266 | 15266 | 15266 | 15266 | 15266 | 15266 |
| Malta | Imports NFU | 3817 | 2740 | 2740 | 2740 | 2740 | 2740 | 2740 |
| Norway | Imports NFU | 760005 | 772943 | 805224 | 839534 | 876077 | 915088 | 956828 |
| Romania | Imports NFU | 19564 | 21813 | 21813 | 21813 | 21813 | 21813 | 21813 |
| Slovakia | Imports NFU | 12848 | 11482 | 11482 | 11482 | 11482 | 11482 | 11482 |
| **Total EUR-28** | | **3702353** | **3008173** | **3040455** | **3074765** | **3111308** | **3150319** | **3192059** |
| Austria | Exports NFU | 1023 | 539 | 539 | 539 | 539 | 539 | 539 |
| Belgium-Luxembourg | Exports NFU | 16815 | 11154 | 11154 | 11154 | 11154 | 11154 | 11154 |
| Denmark | Exports NFU | 1221464 | 1040366 | 1040366 | 1040366 | 1040366 | 1040366 | 1040366 |
| Finland | Exports NFU | 2467 | 1329 | 1329 | 1329 | 1329 | 1329 | 1329 |
| France | Exports NFU | 73880 | 55931 | 55931 | 55931 | 55931 | 55931 | 55931 |
| Germany | Exports NFU | 301513 | 263811 | 263811 | 263811 | 263811 | 263811 | 263811 |
| Greece | Exports NFU | 1473 | 838 | 838 | 838 | 838 | 838 | 838 |
| Ireland | Exports NFU | 22285 | 18290 | 18290 | 18290 | 18290 | 18290 | 18290 |
| Italy | Exports NFU | 20213 | 16214 | 16214 | 16214 | 16214 | 16214 | 16214 |
| Netherlands | Exports NFU | 221196 | 88547 | 88547 | 88547 | 88547 | 88547 | 88547 |
| Portugal | Exports NFU | 6365 | 5580 | 5580 | 5580 | 5580 | 5580 | 5580 |
| Spain | Exports NFU | 44248 | 44395 | 44395 | 44395 | 44395 | 44395 | 44395 |
| Sweden | Exports NFU | 60261 | 64118 | 64118 | 64118 | 64118 | 64118 | 64118 |
| United Kingdom | Exports NFU | 73169 | 57010 | 57010 | 57010 | 57010 | 57010 | 57010 |
| Cyprus | Exports NFU | 15 | 0 | 0 | 0 | 0 | 0 | 0 |
| Czech Republic | Exports NFU | 196 | 296 | 296 | 296 | 296 | 296 | 296 |
| Estonia | Exports NFU | 4403 | 2206 | 2206 | 2206 | 2206 | 2206 | 2206 |
| Hungary | Exports NFU | 1363 | 3204 | 3204 | 3204 | 3204 | 3204 | 3204 |
| Poland | Exports NFU | 8393 | 2056 | 2056 | 2056 | 2056 | 2056 | 2056 |
| Slovenia | Exports NFU | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Bulgaria | Exports NFU | 3418 | 137 | 137 | 137 | 137 | 137 | 137 |
| Latvia | Exports NFU | 3772 | 1089 | 1089 | 1089 | 1089 | 1089 | 1089 |
| Lithuania | Exports NFU | 5326 | 9190 | 9190 | 9190 | 9190 | 9190 | 9190 |
| Malta | Exports NFU | ! | | | | | | |
| Norway | Exports NFU | 470706 | 630195 | 630195 | 630195 | 630195 | 630195 | 630195 |
| Romania | Exports NFU | 24 | 109 | 109 | 109 | 109 | 109 | 109 |
| Slovakia | Exports NFU | 43 | 51 | 51 | 51 | 51 | 51 | 51 |
| **Total EUR-28** | | **2564033** | **2316654** | **2316654** | **2316654** | **2316654** | **2316654** | **2316654** |
| Austria | Net supply NFU | 24464 | 22824 | 22824 | 22824 | 22824 | 22824 | 22824 |
| Belgium-Luxembourg | Net supply NFU | 66729 | 53232 | 53232 | 53232 | 53232 | 53232 | 53232 |
| Denmark | Net supply NFU | 271576 | 317634 | 317634 | 317634 | 317634 | 317634 | 317634 |
| Finland | Net supply NFU | 140595 | 107587 | 107587 | 107587 | 107587 | 107587 | 107587 |
| France | Net supply NFU | 243730 | 230037 | 230037 | 230037 | 230037 | 230037 | 230037 |
| Germany | Net supply NFU | 302473 | 321783 | 321783 | 321783 | 321783 | 321783 | 321783 |
| Greece | Net supply NFU | 50384 | 56406 | 56406 | 56406 | 56406 | 56406 | 56406 |
| Ireland | Net supply NFU | 72906 | 71119 | 71119 | 71119 | 71119 | 71119 | 71119 |
| Italy | Net supply NFU | 177369 | 145412 | 145412 | 145412 | 145412 | 145412 | 145412 |
| Netherlands | Net supply NFU | 366081 | 94769 | 94769 | 94769 | 94769 | 94769 | 94769 |
| Portugal | Net supply NFU | 37615 | 28756 | 28756 | 28756 | 28756 | 28756 | 28756 |
| Spain | Net supply NFU | 216112 | 241407 | 241407 | 241407 | 241407 | 241407 | 241407 |
| Sweden | Net supply NFU | 93214 | 83645 | 83645 | 83645 | 83645 | 83645 | 83645 |
| United Kingdom | Net supply NFU | 732094 | 558278 | 558278 | 558278 | 558278 | 558278 | 558278 |
| Cyprus | Net supply NFU | 8951 | 8768 | 8768 | 8768 | 8768 | 8768 | 8768 |

| Country | Nature | Average 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|---|
| Czech Republic | Net supply NFU | 22009 | 15317 | 15317 | 15317 | 15317 | 15317 | 15317 |
| Estonia | Net supply NFU | 3005 | 2716 | 2716 | 2716 | 2716 | 2716 | 2716 |
| Hungary | Net supply NFU | 47749 | 42302 | 42302 | 42302 | 42302 | 42302 | 42302 |
| Poland | Net supply NFU | 55658 | 52725 | 52725 | 52725 | 52725 | 52725 | 52725 |
| Slovenia | Net supply NFU | 5213 | 3414 | 3414 | 3414 | 3414 | 3414 | 3414 |
| Bulgaria | Net supply NFU | 5974 | 5867 | 5867 | 5867 | 5867 | 5867 | 5867 |
| Latvia | Net supply NFU | 15450 | 12711 | 12711 | 12711 | 12711 | 12711 | 12711 |
| Lithuania | Net supply NFU | 11150 | 9775 | 9775 | 9775 | 9775 | 9775 | 9775 |
| Malta | Net supply NFU | 3817 | 2740 | 2740 | 2740 | 2740 | 2740 | 2740 |
| Norway | Net supply NFU | 1338302 | 1455286 | 1487568 | 1521877 | 1558421 | 1597432 | 1639172 |
| Romania | Net supply NFU | 19641 | 21747 | 21747 | 21747 | 21747 | 21747 | 21747 |
| Slovakia | Net supply NFU | 12805 | 11431 | 11431 | 11431 | 11431 | 11431 | 11431 |
| **Total EUR-28** | | **4345067** | **3977689** | **4009971** | **4044280** | **4080824** | **4119834** | **4161574** |
| Austria | Aquaculture | 2954 | 2084 | 1707 | 1436 | 1244 | 1113 | 1029 |
| Belgium-Luxembourg | Aquaculture | 865 | 802 | 789 | 789 | 801 | 824 | 857 |
| Denmark | Aquaculture | 42064 | 45565 | 48013 | 50604 | 53347 | 56252 | 59328 |
| Finland | Aquaculture | 16827 | 14431 | 13397 | 12443 | 11563 | 10752 | 10005 |
| France | Aquaculture | 281739 | 282963 | 290429 | 298621 | 307497 | 317031 | 327211 |
| Germany | Aquaculture | 60427 | 66507 | 67352 | 68915 | 71026 | 73570 | 76466 |
| Greece | Aquaculture | 42886 | 65452 | 69782 | 74452 | 79486 | 84912 | 90764 |
| Ireland | Aquaculture | 33619 | 44673 | 48098 | 51825 | 55881 | 60298 | 65108 |
| Italy | Aquaculture | 224572 | 257964 | 264564 | 271694 | 279363 | 287593 | 296414 |
| Netherlands | Aquaculture | 102284 | 125535 | 129681 | 134011 | 138534 | 143263 | 148209 |
| Portugal | Aquaculture | 6307 | 6727 | 6627 | 6800 | 7188 | 7757 | 8488 |
| Spain | Aquaculture | 237200 | 327221 | 337830 | 349086 | 361017 | 373693 | 387222 |
| Sweden | Aquaculture | 7093 | 5068 | 4822 | 4624 | 4473 | 4368 | 4306 |
| United Kingdom | Aquaculture | 111302 | 146301 | 153155 | 160459 | 168241 | 176535 | 185373 |
| Cyprus | Aquaculture | 731 | 1387 | 1564 | 1770 | 2012 | 2298 | 2639 |
| Czech Republic | Aquaculture | 18061 | 19792 | 21852 | 24126 | 26637 | 29410 | 32471 |
| Estonia | Aquaculture | 298 | 260 | 260 | 260 | 260 | 260 | 260 |
| Hungary | Aquaculture | 9376 | 7300 | 6049 | 5245 | 4750 | 4470 | 4341 |
| Poland | Aquaculture | 27156 | 29118 | 28756 | 28493 | 28328 | 28263 | 28296 |
| Slovenia | Aquaculture | 831 | 1015 | 1121 | 1238 | 1367 | 1509 | 1666 |
| Bulgaria | Aquaculture | 5024 | 4841 | 5377 | 6027 | 6816 | 7774 | 8940 |
| Latvia | Aquaculture | 444 | 412 | 412 | 412 | 412 | 412 | 412 |
| Lithuania | Aquaculture | 1631 | 1516 | 1516 | 1516 | 1516 | 1516 | 1516 |
| Malta | Aquaculture | 1420 | 2240 | 2473 | 2730 | 3015 | 3328 | 3675 |
| Norway | Aquaculture | 318762 | 466065 | 511905 | 562381 | 617967 | 679189 | 746624 |
| Romania | Aquaculture | 14948 | 9547 | 9615 | 9693 | 9779 | 9875 | 9982 |
| Slovakia | Aquaculture | 1258 | 731 | 807 | 891 | 983 | 1086 | 1199 |
| **Total EUR-28** | | **1570082** | **1935515** | **2027954** | **2130541** | **2243506** | **2367349** | **2502799** |
| Austria | Capture | 432 | 432 | 432 | 432 | 432 | 432 | 432 |
| Belgium-Luxembourg | Capture | 32401 | 32401 | 32401 | 32401 | 32401 | 32401 | 32401 |
| Denmark | Capture | 1789849 | 1789849 | 1789849 | 1789849 | 1789849 | 1789849 | 1789849 |
| Finland | Capture | 174446 | 174446 | 174446 | 174446 | 174446 | 174446 | 174446 |
| France | Capture | 656280 | 656280 | 656280 | 656280 | 656280 | 656280 | 656280 |
| Germany | Capture | 246458 | 246458 | 246458 | 246458 | 246458 | 246458 | 246458 |
| Greece | Capture | 163489 | 163489 | 163489 | 163489 | 163489 | 163489 | 163489 |
| Ireland | Capture | 360804 | 360804 | 360804 | 360804 | 360804 | 360804 | 360804 |
| Italy | Capture | 364551 | 364551 | 364551 | 364551 | 364551 | 364551 | 364551 |
| Netherlands | Capture | 451518 | 451518 | 451518 | 451518 | 451518 | 451518 | 451518 |
| Portugal | Capture | 249962 | 249962 | 249962 | 249962 | 249962 | 249962 | 249962 |
| Spain | Capture | 1124993 | 1124993 | 1124993 | 1124993 | 1124993 | 1124993 | 1124993 |
| Sweden | Capture | 386150 | 386150 | 386150 | 386150 | 386150 | 386150 | 386150 |
| United Kingdom | Capture | 900046 | 900046 | 900046 | 900046 | 900046 | 900046 | 900046 |
| Cyprus | Capture | 2580 | 2580 | 2580 | 2580 | 2580 | 2580 | 2580 |

| Country | Nature | Average 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|---|
| Czech Republic | Capture | 3733 | 3733 | 3733 | 3733 | 3733 | 3733 | 3733 |
| Estonia | Capture | 122585 | 122585 | 122585 | 122585 | 122585 | 122585 | 122585 |
| Hungary | Capture | 7561 | 7561 | 7561 | 7561 | 7561 | 7561 | 7561 |
| Poland | Capture | 362391 | 362391 | 362391 | 362391 | 362391 | 362391 | 362391 |
| Slovenia | Capture | 2254 | 2254 | 2254 | 2254 | 2254 | 2254 | 2254 |
| Bulgaria | Capture | 9074 | 9074 | 9074 | 9074 | 9074 | 9074 | 9074 |
| Latvia | Capture | 127602 | 127602 | 127602 | 127602 | 127602 | 127602 | 127602 |
| Lithuania | Capture | 38241 | 38241 | 38241 | 38241 | 38241 | 38241 | 38241 |
| Malta | Capture | 869 | 869 | 869 | 869 | 869 | 869 | 869 |
| Norway | Capture | 2844335 | 2844335 | 2844335 | 2844335 | 2844335 | 2844335 | 2844335 |
| Romania | Capture | 21374 | 21374 | 21374 | 21374 | 21374 | 21374 | 21374 |
| Slovakia | Capture | 1537 | 1537 | 1537 | 1537 | 1537 | 1537 | 1537 |
| **Total EUR-28** | | **10445515** | **10445515** | **10445515** | **10445515** | **10445515** | **10445515** | **10445515** |
| Austria | Production total | 3386 | 2516 | 2139 | 1867 | 1675 | 1545 | 1461 |
| Belgium-Luxembourg | Production total | 33266 | 33203 | 33190 | 33190 | 33202 | 33225 | 33258 |
| Denmark | Production total | 1831913 | 1835414 | 1837862 | 1840453 | 1843197 | 1846101 | 1849177 |
| Finland | Production total | 191274 | 188878 | 187844 | 186890 | 186009 | 185198 | 184451 |
| France | Production total | 938019 | 939243 | 946709 | 954902 | 963777 | 973311 | 983491 |
| Germany | Production total | 306885 | 312964 | 313809 | 315372 | 317484 | 320027 | 322923 |
| Greece | Production total | 206375 | 228941 | 233271 | 237941 | 242975 | 248401 | 254253 |
| Ireland | Production total | 394423 | 405477 | 408903 | 412630 | 416686 | 421102 | 425912 |
| Italy | Production total | 589123 | 622515 | 629115 | 636245 | 643914 | 652144 | 660965 |
| Netherlands | Production total | 553802 | 577053 | 581199 | 585529 | 590052 | 594781 | 599727 |
| Portugal | Production total | 256269 | 256689 | 256589 | 256762 | 257151 | 257719 | 258451 |
| Spain | Production total | 1362193 | 1452214 | 1462823 | 1474079 | 1486011 | 1498687 | 1512215 |
| Sweden | Production total | 393243 | 391218 | 390971 | 390774 | 390623 | 390518 | 390456 |
| United Kingdom | Production total | 1011348 | 1046347 | 1053201 | 1060505 | 1068287 | 1076581 | 1085419 |
| Cyprus | Production total | 3310 | 3966 | 4143 | 4350 | 4592 | 4878 | 5218 |
| Czech Republic | Production total | 21794 | 23525 | 25585 | 27859 | 30370 | 33143 | 36204 |
| Estonia | Production total | 122884 | 122845 | 122845 | 122845 | 122845 | 122845 | 122845 |
| Hungary | Production total | 16937 | 14861 | 13610 | 12806 | 12311 | 12031 | 11902 |
| Poland | Production total | 389547 | 391508 | 391147 | 390884 | 390719 | 390653 | 390686 |
| Slovenia | Production total | 3084 | 3269 | 3375 | 3491 | 3620 | 3762 | 3920 |
| Bulgaria | Production total | 14098 | 13915 | 14451 | 15101 | 15890 | 16848 | 18014 |
| Latvia | Production total | 128046 | 128014 | 128014 | 128014 | 128014 | 128014 | 128014 |
| Lithuania | Production total | 39872 | 39757 | 39757 | 39757 | 39757 | 39757 | 39757 |
| Malta | Production total | 2290 | 3109 | 3342 | 3600 | 3884 | 4198 | 4544 |
| Norway | Production total | 3163097 | 3310400 | 3356241 | 3406716 | 3462303 | 3523524 | 3590959 |
| Romania | Production total | 36322 | 30920 | 30989 | 31066 | 31152 | 31249 | 31356 |
| Slovakia | Production total | 2796 | 2268 | 2344 | 2428 | 2520 | 2623 | 2736 |
| **Total EUR-28** | | **12015597** | **12381030** | **12473469** | **12576056** | **12689021** | **12812864** | **12948314** |

Source: Database

# ANNEX 8: COMMODITIES FLOWS AND PRODUCTION IN NET WEIGHT 1989-1998 AND 2005-2030

**Table Annex 8-1: Food use production in net weight by OECD groups of commodities from 1989 to 1998**

(tonnes net weight)

| OECD gp | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cephalopods | 276755 | 105477 | 105767 | 139988 | 164536 | 153077 | 178056 | 156372 | 161193 | 190539 | 150556 |
| Crus., mol. & other aquatic inv., prepared | 112315 | 51759 | 62799 | 68065 | 75798 | 70273 | 71946 | 79535 | 71689 | 75359 | 69691 |
| Crustaceans | 182286 | 93069 | 83691 | 99806 | 110419 | 95437 | 80618 | 76678 | 77698 | 74619 | 88004 |
| Fish, cured | 462787 | 216866 | 228779 | 209864 | 184355 | 185128 | 188804 | 201802 | 202423 | 203372 | 202377 |
| Fish, fillets | 895539 | 522316 | 557789 | 538325 | 577270 | 541796 | 515403 | 522599 | 506746 | 524711 | 534106 |
| Fish, fresh/chilled | 472872 | 421372 | 529084 | 607166 | 667836 | 593258 | 607956 | 616614 | 670480 | 661215 | 597220 |
| Fish, frozen | 2148095 | 1030752 | 1070880 | 1270442 | 1350151 | 1264983 | 1295557 | 1209005 | 1227097 | 1187530 | 1211822 |
| Molluscs | 193111 | 129227 | 139473 | 184576 | 137688 | 123366 | 121849 | 144829 | 164779 | 147027 | 143646 |
| Prepared/preserved fish | 1340228 | 718123 | 740208 | 754159 | 772465 | 855166 | 845692 | 884662 | 874597 | 920749 | 818425 |
| **Total FU Production EU-15** | **6083989** | **3288960** | **3518469** | **3872390** | **4040518** | **3882484** | **3905881** | **3892095** | **3956703** | **3985120** | **3815847** |
| Cephalopods | 61737 | 22716 | 22886 | 22132 | 9001 | 3265 | 647 | 303 | 288 | 390 | 9070 |
| Crustaceans | 4822 | 1270 | 4186 | 9800 | 2010 | 4086 | 6070 | 9812 | 14974 | 18995 | 7911 |
| Fish, cured | 77270 | 34300 | 35165 | 46436 | 57448 | 69508 | 80549 | 65421 | 89019 | 64392 | 60249 |
| Fish, fillets | 105290 | 77600 | 75456 | 81225 | 80704 | 101111 | 92331 | 81835 | 74404 | 62182 | 80761 |
| Fish, fresh/chilled | 4470 | 3420 | 6561 | 20594 | 48278 | 54884 | 40504 | 51237 | 63334 | 36198 | 36112 |
| Fish, frozen | 132716 | 71500 | 60000 | 62400 | 134233 | 136598 | 96067 | 69916 | 68176 | 75638 | 86059 |
| Molluscs | 0 | 0 | 0 | 154 | 159 | 453 | 454 | 342 | 234 | 165 | 218 |
| Prepared/preserved fish | 88756 | 40900 | 46758 | 67639 | 105942 | 123343 | 131895 | 148762 | 184190 | 181145 | 114508 |
| **Total FU Production EUR-6 NC** | **475061** | **251706** | **251012** | **310380** | **437775** | **493248** | **448517** | **427628** | **494619** | **439105** | **394888** |
| Cephalopods | 1793 | 213 | 0 | 5876 | 2931 | 3634 | 1279 | 3320 | 56 | 933 | 2027 |
| Crus., mol. & other aquatic inv., prepared | 21903 | 14356 | 12990 | 14787 | 14553 | 14796 | 12134 | 11551 | 14428 | 17012 | 14067 |
| Crustaceans | 22317 | 21179 | 18284 | 16352 | 20819 | 22591 | 14606 | 17284 | 14386 | 13805 | 17701 |
| Fish, cured | 226700 | 100022 | 106090 | 132372 | 143791 | 182489 | 185263 | 182291 | 173150 | 173244 | 153190 |
| Fish, fillets | 128942 | 49226 | 46732 | 70584 | 113293 | 161098 | 168265 | 184888 | 181100 | 218085 | 132586 |
| Fish, fresh/chilled | 275955 | 211848 | 191794 | 176932 | 200258 | 209647 | 223906 | 201178 | 252590 | 274605 | 215862 |
| Fish, frozen | 381483 | 301411 | 429000 | 420704 | 438570 | 529592 | 644690 | 675177 | 729566 | 550251 | 524329 |
| Molluscs | 3546 | 1633 | 1345 | 1056 | 3200 | 3389 | 3424 | 3431 | 3538 | 3336 | 2706 |
| Prepared/preserved fish | 107267 | 56838 | 57716 | 77616 | 82523 | 86771 | 90083 | 110115 | 145202 | 123608 | 92275 |
| **Total FU Production EUR-7 NC** | **1169905** | **756725** | **863950** | **916277** | **1019937** | **1214007** | **1343650** | **1389236** | **1514015** | **1374880** | **1154742** |
| **Total FU Production EUR-28** | **7728956** | **4297391** | **4633431** | **5099047** | **5498231** | **5589739** | **5698049** | **5708959** | **5965337** | **5799105** | **5365477** |

Source: database

**Table Annex 8-2: Non-food use production in net weight by OECD groups of commodities from 1989 to 1998**

(tonnes net weight)

| OECD gp | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fish/marine mammal, fat, oil | 301116 | 141413 | 191893 | 229854 | 165357 | 212381 | 230495 | 198194 | 170789 | 187831 | 192023 |
| Flour, meal unfit for human consumption | 2083021 | 617946 | 621475 | 672304 | 542434 | 630635 | 667585 | 578101 | 617991 | 588740 | 615245 |
| **Total NFU Production EU-15** | **2384137** | **759358** | **813367** | **902158** | **707790** | **843016** | **898080** | **776294** | **788780** | **776571** | **807268** |
| Fish/marine mammal, fat, oil | 829 | 370 | 386 | 0 | 0 | 0 | 0 | 0 | 6 | 58 | 91 |
| Flour, meal unfit for human consumption | 91235 | 51825 | 50686 | 58127 | 54404 | 59745 | 49986 | 39118 | 56597 | 52507 | 52555 |
| **Total NFU Production EUR-6 NC** | **92064** | **52195** | **51072** | **58127** | **54404** | **59745** | **49986** | **39118** | **56603** | **52565** | **52646** |
| Fish/marine mammal, fat, oil | 54631 | 51917 | 90821 | 119927 | 131287 | 118876 | 87200 | 93123 | 93440 | 94255 | 97872 |
| Flour, meal unfit for human consumption | 778613 | 171418 | 213909 | 286197 | 315837 | 213862 | 250436 | 258021 | 265558 | 325169 | 255601 |

| OECD gp | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total NFU Production EUR-7 NC** | **833244** | **223335** | **304730** | **406124** | **447124** | **332738** | **337636** | **351144** | **358998** | **419424** | **353473** |
| **Total NFU Production EUR-28** | **3309445** | **1034888** | **1169169** | **1366409** | **1209318** | **1235499** | **1285702** | **1166556** | **1204381** | **1248560** | **1213387** |

Source: database

### Table Annex 8-3: Food use imports in net weight by OECD groups of commodities from 1989 to 1998

(tonnes net weight)

| OECD gp | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cephalopods | 432575 | 280906 | 321328 | 282485 | 309859 | 320092 | 346726 | 362641 | 416139 | 428187 | 340929 |
| Crus., mol. & other aquatic inv., prepared | 95092 | 72195 | 70921 | 73193 | 65381 | 76435 | 74697 | 80836 | 86415 | 74748 | 74980 |
| Crustaceans | 513159 | 408961 | 444167 | 456973 | 447278 | 522309 | 479986 | 526452 | 528337 | 582595 | 488562 |
| Fish, cured | 399687 | 261910 | 264132 | 247738 | 243682 | 273715 | 276590 | 315990 | 323347 | 302759 | 278874 |
| Fish, fillets | 781668 | 630683 | 635481 | 675123 | 671816 | 748385 | 770595 | 794944 | 804565 | 903320 | 737212 |
| Fish, fresh/chilled | 1308328 | 959309 | 921271 | 975203 | 928659 | 1068968 | 1014893 | 1106034 | 1137118 | 1161525 | 1030331 |
| Fish, frozen | 1200882 | 969981 | 1027828 | 944459 | 860240 | 896589 | 848985 | 863399 | 871020 | 901766 | 909363 |
| Molluscs | 263825 | 175253 | 209588 | 237504 | 234697 | 169192 | 174743 | 213342 | 207972 | 230938 | 205914 |
| Prepared/preserved fish | 714882 | 547100 | 609458 | 639390 | 669618 | 752729 | 727109 | 844711 | 890143 | 961455 | 737968 |
| **Total FU Imports EU-15** | **5710096** | **4306297** | **4504173** | **4532066** | **4431230** | **4828412** | **4714324** | **5108350** | **5265057** | **5547294** | **4804134** |
| Cephalopods | 2395 | 1558 | 1451 | 3118 | 2742 | 3332 | 3521 | 4139 | 3760 | 4122 | 3083 |
| Crus., mol. & other aquatic inv., prepared | 62 | 20 | 35 | 418 | 348 | 432 | 598 | 721 | 531 | 832 | 437 |
| Crustaceans | 411 | 258 | 428 | 837 | 8034 | 7929 | 9041 | 7141 | 6142 | 5960 | 5086 |
| Fish, cured | 13688 | 8167 | 7902 | 6399 | 4574 | 5898 | 5574 | 5890 | 4821 | 3223 | 5828 |
| Fish, fillets | 1137 | 574 | 2010 | 12678 | 27392 | 118364 | 108155 | 55096 | 50040 | 89100 | 51490 |
| Fish, fresh/chilled | 336 | 296 | 635 | 6682 | 10406 | 9560 | 11855 | 25911 | 28103 | 17471 | 12324 |
| Fish, frozen | 172473 | 120501 | 84307 | 79128 | 77102 | 112614 | 109142 | 126787 | 183556 | 191728 | 120541 |
| Molluscs | 15 | 8 | 29 | 328 | 301 | 540 | 436 | 319 | 577 | 534 | 341 |
| Prepared/preserved fish | 33180 | 24674 | 10631 | 13047 | 24807 | 43754 | 40871 | 103210 | 113138 | 108668 | 53644 |
| **Total FU Imports EUR-6 NC** | **223697** | **156056** | **107428** | **122635** | **155706** | **302423** | **289193** | **329214** | **390668** | **421638** | **252773** |
| Cephalopods | 6628 | 3080 | 5284 | 5146 | 4015 | 1669 | 995 | 905 | 1113 | 7507 | 3302 |
| Crus., mol. & other aquatic inv., prepared | 1008 | 1002 | 1081 | 1630 | 1468 | 1898 | 1629 | 2043 | 2238 | 2499 | 1721 |
| Crustaceans | 13738 | 10191 | 13419 | 20149 | 28966 | 14847 | 20888 | 22705 | 17989 | 18093 | 18583 |
| Fish, cured | 5680 | 6052 | 4620 | 1944 | 3859 | 6185 | 4909 | 7157 | 7312 | 9184 | 5691 |
| Fish, fillets | 2172 | 3253 | 4234 | 3052 | 9228 | 11221 | 18458 | 23269 | 25976 | 21674 | 13374 |
| Fish, fresh/chilled | 27603 | 33831 | 96226 | 107726 | 129553 | 142505 | 168754 | 213897 | 233218 | 238784 | 151610 |
| Fish, frozen | 32538 | 43542 | 27220 | 32247 | 48452 | 99005 | 85466 | 145885 | 175193 | 190879 | 94210 |
| Molluscs | 455 | 422 | 113 | 172 | 167 | 2348 | 5924 | 6399 | 4573 | 3546 | 2629 |
| Prepared/preserved fish | 17481 | 12440 | 9402 | 11796 | 17009 | 23374 | 19847 | 27588 | 32870 | 38492 | 21424 |
| **Total FU Imports EUR-7 NC** | **107303** | **113813** | **161599** | **183862** | **242717** | **303052** | **326870** | **449848** | **500482** | **530658** | **312545** |
| **Total FU Imports EUR-28** | **6041095** | **4576166** | **4773201** | **4838563** | **4829653** | **5433887** | **5330386** | **5887412** | **6156207** | **6499590** | **5369452** |

Source: database

### Table Annex 8-4: Non-food use imports in net weight by OECD groups of commodities from 1989 to 1998

(tonnes net weight)

| OECD gp | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fish/marine mammal, fat, oil | 1876436 | 527227 | 458376 | 376389 | 391305 | 490738 | 546311 | 334543 | 315222 | 180254 | 402263 |
| Flour, meal unfit for human consumption | 1808136 | 1365809 | 1130390 | 1176740 | 1240009 | 1643597 | 1296983 | 1182985 | 1390048 | 1210624 | 1293021 |
| **Total NFU Imports EU-15** | **3684571** | **1893036** | **1588766** | **1553129** | **1631314** | **2134336** | **1843294** | **1517528** | **1705270** | **1390878** | **1695283** |
| Fish/marine mammal, fat, oil | 24291 | 2539 | 4723 | 1544 | 1779 | 1763 | 1841 | 1496 | 867 | 457 | 1890 |
| Flour, meal unfit for human consumption | 84455 | 12597 | 37669 | 48360 | 68319 | 78878 | 93073 | 68653 | 68363 | 63244 | 59906 |
| **Total NFU Imports EUR-6 NC** | **108746** | **15136** | **42392** | **49904** | **70098** | **80641** | **94914** | **70149** | **69230** | **63701** | **61796** |
| Fish/marine mammal, fat, oil | 328265 | 75773 | 75341 | 72568 | 113586 | 139501 | 175501 | 176764 | 202537 | 158754 | 132258 |
| Flour, meal unfit for human consumption | 57338 | 81602 | 53622 | 59617 | 64282 | 110758 | 174400 | 157197 | 169618 | 146254 | 113039 |
| **Total NFU Imports EUR-7 NC** | **385603** | **157375** | **128963** | **132185** | **177868** | **250259** | **349901** | **333961** | **372155** | **305008** | **245297** |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total NFU Imports EUR-28** | **4178920** | **2065547** | **1760121** | **1735218** | **1879280** | **2465236** | **2288109** | **1921638** | **2146655** | **1759587** | **2002377** |

Source: database

**Table Annex 8-5: Food use exports in net weight by OECD groups of commodities from 1989 to 1998**

(tonnes net weight)

| OECD gp | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cephalopods | 111931 | 90892 | 105605 | 101769 | 123176 | 133454 | 131715 | 161803 | 152634 | 155431 | 128498 |
| Crus., mol. & other aquatic inv., prepared | 60414 | 45016 | 41818 | 54551 | 56173 | 61094 | 61051 | 60322 | 59536 | 60690 | 55583 |
| Crustaceans | 222197 | 159907 | 167896 | 171912 | 174143 | 218124 | 203682 | 248366 | 262987 | 281285 | 209811 |
| Fish, cured | 146073 | 117294 | 120304 | 103686 | 101488 | 123981 | 121274 | 143848 | 151686 | 151533 | 126121 |
| Fish, fillets | 404840 | 264866 | 268919 | 267325 | 300970 | 312187 | 294161 | 289503 | 291054 | 298293 | 287475 |
| Fish, fresh/chilled | 853921 | 687256 | 851275 | 908943 | 956120 | 990527 | 947735 | 1090718 | 1180611 | 1214271 | 980828 |
| Fish, frozen | 1115459 | 910310 | 894400 | 1012770 | 1124456 | 1111049 | 1208587 | 1168344 | 1330632 | 1354468 | 1123891 |
| Molluscs | 197251 | 153380 | 184356 | 201083 | 175355 | 143802 | 149406 | 202310 | 214973 | 209545 | 181579 |
| Prepared/preserved fish | 317106 | 238417 | 263023 | 263440 | 316697 | 345419 | 392819 | 465431 | 473166 | 507576 | 362887 |
| **Total FU Exports EU-15** | **3429192** | **2667338** | **2897595** | **3085477** | **3328577** | **3439636** | **3510430** | **3830645** | **4117280** | **4233092** | **3456674** |
| Cephalopods | 18912 | 16859 | 14920 | 21225 | 7908 | 2419 | 124 | 165 | 126 | 177 | 7103 |
| Crus., mol. & other aquatic inv., prepared | 0 | 0 | 0 | 321 | 143 | 150 | 78 | 467 | 224 | 75 | 162 |
| Crustaceans | 0 | 0 | 65 | 9723 | 6343 | 5380 | 10753 | 13546 | 10160 | 13964 | 7770 |
| Fish, cured | 193 | 243 | 1109 | 802 | 2703 | 11177 | 14675 | 12904 | 20121 | 17957 | 9077 |
| Fish, fillets | 0 | 0 | 38 | 84059 | 57219 | 64293 | 47963 | 41526 | 30510 | 35704 | 40146 |
| Fish, fresh/chilled | 11 | 10 | 2988 | 6769 | 21378 | 51040 | 42229 | 53636 | 82115 | 40824 | 33443 |
| Fish, frozen | 113451 | 105783 | 104510 | 8999 | 30848 | 63993 | 65872 | 60176 | 72094 | 84643 | 66324 |
| Molluscs | 0 | 0 | 2 | 157 | 147 | 511 | 477 | 241 | 335 | 135 | 223 |
| Prepared/preserved fish | 1185 | 489 | 411 | 7099 | 39044 | 73186 | 77006 | 89693 | 114962 | 106144 | 56448 |
| **Total FU Exports EUR-6 NC** | **133752** | **123384** | **124043** | **139154** | **165733** | **272149** | **259177** | **272354** | **330647** | **299623** | **220696** |
| Cephalopods | 1431 | 292 | 1840 | 578 | 830 | 227 | 316 | 817 | 88 | 1338 | 703 |
| Crus., mol. & other aquatic inv., prepared | 21042 | 14293 | 12942 | 15230 | 15161 | 15495 | 10482 | 12390 | 15200 | 18154 | 14372 |
| Crustaceans | 11311 | 10343 | 9412 | 7275 | 8946 | 10428 | 7113 | 9948 | 10835 | 12085 | 9598 |
| Fish, cured | 125262 | 85780 | 99356 | 106183 | 132140 | 173516 | 174545 | 179192 | 168280 | 169009 | 143111 |
| Fish, fillets | 123639 | 49256 | 46312 | 71182 | 99229 | 152767 | 167646 | 179785 | 175954 | 201976 | 127123 |
| Fish, fresh/chilled | 268731 | 225609 | 237411 | 252475 | 278273 | 285918 | 317521 | 342624 | 403816 | 410736 | 306043 |
| Fish, frozen | 269273 | 203536 | 301405 | 291702 | 295049 | 392363 | 475371 | 570416 | 659424 | 569775 | 417671 |
| Molluscs | 2286 | 1957 | 1328 | 1100 | 3051 | 3736 | 3755 | 2819 | 3888 | 1103 | 2526 |
| Prepared/preserved fish | 42455 | 29867 | 33148 | 33698 | 55527 | 68171 | 73398 | 94864 | 133772 | 120237 | 71409 |
| **Total FU Exports EUR-7 NC** | **865430** | **620933** | **743154** | **779424** | **888206** | **1102622** | **1230147** | **1392854** | **1571257** | **1504412** | **1092557** |
| **Total FU Exports EUR-28** | **4428373** | **3411654** | **3764792** | **4004055** | **4382516** | **4814407** | **4999754** | **5495853** | **6019183** | **6037127** | **4769927** |

Source: database

**Table Annex 8-6: Non-food use exports in net weight by OECD groups of commodities from 1989 to 1998**

(tonnes net weight)

| OECD gp | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fish/marine mammal, fat, oil | 384004 | 166429 | 199028 | 233480 | 202976 | 241336 | 276111 | 195320 | 188860 | 180680 | 209358 |
| Flour, meal unfit for human consumption | 1882824 | 580369 | 520209 | 604330 | 654723 | 969174 | 834552 | 676858 | 639913 | 593823 | 674883 |
| **Total NFU Exports EU-15** | **2266828** | **746798** | **719238** | **837809** | **857699** | **1210509** | **1110663** | **872178** | **828774** | **774503** | **884241** |
| Fish/marine mammal, fat, oil | 0 | 0 | 0 | 0 | 43 | 22 | 32 | 24 | 8 | 7 | 15 |
| Flour, meal unfit for human consumption | 6793 | 4898 | 2444 | 3976 | 8567 | 6696 | 11704 | 4735 | 18725 | 13547 | 8366 |
| **Total NFU Exports EUR-6 NC** | **6793** | **4898** | **2444** | **3976** | **8610** | **6718** | **11736** | **4759** | **18733** | **13554** | **8381** |
| Fish/marine mammal, fat, oil | 127714 | 45817 | 62696 | 57261 | 65742 | 68736 | 90553 | 73571 | 58581 | 44821 | 63086 |
| Flour, meal unfit for human consumption | 54144 | 45345 | 110520 | 143680 | 142410 | 138008 | 163260 | 215317 | 208542 | 277112 | 160466 |
| **Total NFU Exports EUR-7 NC** | **181858** | **91162** | **173216** | **200941** | **208152** | **206744** | **253813** | **288888** | **267123** | **321933** | **223552** |
| Total NFU Exports EUR-28 | 2455480 | 842858 | 894898 | 1042726 | 1074461 | 1423971 | 1376212 | 1165826 | 1114630 | 1109990 | 1116175 |

Source: database

**Table Annex 8-7: Food use net supply in net weight by OECD groups of commodities from 1989 to 1998**

(X 1000 tonnes)

| OECD group of commodities | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cephalopods | 342 | 295 | 321 | 321 | 351 | 340 | 393 | 357 | 425 | 463 | 361 |
| Crus., mol. & other aquatic inv., prepared | 69 | 79 | 92 | 87 | 85 | 86 | 86 | 100 | 99 | 89 | 87 |
| Crustaceans | 277 | 342 | 360 | 385 | 384 | 400 | 357 | 355 | 343 | 376 | 358 |
| Fish, cured | 362 | 361 | 373 | 354 | 327 | 335 | 344 | 374 | 374 | 355 | 356 |
| Fish, fillets | 745 | 888 | 924 | 946 | 948 | 978 | 992 | 1028 | 1020 | 1130 | 960 |
| Fish, fresh/chilled | 665 | 693 | 599 | 673 | 640 | 672 | 675 | 632 | 627 | 608 | 649 |
| Fish, frozen | 972 | 1090 | 1204 | 1202 | 1086 | 1051 | 936 | 904 | 767 | 735 | 995 |
| Molluscs | 139 | 151 | 165 | 221 | 197 | 149 | 147 | 156 | 158 | 168 | 165 |
| Prepared/preserved fish | 965 | 1027 | 1087 | 1130 | 1125 | 1262 | 1180 | 1264 | 1292 | 1375 | 1171 |
| **Total EU-15** | **4536** | **4928** | **5125** | **5319** | **5143** | **5271** | **5110** | **5170** | **5104** | **5299** | **5101** |
| Cephalopods | 25 | 7 | 9 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 7 |
| Crus., mol. & other aquatic inv., prepared | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| Crustaceans | 3 | 2 | 5 | 1 | 4 | 7 | 4 | 3 | 11 | 11 | 5 |
| Fish, cured | 65 | 42 | 42 | 52 | 59 | 64 | 71 | 58 | 74 | 50 | 58 |
| Fish, fillets | 72 | 78 | 77 | 10 | 51 | 155 | 153 | 95 | 94 | 116 | 90 |
| Fish, fresh/chilled | 3 | 4 | 4 | 21 | 37 | 13 | 10 | 24 | 9 | 13 | 14 |
| Fish, frozen | 134 | 86 | 40 | 133 | 180 | 185 | 139 | 137 | 180 | 183 | 140 |
| Molluscs | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Prepared/preserved fish | 88 | 65 | 57 | 74 | 92 | 94 | 96 | 162 | 182 | 184 | 109 |
| **Total EUR-6 NC** | **390** | **284** | **234** | **294** | **428** | **524** | **479** | **484** | **555** | **561** | **423** |
| Cephalopods | 5 | 3 | 3 | 10 | 6 | 5 | 2 | 3 | 1 | 7 | 5 |
| Crus., mol. & other aquatic inv., prepared | 2 | 1 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 1 |
| Crustaceans | 15 | 21 | 22 | 29 | 41 | 27 | 28 | 30 | 22 | 20 | 26 |
| Fish, cured | 40 | 20 | 11 | 28 | 16 | 15 | 16 | 10 | 12 | 13 | 18 |
| Fish, fillets | 15 | 3 | 5 | 2 | 23 | 20 | 19 | 28 | 31 | 38 | 18 |
| Fish, fresh/chilled | 55 | 20 | 51 | 32 | 52 | 66 | 75 | 72 | 82 | 103 | 61 |
| Fish, frozen | 164 | 141 | 155 | 161 | 192 | 236 | 255 | 251 | 245 | 171 | 197 |
| Molluscs | 0 | 0 | 0 | 0 | 0 | 2 | 6 | 7 | 4 | 6 | 3 |
| Prepared/preserved fish | 32 | 39 | 34 | 56 | 44 | 42 | 37 | 43 | 44 | 42 | 41 |
| **Total EUR-7 NC** | **327** | **250** | **282** | **321** | **374** | **414** | **440** | **446** | **443** | **401** | **370** |
| **Total EUR-28** | **5252** | **5462** | **5642** | **5934** | **5945** | **6209** | **6029** | **6101** | **6102** | **6262** | **5894** |

Source: database

**Table Annex 8-8: Non-food use net supply by OECD groups of commodities from 1989 to 1998**

(X 1000 tonnes net weight)

| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EU-15 Fish/marine mammal, fat, oil | 606 | 502 | 451 | 373 | 354 | 462 | 501 | 337 | 297 | 187 | 407 |
| EU-15 Flour, meal unfit for human consumption | 1288 | 1403 | 1232 | 1245 | 1128 | 1305 | 1130 | 1084 | 1368 | 1206 | 1239 |
| **Total EU-15** | **1894** | **1906** | **1683** | **1617** | **1481** | **1767** | **1631** | **1422** | **1665** | **1393** | **1646** |
| EUR-6 NC Fish/marine mammal, fat, oil | 9 | 3 | 5 | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 3 |
| EUR-6 NC Flour, meal unfit for human consumption | 79 | 60 | 86 | 103 | 114 | 132 | 131 | 103 | 106 | 102 | 102 |
| **Total EUR-6 NC** | **88** | **62** | **91** | **104** | **116** | **134** | **133** | **105** | **107** | **103** | **104** |
| EUR-7 NC Fish/marine mammal, fat, oil | 144 | 82 | 103 | 135 | 179 | 190 | 172 | 196 | 237 | 208 | 165 |
| EUR-7 NC Flour, meal unfit for human consumption | 212 | 208 | 157 | 202 | 238 | 187 | 262 | 200 | 227 | 194 | 209 |
| **Total EUR-7 NC** | **356** | **290** | **260** | **337** | **417** | **376** | **434** | **396** | **464** | **402** | **373** |
| **Total EUR-28** | **2329** | **2255** | **2029** | **2057** | **2012** | **2275** | **2196** | **1921** | **2236** | **1898** | **2121** |

Source: database

**Table Annex 8-9: Food use production in net weight by OECD groups of commodities from 2005 to 2030**

(tonnes net weight)

| OECD gp | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Cephalopods | 167847 | 190539 | 190539 | 190539 | 190539 | 190539 | 190539 |
| Crus., mol. & other aquatic inv., prepared | 73760 | 75450 | 75516 | 75583 | 75651 | 75720 | 75791 |
| Crustaceans | 81010 | 74620 | 74620 | 74620 | 74621 | 74621 | 74621 |
| Fish, cured | 196306 | 204215 | 204881 | 205604 | 206384 | 207223 | 208125 |
| Fish, fillets | 522251 | 529269 | 532597 | 535988 | 539442 | 542962 | 546548 |
| Fish, fresh/chilled | 629905 | 668328 | 673527 | 678826 | 684229 | 689739 | 695357 |
| Fish, frozen | 1236834 | 1188187 | 1188660 | 1189137 | 1189618 | 1190103 | 1190591 |
| Molluscs | 140370 | 150532 | 153116 | 155767 | 158488 | 161280 | 164147 |
| Prepared/preserved fish | 876173 | 927010 | 931541 | 936122 | 940753 | 945435 | 950169 |
| **Total FU Production EU-15** | **3924457** | **4008149** | **4024997** | **4042186** | **4059725** | **4077622** | **4095888** |
| Cephalopods | 979 | 390 | 390 | 390 | 390 | 390 | 390 |
| Crustaceans | 10787 | 18995 | 18995 | 18995 | 18995 | 18995 | 18995 |
| Fish, cured | 73778 | 64854 | 65187 | 65522 | 65860 | 66201 | 66544 |
| Fish, fillets | 82373 | 62182 | 62182 | 62182 | 62182 | 62182 | 62182 |
| Fish, fresh/chilled | 49231 | 36377 | 36507 | 36637 | 36768 | 36900 | 37034 |
| Fish, frozen | 89279 | 75638 | 75638 | 75638 | 75638 | 75638 | 75638 |
| Molluscs | 330 | 165 | 165 | 165 | 165 | 165 | 165 |
| Prepared/preserved fish | 153867 | 181145 | 181145 | 181145 | 181145 | 181145 | 181145 |
| **Total FU Production EUR-6 NC** | **460623** | **439746** | **440208** | **440674** | **441143** | **441616** | **442093** |
| Cephalopods | 1844 | 933 | 933 | 933 | 933 | 933 | 933 |
| Crus., mol. & other aquatic inv., prepared | 13984 | 17012 | 17012 | 17012 | 17012 | 17012 | 17012 |
| Crustaceans | 16534 | 13805 | 13805 | 13805 | 13805 | 13805 | 13805 |
| Fish, cured | 179287 | 176613 | 179063 | 181550 | 184074 | 186636 | 189236 |
| Fish, fillets | 182687 | 218085 | 218085 | 218085 | 218085 | 218085 | 218085 |
| Fish, fresh/chilled | 232385 | 285474 | 293506 | 301771 | 310275 | 319024 | 328026 |
| Fish, frozen | 625855 | 550251 | 550251 | 550251 | 550251 | 550251 | 550251 |
| Molluscs | 3424 | 3336 | 3336 | 3336 | 3336 | 3336 | 3336 |
| Prepared/preserved fish | 111156 | 124428 | 125024 | 125629 | 126243 | 126866 | 127498 |
| **Total FU Production EUR-7 NC** | **1367158** | **1389936** | **1401015** | **1412371** | **1424013** | **1435947** | **1448182** |
| **Total FU Production EUR-28** | **5752238** | **5837831** | **5866220** | **5895231** | **5924881** | **5955185** | **5986163** |

Source: database

**Table Annex 8-10: Food use imports in net weight by OECD groups of commodities from 2005 to 2030**

(tonnes net weight)

| OECD gp | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Cephalopods | 374757 | 445178 | 457850 | 470989 | 484613 | 498743 | 513398 |
| Crus., mol. & other aquatic inv., prepared | 78626 | 79682 | 83641 | 88007 | 92825 | 98145 | 104024 |
| Crustaceans | 527936 | 600420 | 614725 | 630481 | 647827 | 666913 | 687909 |
| Fish, cured | 298480 | 308957 | 314073 | 319842 | 326347 | 333680 | 341946 |
| Fish, fillets | 804362 | 944389 | 975218 | 1007354 | 1040857 | 1075786 | 1112207 |
| Fish, fresh/chilled | 1097707 | 1163213 | 1165023 | 1167361 | 1170250 | 1173719 | 1177800 |
| Fish, frozen | 876352 | 871456 | 852508 | 835589 | 820530 | 807176 | 795391 |
| Molluscs | 199238 | 232751 | 234166 | 235693 | 237342 | 239128 | 241063 |
| Prepared/preserved fish | 835229 | 1005805 | 1039725 | 1075626 | 1113616 | 1153809 | 1196327 |
| **Total FU Imports EU-15** | **5092687** | **5651851** | **5736928** | **5830942** | **5934206** | **6047100** | **6170067** |
| Cephalopods | 3775 | 4134 | 4143 | 4154 | 4166 | 4179 | 4194 |
| Crus., mol. & other aquatic inv., prepared | 623 | 947 | 1041 | 1147 | 1266 | 1400 | 1551 |
| Crustaceans | 7243 | 6396 | 6733 | 7093 | 7478 | 7889 | 8328 |
| Fish, cured | 5081 | 2980 | 2835 | 2709 | 2600 | 2504 | 2419 |
| Fish, fillets | 84151 | 88289 | 87799 | 87391 | 87070 | 86844 | 86720 |

| OECD gp | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Fish, fresh/chilled | 18580 | 18831 | 19880 | 21000 | 22195 | 23470 | 24833 |
| Fish, frozen | 144765 | 200817 | 207858 | 215387 | 223429 | 232014 | 241173 |
| Molluscs | 481 | 564 | 588 | 614 | 643 | 676 | 711 |
| Prepared/preserved fish | 81928 | 129219 | 146417 | 166055 | 188486 | 214111 | 243390 |
| **Total FU Imports EUR-6 NC** | **346627** | **452176** | **477295** | **505551** | **537333** | **573087** | **613318** |
| Cephalopods | 2438 | 7554 | 7591 | 7632 | 7677 | 7727 | 7781 |
| Crus., mol. & other aquatic inv., prepared | 2061 | 2495 | 2492 | 2489 | 2486 | 2484 | 2481 |
| Crustaceans | 18904 | 18610 | 19036 | 19516 | 20057 | 20670 | 21363 |
| Fish, cured | 6949 | 9352 | 9480 | 9615 | 9757 | 9909 | 10069 |
| Fish, fillets | 20120 | 25179 | 28050 | 31271 | 34890 | 38957 | 43534 |
| Fish, fresh/chilled | 199432 | 243765 | 247838 | 252405 | 257536 | 263309 | 269819 |
| Fish, frozen | 139286 | 200388 | 207898 | 216077 | 224994 | 234727 | 245363 |
| Molluscs | 4558 | 4155 | 4656 | 5219 | 5853 | 6566 | 7368 |
| Prepared/preserved fish | 28434 | 43201 | 47189 | 51807 | 57176 | 63437 | 70761 |
| **Total FU Imports EUR-7 NC** | **422182** | **554699** | **574229** | **596032** | **620426** | **647784** | **678539** |
| **Total FU Imports EUR-28** | **5861496** | **6658727** | **6788452** | **6932524** | **7091966** | **7267971** | **7461924** |

Source: database

### Table Annex 8-11: Non-food use imports in net weight by OECD groups of commodities from 2005 to 2030

(tonnes net weight)

| OECD gp | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Fish/marine mammal, fat, oil | 373414 | 180362 | 180362 | 180362 | 180362 | 180362 | 180362 |
| Flour, meal unfit for human consumption | 1344847 | 1213103 | 1213103 | 1213103 | 1213103 | 1213103 | 1213103 |
| **Total NFU Imports EU-15** | **1718261** | **1393465** | **1393465** | **1393465** | **1393465** | **1393465** | **1393465** |
| Fish/marine mammal, fat, oil | 1285 | 457 | 457 | 457 | 457 | 457 | 457 |
| Flour, meal unfit for human consumption | 74442 | 63244 | 63244 | 63244 | 63244 | 63244 | 63244 |
| **Total NFU Imports EUR-6 NC** | **75727** | **63701** | **63701** | **63701** | **63701** | **63701** | **63701** |
| Fish/marine mammal, fat, oil | 170611 | 165147 | 169872 | 174734 | 179736 | 184883 | 190179 |
| Flour, meal unfit for human consumption | 151645 | 150317 | 153321 | 156411 | 159590 | 162861 | 166227 |
| **Total NFU Imports EUR-7 NC** | **322257** | **315465** | **323193** | **331145** | **339326** | **347744** | **356406** |
| **Total NFU Imports EUR-28** | **2116245** | **1772631** | **1780359** | **1788311** | **1796492** | **1804910** | **1813572** |

Source: database

### Table Annex 8-12: Food use exports in net weight by OECD groups of commodities from 2005 to 2030

(tonnes net weight)

| OECD gp | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Cephalopods | 147007 | 155431 | 155431 | 155431 | 155431 | 155431 | 155431 |
| Crus., mol. & other aquatic inv., prepared | 60539 | 60947 | 61141 | 61343 | 61555 | 61776 | 62008 |
| Crustaceans | 242889 | 281632 | 281884 | 282139 | 282399 | 282662 | 282930 |
| Fish, cured | 138464 | 152600 | 153451 | 154383 | 155405 | 156526 | 157754 |
| Fish, fillets | 297040 | 298293 | 298293 | 298293 | 298293 | 298293 | 298293 |
| Fish, fresh/chilled | 1084772 | 1220519 | 1225074 | 1229709 | 1234425 | 1239224 | 1244107 |
| Fish, frozen | 1234616 | 1357034 | 1358939 | 1360907 | 1362939 | 1365038 | 1367207 |
| Molluscs | 184007 | 210334 | 210908 | 211489 | 212078 | 212675 | 213280 |
| Prepared/preserved fish | 436882 | 507576 | 507576 | 507576 | 507576 | 507576 | 507576 |
| **Total FU Exports EU-15** | **3826216** | **4244366** | **4252696** | **4261270** | **4270101** | **4279202** | **4288586** |
| Cephalopods | 602 | 177 | 177 | 177 | 177 | 177 | 177 |
| Crus., mol. & other aquatic inv., prepared | 199 | 75 | 75 | 75 | 75 | 75 | 75 |
| Crustaceans | 10761 | 13964 | 13964 | 13964 | 13964 | 13964 | 13964 |
| Fish, cured | 15367 | 18206 | 18395 | 18595 | 18805 | 19027 | 19260 |
| Fish, fillets | 43999 | 35704 | 35704 | 35704 | 35704 | 35704 | 35704 |

| OECD gp | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Fish, fresh/chilled | 53969 | 40824 | 40824 | 40824 | 40824 | 40824 | 40824 |
| Fish, frozen | 69356 | 84643 | 84643 | 84643 | 84643 | 84643 | 84643 |
| Molluscs | 340 | 135 | 135 | 135 | 135 | 135 | 135 |
| Prepared/preserved fish | 92198 | 106144 | 106144 | 106144 | 106144 | 106144 | 106144 |
| **Total FU Exports EUR-6 NC** | **286790** | **299872** | **300061** | **300261** | **300471** | **300693** | **300926** |
| Cephalopods | 557 | 1338 | 1338 | 1338 | 1338 | 1338 | 1338 |
| Crus., mol. & other aquatic inv., prepared | 14344 | 18154 | 18154 | 18154 | 18154 | 18154 | 18154 |
| Crustaceans | 10082 | 12085 | 12085 | 12085 | 12085 | 12085 | 12085 |
| Fish, cured | 172908 | 172531 | 175093 | 177694 | 180334 | 183015 | 185736 |
| Fish, fillets | 175626 | 201976 | 201976 | 201976 | 201976 | 201976 | 201976 |
| Fish, fresh/chilled | 352123 | 420868 | 428260 | 435782 | 443438 | 451230 | 459159 |
| Fish, frozen | 533470 | 569775 | 569775 | 569775 | 569775 | 569775 | 569775 |
| Molluscs | 3060 | 1103 | 1103 | 1103 | 1103 | 1103 | 1103 |
| Prepared/preserved fish | 98088 | 120237 | 120237 | 120237 | 120237 | 120237 | 120237 |
| **Total FU Exports EUR-7 NC** | **1360258** | **1518067** | **1528020** | **1538144** | **1548440** | **1558912** | **1569563** |
| **Total FU Exports EUR-28** | **5473265** | **6062305** | **6080778** | **6099675** | **6119012** | **6138806** | **6159076** |

Source: database

**Table Annex 8-13: Food use net supply by OECD groups of commodities from 2005 to 2030**

(X 1000 tonnes net weight)

| OECD group of commodities | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Cephalopods | 396 | 480 | 493 | 506 | 520 | 534 | 549 |
| Crus., mol. & other aquatic inv., prepared | 92 | 94 | 98 | 102 | 107 | 112 | 118 |
| Crustaceans | 366 | 393 | 407 | 423 | 440 | 459 | 480 |
| Fish, cured | 356 | 361 | 366 | 371 | 377 | 384 | 392 |
| Fish, fillets | 1030 | 1175 | 1210 | 1245 | 1282 | 1320 | 1360 |
| Fish, fresh/chilled | 643 | 611 | 613 | 616 | 620 | 624 | 629 |
| Fish, frozen | 879 | 703 | 682 | 664 | 647 | 632 | 619 |
| Molluscs | 156 | 173 | 176 | 180 | 184 | 188 | 192 |
| Prepared/preserved fish | 1275 | 1425 | 1464 | 1504 | 1547 | 1592 | 1639 |
| **Total EU-15** | **5191** | **5416** | **5509** | **5612** | **5724** | **5846** | **5977** |
| Cephalopods | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Crus., mol. & other aquatic inv., prepared | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| Crustaceans | 7 | 11 | 12 | 12 | 13 | 13 | 13 |
| Fish, cured | 63 | 50 | 50 | 50 | 50 | 50 | 50 |
| Fish, fillets | 123 | 115 | 114 | 114 | 114 | 113 | 113 |
| Fish, fresh/chilled | 14 | 14 | 16 | 17 | 18 | 20 | 21 |
| Fish, frozen | 165 | 192 | 199 | 206 | 214 | 223 | 232 |
| Molluscs | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| Prepared/preserved fish | 144 | 204 | 221 | 241 | 263 | 289 | 318 |
| **Total EUR-6 NC** | **520** | **592** | **617** | **646** | **678** | **714** | **754** |
| Cephalopods | 4 | 7 | 7 | 7 | 7 | 7 | 7 |
| Crus., mol. & other aquatic inv., prepared | 2 | 1 | 1 | 1 | 1 | 1 | 1 |
| Crustaceans | 25 | 20 | 21 | 21 | 22 | 22 | 23 |
| Fish, cured | 13 | 13 | 13 | 13 | 13 | 14 | 14 |
| Fish, fillets | 27 | 41 | 44 | 47 | 51 | 55 | 60 |
| Fish, fresh/chilled | 80 | 108 | 113 | 118 | 124 | 131 | 139 |
| Fish, frozen | 232 | 181 | 188 | 197 | 205 | 215 | 226 |
| Molluscs | 5 | 6 | 7 | 7 | 8 | 9 | 10 |
| Prepared/preserved fish | 42 | 47 | 52 | 57 | 63 | 70 | 78 |
| **Total EUR-7 NC** | **429** | **427** | **447** | **470** | **496** | **525** | **557** |
| **Total EUR-28** | **6140** | **6434** | **6574** | **6728** | **6898** | **7084** | **7289** |

Source: database

## ANNEX 9: EUROPEAN IMPORTS CONTROLS[54]

Principles for veterinary checks are laid down in Directive 97/78. Inspections of consignments originating from third countries must be carried out on all consignments, at the first point of entry into the EU territory and in approved border inspection posts. Import controls are done in three consecutive steps:

- documentary check: examination of the health certificate;

- identity check: visual inspection to confirm consistency between documents and products, verification for the presence of required sanitary marks (country of origin, approval number);

- physical check: check on the product itself (organoleptic control, packaging, temperature), it may include sampling and laboratory testing. Each shipment must be accompanied by a sanitary certificate following the model drawn up by EU Decision 2001/65/EC for fishery and aquaculture products and 1996/333/Ec for shellfish(see below). A certificate may be issued for goods produced in different establishments, but can only be made to one consignee. A certificate may be issued for several containers of the same product considered to be a single lot.

It must be noted that a certificate defines a lot; therefore a rejection may be decided for all goods covered by the same certificate, even if only a part of it presents a sanitary or documentary problem.

The certificate must be issued in one of the official languages of the country of entry into the EU territory, and if necessary in the language of the country of destination. In practice, the veterinary office of the point of entry into the EU does the documentary check and issues an "Annex B" which as to be in the language of the country of destination.

Each import control (one certificate = one control) is subject to inspection fees. In the case of processed food containing animal products (surimi for example), the European importer must have a "import licence" from the Customs Authorities before the import process occurs.

Products imported from "harmonized" countries are subject to the documentary, identity and physical checks at the approved border inspection post at the first point of entry into the EU territory. When such a consignment satisfies EU requirements, it is then considered as an EU product. That is to say that if a consignment can be marketed in one Member State, it can be marketed in all the others without being subject to non-harmonized rules.

If the documentary and the identity checks must be performed on all consignments, the frequency of physical checks is reduced for products from "harmonized" countries from a theoretical 100 per cent to a theoretical 20 percent for fish products in hermetically sealed containers, for fresh and frozen fish, for dry and/or salted products, to 50 percent for other fishery products and for bivalve mollusks.

[54] From: http://www.nmfs.noaa.gov/trade/EUCONTENTS.htm#_Toc451577954

The "China Case":

The European Union has adopted on January 30, 2002, the Decision 2002/69/EC concerning certain protective measures with regards to the products of animal origin imported from China. This ban is the consequence of an inspection conducted in China that revealed a very poor residue inspection system on the one hand, and of the presence of antibiotic (Chloramphenicol) in shrimps imported from the Chinese territory on the other hand.

As a consequence:

- All seafood products coming from China are concerned by this ban except fish caught, frozen, packed "on board" and landed within the Community territory. This derogation doesn't apply to crustaceans.

- US products exported to China for processing are also concerned by this ban.

- All Aquaculture products coming from China are prohibited within the EU.

The Commission reviewed its ban on July 2002 and authorized certain species to enter the EU Territory under very strict conditions. 20 percent of all shipments coming from China are subject to tests and analysis in order to detect the presence of antibiotics such as Chloramphenicol and Nitrofurans. These tests are to the expenses of the exporter/importer and lead to a 2 to 3 weeks delay. The list[55] of products of animal origin intended for human consumption or animal feed use authorized to be imported into the Community, subject to a chemical test under the conditions of Article 3 of Decision 2002/69/EC (last amended by Decision 2002/573/EC), is as follow:

1. Entire fish, fish de-headed and gutted, and fish fillets from the following species caught at sea:

Alaska Pollack (*Theragra chalcogramma*)
Cod (*Gadus* spp.)
Redfish (*Sebastes* spp.)
Blue Whiting (*Micromesistius poutassou*)
Halibut (*Reinhardtius* spp.)
Haddock (*Melanogrammus aeglefinus*)
Herring (*Clupea* spp.)
Yellowfin sole (*Limanda* spp.)
Cephalopods (*Sepiidae, Sepiolidae, Loliginidae, Ommastrephidae, Octopodidae*)
Plaice (*Pleuronectes platessa*)
Pacific Salmon (*Oncorhynchus keta, O. kisutch, O. nerka, O. gorbuscha*)

2. Fillets of salmon (Salmon salar)

3. Casings.

[55] This list is dated from July 2002 and may be subject to changes in function of the review of the decision.

# ANNEX 10: NON-FOOD USE PRODUCTION, EXPORTS, IMPORTS

### Table Annex 10-1: Non-food use production by FAO groups of species from 1989 to 1998

(tonnes live weight)

| Gp Species | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Marine fish, pelagic, small | 1858269 | 1465111 | 1549292 | 1713567 | 1376956 | 1602342 | 1678609 | 1414547 | 1529152 | 1447255 | 1563510 |
| Marine fish, demersal | 177869 | 161738 | 138928 | 122541 | 135299 | 139433 | 129297 | 75021 | 71080 | 51777 | 120298 |
| Marine fish, others | 347999 | 286732 | 342471 | 454445 | 309851 | 429847 | 546605 | 417495 | 436539 | 402869 | 397485 |
| **Total NFU Production EU-15** | **2384137** | **1913582** | **2030691** | **2290553** | **1822107** | **2171622** | **2354511** | **1907062** | **2036771** | **1901901** | **2081294** |
| Marine fish, pelagic, small | 0 | 0 | 0 | 834 | 6970 | 2958 | 5296 | 3832 | 27003 | 18324 | 6522 |
| Marine fish, demersal | 71485 | 63582 | 62060 | 69915 | 56190 | 61479 | 49293 | 33735 | 33425 | 32456 | 53362 |
| Marine fish, others | 20578 | 18247 | 17733 | 16371 | 10094 | 13741 | 12708 | 9820 | 7318 | 4679 | 13129 |
| **Total NFU Production EUR-6 NC** | **92064** | **81829** | **79793** | **87119** | **73254** | **78177** | **67297** | **47387** | **67746** | **55459** | **73012** |
| Marine fish, pelagic, small | 764096 | 645773 | 814101 | 1031538 | 1008850 | 595673 | 697747 | 695868 | 840589 | 1020641 | 811488 |
| Marine fish, demersal | 21412 | 13703 | 23148 | 17902 | 12410 | 10453 | 18560 | 14136 | 12837 | 12819 | 15738 |
| Marine fish, others | 46338 | 194807 | 345890 | 452269 | 431134 | 336762 | 246302 | 248565 | 296267 | 295349 | 289368 |
| Aquatic mammals | 1398 | 1378 | 1179 | 1129 | 694 | 1234 | 1245 | 748 | 0 | 0 | 901 |
| **Total NFU Production EUR-7 NC** | **833244** | **855661** | **1184318** | **1502837** | **1453088** | **944122** | **963855** | **959318** | **1149692** | **1328810** | **1117495** |
| **Total NFU Production EUR-28** | **3309445** | **2851072** | **3294802** | **3880509** | **3348449** | **3193921** | **3385664** | **2913768** | **3254210** | **3286169** | **3271801** |

Source: Database

### Table Annex 10-2: Non-food use production by OECD groups of commodities from 1989 to 1998

(tonnes live weight)

| OECD gp | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fish/marine mammal, fat, oil | 301116 | 255128 | 315870 | 433049 | 296682 | 382099 | 450945 | 334830 | 330895 | 329203 | 342982 |
| Flour, meal unfit for human consumption | 2083021 | 1658454 | 1714821 | 1857504 | 1525425 | 1789523 | 1903566 | 1572233 | 1705876 | 1572698 | 1738312 |
| **Total NFU Production EU-15** | **2384137** | **1913582** | **2030691** | **2290553** | **1822107** | **2171622** | **2354511** | **1907062** | **2036771** | **1901901** | **2081294** |
| Fish/marine mammal, fat, oil | 829 | 580 | 603 | 0 | 0 | 0 | 0 | 0 | 7 | 50 | 207 |
| Flour, meal unfit for human consumption | 91235 | 81249 | 79190 | 87119 | 73254 | 78177 | 67297 | 47387 | 67740 | 55409 | 72806 |
| **Total NFU Production EUR-6 NC** | **92064** | **81829** | **79793** | **87119** | **73254** | **78177** | **67297** | **47387** | **67746** | **55459** | **73012** |
| Fish/marine mammal, fat, oil | 54631 | 201231 | 356501 | 461570 | 437866 | 343803 | 253697 | 257351 | 302625 | 301139 | 297041 |
| Flour, meal unfit for human consumption | 778613 | 654430 | 827817 | 1041268 | 1015222 | 600319 | 710158 | 701967 | 847067 | 1027671 | 820453 |
| **Total NFU Production EUR-7 NC** | **833244** | **855661** | **1184318** | **1502837** | **1453088** | **944122** | **963855** | **959318** | **1149692** | **1328810** | **1117495** |
| **Total NFU Production EUR-28** | **3309445** | **2851072** | **3294802** | **3880509** | **3348449** | **3193921** | **3385664** | **2913768** | **3254210** | **3286169** | **3271801** |

Source: database

### Table Annex 10-3: Non-food use exports per country from 1989 to 1998

(tonnes live weight)

| Country | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 40011 | 41933 | 35290 | 34996 | 32923 | 30536 | 29725 | 18957 | 24859 | 23363 | 31259 |
| Belgium-Luxembourg | 96766 | 99612 | 82866 | 74293 | 71763 | 115059 | 82909 | 70877 | 82148 | 63963 | 84026 |
| Denmark | 133110 | 82309 | 46086 | 91391 | 90698 | 95741 | 97070 | 104426 | 102851 | 100002 | 94368 |
| Finland | 111241 | 114544 | 98488 | 104497 | 97133 | 117669 | 114307 | 112006 | 107785 | 98725 | 107640 |
| France | 151245 | 180800 | 164539 | 197375 | 231907 | 258402 | 262616 | 207679 | 239661 | 203447 | 209767 |
| Germany | 1194512 | 846231 | 729142 | 616830 | 602101 | 637481 | 593022 | 518980 | 628136 | 568789 | 693523 |
| Greece | 28515 | 28396 | 28990 | 29150 | 34100 | 44926 | 40162 | 44775 | 49198 | 55161 | 38337 |
| Ireland | 19138 | 27825 | 30891 | 24349 | 32344 | 36299 | 38840 | 42903 | 36087 | 22167 | 31084 |
| Italy | 160568 | 189070 | 177976 | 182721 | 176997 | 206233 | 206311 | 183520 | 189326 | 149642 | 182236 |
| Netherlands | 689660 | 721412 | 568741 | 490003 | 534331 | 1011143 | 892857 | 454690 | 394377 | 183316 | 594053 |
| Portugal | 4359 | 4867 | 4690 | 6660 | 7085 | 13303 | 12261 | 24217 | 29987 | 20347 | 12778 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Spain | 59196 | 51661 | 56632 | 48767 | 83207 | 136861 | 129027 | 124282 | 164922 | 129909 | 98446 |
| Sweden | 148340 | 150442 | 111254 | 92719 | 46610 | 44454 | 45717 | 32076 | 35981 | 24647 | 73224 |
| United Kingdom | 847909 | 797512 | 684974 | 656743 | 701059 | 732870 | 679444 | 537545 | 570104 | 455631 | 666379 |
| **Total EU-15** | **3684571** | **3336613** | **2820560** | **2650493** | **2742259** | **3480976** | **3224267** | **2476931** | **2655421** | **2099109** | **2917120** |
| Cyprus | 6575 | 7920 | 7785 | 8881 | 8408 | 9064 | 9503 | 8777 | 8721 | 8768 | 8440 |
| Czech Republic | 0 | 0 | 0 | 0 | 24324 | 24325 | 26850 | 23077 | 21161 | 15613 | 13535 |
| Estonia | 0 | 0 | 0 | 0 | 1284 | 1096 | 10059 | 2316 | 3767 | 1469 | 1999 |
| Hungary | 0 | 0 | 34176 | 38152 | 39017 | 52488 | 59850 | 45308 | 42408 | 45506 | 35690 |
| Poland | 102171 | 14814 | 17400 | 8146 | 8604 | 6114 | 4549 | 4176 | 4984 | 2776 | 17374 |
| Slovenia | 0 | 0 | 0 | 6985 | 5634 | 7117 | 6475 | 4401 | 4585 | 3414 | 3861 |
| **Total EUR-6 NC** | **108746** | **22734** | **59360** | **62164** | **87271** | **100204** | **117286** | **88055** | **85625** | **77546** | **80899** |
| Bulgaria | 0 | 0 | 0 | 0 | 1101 | 11464 | 12494 | 10758 | 6242 | 6004 | 4806 |
| Latvia | 0 | 0 | 0 | 0 | 234 | 5033 | 6758 | 1634 | 529 | 1272 | 1546 |
| Lithuania | 0 | 0 | 0 | 0 | 0 | 11084 | 12992 | 10911 | 12732 | 15266 | 6298 |
| Malta | 0 | 2855 | 3347 | 3918 | 3536 | 4098 | 4773 | 3954 | 3521 | 2740 | 3274 |
| Norway | 373879 | 251437 | 272995 | 278480 | 390784 | 489155 | 839400 | 801747 | 938915 | 730808 | 536760 |
| Romania | 11724 | 70564 | 13770 | 6704 | 21427 | 15804 | 16048 | 28435 | 15720 | 21813 | 22201 |
| Slovakia | 0 | 0 | 0 | 0 | 13310 | 14641 | 13020 | 11957 | 13142 | 11482 | 7755 |
| **Total EUR-7 NC** | **385603** | **324855** | **290113** | **289103** | **430392** | **551280** | **905484** | **869396** | **990802** | **789384** | **582641** |
| **Total EUR-28** | **4178920** | **3684202** | **3170033** | **3001760** | **3259922** | **4132460** | **4247037** | **3434382** | **3731849** | **2966039** | **3580660** |

Source: Database

### Table Annex 10-4: Non-food use imports by FAO groups of species from 1989 to 1998

(tonnes live weight)

| Gp Species | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Marine fish, pelagic, small | 1490976 | 1428440 | 1134158 | 1233140 | 1328327 | 1703009 | 1354786 | 1209358 | 1433630 | 1190931 | 1350676 |
| Marine fish, others | 2189415 | 1853416 | 1631995 | 1355600 | 1379472 | 1740954 | 1821647 | 1210883 | 1162183 | 846801 | 1519237 |
| Crustaceans | 147 | 26 | 167 | 97 | 196 | 29 | 0 | 0 | 0 | 0 | 66 |
| Aquatic animals | 459 | 51664 | 53000 | 58348 | 31626 | 34836 | 44308 | 53632 | 55186 | 57991 | 44105 |
| Aquatic mammals | 3574 | 3067 | 1240 | 3308 | 2637 | 2148 | 3527 | 3058 | 4422 | 3387 | 3037 |
| **Total NFU Imports EU-15** | **3684571** | **3336613** | **2820560** | **2650493** | **2742259** | **3480976** | **3224267** | **2476931** | **2655421** | **2099109** | **2917120** |
| Marine fish, pelagic, small | 84451 | 15112 | 45146 | 58019 | 81971 | 92290 | 110762 | 80888 | 80726 | 74778 | 72414 |
| Marine fish, others | 24292 | 7621 | 14157 | 4140 | 5293 | 6822 | 5629 | 6700 | 4525 | 2403 | 8158 |
| Aquatic animals | 2 | 1 | 57 | 6 | 7 | 867 | 894 | 467 | 374 | 365 | 304 |
| Aquatic mammals | 0 | 0 | 0 | 0 | 0 | 226 | 0 | 0 | 0 | 0 | 23 |
| **Total NFU Imports EUR-6 NC** | **108746** | **22734** | **59360** | **62164** | **87271** | **100204** | **117286** | **88055** | **85625** | **77546** | **80899** |
| Marine fish, pelagic, small | 57338 | 97922 | 64346 | 71540 | 89601 | 132738 | 63197 | 64377 | 49254 | 55534 | 74585 |
| Marine fish, demersal | 1377 | 1283 | 1455 | 639 | 613 | 1284 | 3691 | 2640 | 1535 | 617 | 1513 |
| Marine fish, others | 326888 | 223533 | 221531 | 215410 | 339071 | 415551 | 835841 | 800358 | 938972 | 732568 | 504972 |
| Aquatic animals | 0 | 0 | 0 | 0 | 0 | 55 | 582 | 651 | 164 | 290 | 174 |
| Aquatic mammals | 0 | 2117 | 2781 | 1513 | 1107 | 1652 | 2173 | 1370 | 877 | 375 | 1397 |
| **Total NFU Imports EUR-7 NC** | **385603** | **324855** | **290113** | **289103** | **430392** | **551280** | **905484** | **869396** | **990802** | **789384** | **582641** |
| **Total NFU Imports EUR-28** | **4178920** | **3684202** | **3170033** | **3001760** | **3259922** | **4132460** | **4247037** | **3434382** | **3731849** | **2966039** | **3580660** |

Source: Database

### Table Annex 10-5: Non-food use imports by OECD groups of commodities from 1989 to 1998

(tonnes live weight)

| OECD gp | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fish/marine mammal, fat, oil | 1876436 | 1571557 | 1366304 | 1118340 | 1163893 | 1467155 | 1633917 | 997784 | 939927 | 535880 | 1267119 |
| Flour, meal unfit for human consumption | 1808136 | 1765055 | 1454256 | 1532154 | 1578366 | 2013821 | 1590350 | 1479147 | 1715494 | 1563229 | 1650001 |
| **Total NFU Imports EU-15** | **3684571** | **3336613** | **2820560** | **2650493** | **2742259** | **3480976** | **3224267** | **2476931** | **2655421** | **2099109** | **2917120** |
| Fish/marine mammal, fat, oil | 24291 | 7617 | 14153 | 4131 | 5288 | 5224 | 5496 | 4483 | 2573 | 1336 | 7459 |
| Flour, meal unfit for human consumption | 84455 | 15117 | 45207 | 58033 | 81984 | 94980 | 111789 | 83572 | 83053 | 76210 | 73440 |
| **Total NFU Imports EUR-6 NC** | **108746** | **22734** | **59360** | **62164** | **87271** | **100204** | **117286** | **88055** | **85625** | **77546** | **80899** |
| Fish/marine mammal, fat, oil | 328265 | 226933 | 225766 | 217562 | 340737 | 418275 | 526356 | 530167 | 607422 | 474202 | 389569 |
| Flour, meal unfit for human consumption | 57338 | 97922 | 64346 | 71540 | 89655 | 133005 | 379128 | 339229 | 383380 | 315181 | 193073 |

| OECD gp | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total NFU Imports EUR-7 NC** | **385603** | **324855** | **290113** | **289103** | **430392** | **551280** | **905484** | **869396** | **990802** | **789384** | **582641** |
| **Total NFU Imports EUR-28** | **4178920** | **3684202** | **3170033** | **3001760** | **3259922** | **4132460** | **4247037** | **3434382** | **3731849** | **2966039** | **3580660** |

Source: database

**Table Annex 10-6: Non-food use exports per country from 1989 to 1998**

(tonnes)

| Country | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 21 | 178 | 132 | 231 | 172 | 334 | 874 | 1665 | 1705 | 539 | 585 |
| Belgium-Luxembourg | 9400 | 12450 | 7032 | 5516 | 8095 | 17185 | 20416 | 16031 | 19290 | 11154 | 12657 |
| Denmark | 1482841 | 1103912 | 1220605 | 1576181 | 1194572 | 1395443 | 1512614 | 1074894 | 1084003 | 1040366 | 1268543 |
| Finland | 11 | 1214 | 164 | 116 | 238 | 2230 | 7022 | 1394 | 357 | 1329 | 1408 |
| France | 63928 | 69770 | 71322 | 85019 | 92328 | 92205 | 82029 | 66210 | 73024 | 55931 | 75177 |
| Germany | 362383 | 253348 | 164379 | 175800 | 228666 | 353823 | 306169 | 266729 | 317033 | 263811 | 269214 |
| Greece | 50 | 493 | 331 | 228 | 7234 | 764 | 1251 | 2541 | 1970 | 838 | 1570 |
| Ireland | 20922 | 17195 | 25552 | 30988 | 22721 | 20914 | 27735 | 26337 | 18151 | 18290 | 22881 |
| Italy | 19965 | 41164 | 30275 | 31103 | 28598 | 21721 | 26801 | 20115 | 16214 | 16214 | 25217 |
| Netherlands | 224124 | 123435 | 108156 | 104833 | 206599 | 418023 | 284679 | 193876 | 120855 | 88547 | 187313 |
| Portugal | 4882 | 3692 | 9073 | 8274 | 6064 | 4251 | 7165 | 6584 | 8247 | 5580 | 6381 |
| Spain | 45190 | 48417 | 48617 | 52058 | 42013 | 44765 | 29352 | 56823 | 45904 | 44395 | 45753 |
| Sweden | 13695 | 22779 | 21843 | 20658 | 27820 | 56506 | 74414 | 56631 | 49636 | 64118 | 40810 |
| United Kingdom | 19416 | 26030 | 12249 | 46965 | 53664 | 85501 | 100297 | 69753 | 53284 | 57010 | 52417 |
| **Total EU-15** | **2266828** | **1724076** | **1719729** | **2137970** | **1918784** | **2513665** | **2480819** | **1859585** | **1809671** | **1668121** | **2009925** |
| Cyprus | 0 | 24 | 0 | 0 | 120 | 0 | 28 | 48 | 0 | 0 | 22 |
| Czech Republic | | | | | 151 | 19 | 129 | 156 | 382 | 296 | 189 |
| Estonia | | | | | 3375 | 2230 | 10592 | 3744 | 3242 | 2206 | 4232 |
| Hungary | | | 6 | 56 | 78 | 1522 | 667 | 16 | 1404 | 3204 | 869 |
| Poland | 6793 | 6000 | 3000 | 3977 | 6535 | 4416 | 2940 | 1845 | 20345 | 12421 | 6827 |
| Slovenia | | | | 738 | 136 | 0 | 0 | 6 | 0 | 0 | 126 |
| **Total EUR-6 NC** | **6793** | **6024** | **3006** | **4771** | **10394** | **8187** | **14356** | **5815** | **25373** | **18128** | **10285** |
| Bulgaria | | | | | | 2018 | 6096 | 7076 | 1763 | 137 | 3418 |
| Latvia | | | | 4792 | 4637 | 4147 | 7375 | 4738 | 1512 | 1089 | 4041 |
| Lithuania | | | | | | 750 | 1130 | 5300 | 10259 | 9190 | 5326 |
| Malta | | | | | | | | | | | |
| Norway | 181858 | 190955 | 319529 | 338423 | 362330 | 375794 | 416348 | 491224 | 439969 | 630195 | 374663 |
| Romania | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 109 | 12 |
| Slovakia | | | | | 24 | 26 | 0 | 0 | 138 | 51 | 40 |
| **Total EUR-7 NC** | **181858** | **190955** | **319529** | **343214** | **366991** | **382736** | **430950** | **508349** | **453641** | **640771** | **381899** |
| **Total EUR-28** | **2455480** | **1921054** | **2042264** | **2485955** | **2296170** | **2904588** | **2926124** | **2373750** | **2288685** | **2327019** | **2402109** |

Source: Database

**Table Annex 10-7: Non-food use exports by FAO groups of species from 1989 to 1998**

(tonnes live weight)

| Gp Species | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Marine fish, pelagic, small | 1579201 | 1267582 | 1244539 | 1557457 | 1433910 | 1696022 | 1621788 | 1243959 | 1259132 | 1157921 | 1406151 |
| Marine fish, others | 687675 | 443382 | 461003 | 568950 | 480918 | 810750 | 849713 | 610306 | 544024 | 503062 | 595978 |
| Crustaceans | 0 | 0 | 1 | 25 | 21 | 24 | 0 | 0 | 0 | 0 | 7 |
| Aquatic animals | 150 | 13273 | 14508 | 11596 | 4028 | 6262 | 9296 | 5500 | 7363 | 6887 | 7886 |
| Aquatic mammals | 198 | 161 | 322 | 58 | 93 | 606 | 22 | 180 | 848 | 251 | 98 |
| **Total NFU Exports EU-15** | **2266828** | **1724076** | **1719729** | **2137970** | **1918784** | **2513665** | **2480819** | **1859585** | **1809671** | **1668121** | **2009925** |
| Marine fish, pelagic, small | 6793 | 6024 | 3006 | 4771 | 10280 | 7342 | 12569 | 5258 | 25215 | 17634 | 9889 |
| Marine fish, others | 0 | 0 | 0 | 0 | 115 | 538 | 1426 | 412 | 37 | 404 | 293 |
| Aquatic animals | 0 | 0 | 0 | 0 | 0 | 307 | 361 | 145 | 122 | 89 | 102 |
| **Total NFU Exports EUR-6 NC** | **6793** | **6024** | **3006** | **4771** | **10394** | **8187** | **14356** | **5815** | **25373** | **18128** | **10285** |
| Marine fish, pelagic, small | 54144 | 54414 | 132624 | 172416 | 170724 | 91451 | 123734 | 103353 | 80182 | 57476 | 104052 |
| Marine fish, demersal | 2073 | 2423 | 3315 | 3260 | 3006 | 5176 | 4622 | 5460 | 6259 | 5629 | 4122 |
| Marine fish, others | 125638 | 134118 | 183590 | 167532 | 193255 | 286109 | 301846 | 399487 | 367180 | 577536 | 273629 |

| Gp Species | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aquatic animals | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 42 | 20 | 130 | 19 |
| Aquatic mammals | 3 | 0 | 0 | 6 | 6 | 0 | 747 | 6 | 0 | 0 | 77 |
| **Total NFU Exports EUR-7 NC** | **181858** | **190955** | **319529** | **343214** | **366991** | **382736** | **430950** | **508349** | **453641** | **640771** | **381899** |
| **Total NFU Exports EUR-28** | **2455480** | **1921054** | **2042264** | **2485955** | **2296170** | **2904588** | **2926124** | **2373750** | **2288685** | **2327019** | **2402109** |

**Table Annex 10-8: Non-food use exports by OECD groups of commodities from 1989 to 1998**

(tonnes live weight)

| OECD gp | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fish/marine mammal, fat, oil | 384004 | 394316 | 413781 | 527530 | 460681 | 526956 | 623503 | 430299 | 433656 | 369551 | 456428 |
| Flour, meal unfit for human consumption | 1882824 | 1329759 | 1305948 | 1610440 | 1458103 | 1986709 | 1857316 | 1429287 | 1376015 | 1298570 | 1553497 |
| **Total NFU Exports EU-15** | **2266828** | **1724076** | **1719729** | **2137970** | **1918784** | **2513665** | **2480819** | **1859585** | **1809671** | **1668121** | **2009925** |
| Fish/marine mammal, fat, oil | 0 | 0 | 0 | 0 | 115 | 62 | 89 | 72 | 24 | 21 | 38 |
| Flour, meal unfit for human consumption | 6793 | 6024 | 3006 | 4771 | 10280 | 8126 | 14267 | 5743 | 25349 | 18107 | 10247 |
| **Total NFU Exports EUR-6 NC** | **6793** | **6024** | **3006** | **4771** | **10394** | **8187** | **14356** | **5815** | **25373** | **18128** | **10285** |
| Fish/marine mammal, fat, oil | 127714 | 136541 | 186905 | 170798 | 196267 | 204775 | 125116 | 104722 | 87535 | 69443 | 140982 |
| Flour, meal unfit for human consumption | 54144 | 54414 | 132624 | 172416 | 170724 | 177961 | 305834 | 403627 | 366106 | 571328 | 240918 |
| **Total NFU Exports EUR-7 NC** | **181858** | **190955** | **319529** | **343214** | **366991** | **382736** | **430950** | **508349** | **453641** | **640771** | **381899** |
| **Total NFU Exports EUR-28** | **2455480** | **1921054** | **2042264** | **2485955** | **2296170** | **2904588** | **2926124** | **2373750** | **2288685** | **2327019** | **2402109** |

Source: database

**Table Annex 10-9: Non-food use net supply by OECD groups of commodities from 1989 to 1998**

(X 1000 tonnes live weight)

| OECD group of commodities | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Fish/marine mammal, fat, oil | 1794 | 1432 | 1268 | 1024 | 1000 | 1322 | 1461 | 902 | 837 | 496 | 1154 |
| Flour, meal unfit for human consumption | 2008 | 2094 | 1863 | 1779 | 1646 | 1817 | 1637 | 1622 | 2045 | 1837 | 1835 |
| **Total EU-15** | **3802** | **3526** | **3132** | **2803** | **2646** | **3139** | **3098** | **2524** | **2883** | **2333** | **2988** |
| Fish/marine mammal, fat, oil | 25 | 8 | 15 | 4 | 5 | 5 | 5 | 4 | 3 | 1 | 8 |
| Flour, meal unfit for human consumption | 169 | 90 | 121 | 140 | 145 | 165 | 165 | 125 | 125 | 114 | 136 |
| **Total EUR-6 NC** | **194** | **99** | **136** | **145** | **150** | **170** | **170** | **130** | **128** | **115** | **144** |
| Fish/marine mammal, fat, oil | 255 | 292 | 395 | 508 | 582 | 557 | 655 | 683 | 823 | 706 | 546 |
| Flour, meal unfit for human consumption | 782 | 698 | 760 | 940 | 934 | 555 | 783 | 638 | 864 | 772 | 773 |
| **Total EUR-7 NC** | **1037** | **990** | **1155** | **1449** | **1516** | **1113** | **1438** | **1320** | **1687** | **1477** | **1318** |
| **Total EUR-28** | **5008** | **4606** | **4408** | **4392** | **4307** | **4417** | **4701** | **3970** | **4695** | **3924** | **4443** |

Source: database

**Table Annex 10-10: Non-food use net supply per country from 1989 to 1998**

(X1000 tonnes live weight)

| Country | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Average 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Austria | 40 | 42 | 35 | 35 | 33 | 30 | 29 | 17 | 23 | 23 | 31 |
| Belgium-Luxembourg | 88 | 88 | 77 | 70 | 65 | 99 | 63 | 55 | 63 | 53 | 72 |
| Denmark | 218 | 111 | 131 | 85 | 73 | 179 | 193 | 270 | 398 | 318 | 198 |
| Finland | 139 | 133 | 114 | 122 | 110 | 156 | 150 | 151 | 139 | 108 | 132 |
| France | 189 | 207 | 175 | 204 | 232 | 252 | 266 | 219 | 251 | 230 | 223 |
| Germany | 858 | 616 | 585 | 462 | 396 | 301 | 301 | 265 | 324 | 322 | 443 |
| Greece | 28 | 31 | 33 | 33 | 32 | 51 | 44 | 47 | 53 | 56 | 41 |
| Ireland | 26 | 51 | 64 | 61 | 72 | 66 | 77 | 81 | 69 | 71 | 64 |
| Italy | 152 | 159 | 159 | 156 | 156 | 192 | 190 | 175 | 185 | 145 | 167 |
| Netherlands | 466 | 598 | 461 | 385 | 328 | 593 | 608 | 261 | 274 | 95 | 407 |
| Portugal | 31 | 29 | 26 | 39 | 37 | 37 | 34 | 44 | 44 | 29 | 35 |
| Spain | 265 | 239 | 227 | 164 | 120 | 175 | 199 | 189 | 276 | 241 | 209 |
| Sweden | 190 | 181 | 142 | 151 | 105 | 104 | 122 | 87 | 69 | 84 | 124 |

| Country | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Average 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| United Kingdom | 1112 | 1040 | 903 | 836 | 888 | 904 | 822 | 662 | 714 | 558 | 844 |
| **Total EU-15** | **3802** | **3526** | **3132** | **2803** | **2646** | **3139** | **3098** | **2524** | **2883** | **2333** | **2988** |
| Cyprus | 7 | 8 | 8 | 9 | 8 | 9 | 9 | 9 | 9 | 9 | 8 |
| Czech Republic | 0 | 0 | 0 | 0 | 24 | 24 | 27 | 23 | 21 | 15 | 22 |
| Estonia | 0 | 0 | 0 | 0 | 5 | 2 | 5 | 2 | 3 | 3 | 3 |
| Hungary | 0 | 0 | 34 | 38 | 39 | 51 | 59 | 45 | 41 | 42 | 44 |
| Poland | 187 | 91 | 94 | 90 | 68 | 77 | 64 | 46 | 50 | 42 | 81 |
| Slovenia | 0 | 0 | 0 | 7 | 6 | 7 | 6 | 4 | 5 | 3 | 6 |
| **Total EUR-6 NC** | **194** | **99** | **136** | **145** | **150** | **170** | **170** | **130** | **128** | **115** | **144** |
| Bulgaria | 0 | 0 | 0 | 0 | 1 | 9 | 6 | 4 | 4 | 6 | 5 |
| Latvia | 0 | 0 | 0 | 23 | 22 | 17 | 17 | 18 | 12 | 13 | 17 |
| Lithuania | 0 | 0 | 0 | 0 | 0 | 10 | 12 | 14 | 10 | 10 | 11 |
| Malta | 0 | 3 | 3 | 4 | 4 | 4 | 5 | 4 | 4 | 3 | 3 |
| Norway | 1011 | 910 | 1133 | 1408 | 1455 | 1041 | 1369 | 1240 | 1628 | 1413 | 1261 |
| Romania | 26 | 77 | 19 | 13 | 22 | 16 | 16 | 29 | 16 | 22 | 25 |
| Slovakia | 0 | 0 | 0 | 0 | 13 | 15 | 13 | 12 | 13 | 11 | 13 |
| **Total EUR-7 NC** | **1037** | **990** | **1155** | **1449** | **1516** | **1113** | **1438** | **1320** | **1687** | **1477** | **1318** |
| **Total EUR-28** | **5033** | **4614** | **4423** | **4396** | **4312** | **4422** | **4707** | **3974** | **4697** | **3925** | **4450** |

Source: database

**Table Annex 10-11: Non-food use net supply by FAO groups of species from 1989 to 1998**

(X1000 tonnes live weight)

| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Marine fish, pelagic, small | 1770.0 | 1626.0 | 1438.9 | 1389.3 | 1271.4 | 1609.3 | 1411.6 | 1379.9 | 1703.6 | 1480.3 | 1508.0 |
| Marine fish, demersal | 177.9 | 161.7 | 138.9 | 122.5 | 135.3 | 139.4 | 129.3 | 75.0 | 71.1 | 51.8 | 120.3 |
| Marine fish, others | 1849.7 | 1696.8 | 1513.5 | 1241.1 | 1208.4 | 1360.1 | 1518.5 | 1018.1 | 1054.7 | 746.6 | 1320.7 |
| Crustaceans | 0.1 | 0.0 | 0.2 | 0.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Aquatic animals | 0.3 | 38.4 | 38.5 | 46.8 | 27.6 | 28.6 | 35.0 | 48.1 | 47.8 | 51.1 | 36.2 |
| Aquatic mammals | 3.8 | 3.2 | 1.6 | 3.4 | 2.7 | 1.5 | 3.5 | 3.2 | 5.3 | 3.1 | 3.1 |
| **EU-15 Total** | **3801.9** | **3526.1** | **3131.5** | **2803.1** | **2645.6** | **3138.9** | **3098.0** | **2524.4** | **2882.5** | **2332.9** | **2988.5** |
| Marine fish, pelagic, small | 77.7 | 9.1 | 42.1 | 54.1 | 78.7 | 87.9 | 103.5 | 79.5 | 82.5 | 75.5 | 69.0 |
| Marine fish, demersal | 71.5 | 63.6 | 62.1 | 69.9 | 56.2 | 61.5 | 49.3 | 33.7 | 33.4 | 32.5 | 53.4 |
| Marine fish, others | 44.9 | 25.9 | 31.9 | 20.5 | 15.3 | 20.0 | 16.9 | 16.1 | 11.8 | 6.7 | 21.0 |
| Aquatic animals | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.6 | 0.5 | 0.3 | 0.3 | 0.3 | 0.2 |
| Aquatic mammals | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **TotalEUR-6 NC** | **194.0** | **98.5** | **136.1** | **144.5** | **150.1** | **170.2** | **170.2** | **129.6** | **128.0** | **114.9** | **143.6** |
| Marine fish, pelagic, small | 767.3 | 689.3 | 745.8 | 930.7 | 927.7 | 637.0 | 637.2 | 656.9 | 809.7 | 1018.7 | 782.0 |
| Marine fish, demersal | 20.7 | 12.6 | 21.3 | 15.3 | 10.0 | 6.6 | 17.6 | 11.3 | 8.1 | 7.8 | 13.1 |
| Marine fish, others | 247.6 | 284.2 | 383.8 | 500.1 | 577.0 | 466.2 | 780.3 | 649.4 | 868.1 | 450.4 | 520.7 |
| Aquatic animals | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.6 | 0.6 | 0.1 | 0.2 | 0.2 |
| Aquatic mammals | 1.4 | 3.5 | 4.0 | 2.6 | 1.8 | 2.9 | 2.7 | 2.1 | 0.9 | 0.4 | 2.2 |
| **TotalEUR-7 NC** | **1037.0** | **989.6** | **1154.9** | **1448.7** | **1516.5** | **1112.7** | **1438.4** | **1320.4** | **1686.9** | **1477.4** | **1318.2** |
| **Total EUR-28** | **5032.9** | **4614.2** | **4422.6** | **4396.3** | **4312.2** | **4421.8** | **4706.6** | **3974.4** | **4697.4** | **3925.2** | **4450.4** |

Source: database

**Table Annex 10-12: EU-15 Non-food use net supply of main species from 1989 to 1998**

(X1000 tonnes live weight)

| Species | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av 89-98 | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fishes nei | 1746 | 1837 | 1386 | 892 | 1080 | 1273 | 1144 | 870 | 1110 | 716 | 1205 | 40.3% |
| Jack mackerel | 100 | 103 | 87 | 97 | 101 | 99 | 95 | 97 | 114 | 95 | 99 | 3.3% |
| Blue whiting | 173 | 158 | 135 | 114 | 129 | 135 | 126 | 72 | 68 | 46 | 116 | 3.9% |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Herring | 42 | 38 | 33 | 55 | 62 | 80 | 106 | 82 | 61 | 89 | 65 | 2.2% |
| Coral | 0 | 38 | 38 | 47 | 27 | 29 | 36 | 48 | 48 | 51 | 36 | 1.2% |
| **Sub-total** | **2062** | **2174** | **1679** | **1205** | **1398** | **1616** | **1506** | **1169** | **1401** | **997** | **1521** | **50.9%** |
| **Total other species** | **1740** | **1352** | **1453** | **1598** | **1247** | **1523** | **1592** | **1356** | **1481** | **1336** | **1468** | **49.1%** |
| **Total EU-15** | **3802** | **3526** | **3132** | **2803** | **2646** | **3139** | **3098** | **2524** | **2883** | **2333** | **2988** | **100.0%** |

Source: database

**Table Annex 10-13: EUR-6 NC Non-food use net supply of main species from 1989 to 1998**

(X1000 tonnes live weight)

| Species | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av 89-98 | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| White fishes nei | 71 | 64 | 62 | 70 | 56 | 61 | 49 | 34 | 33 | 32 | 53 | 35.5% |
| Marine fishes nei | 20 | 18 | 17 | 17 | 17 | 17 | 18 | 14 | 34 | 23 | 19 | 12.9% |
| Krill | 5 | 2 | 7 | 6 | -4 | -1 | 8 | 12 | 16 | 16 | 7 | 4.5% |
| **Sub-total** | **96** | **83** | **86** | **93** | **70** | **77** | **75** | **60** | **84** | **72** | **80** | **52.9%** |
| **Total other species** | **103** | **17** | **57** | **57** | **77** | **92** | **103** | **82** | **60** | **59** | **71** | **47.1%** |
| **Total EUR-6 NC** | **199** | **101** | **143** | **150** | **147** | **169** | **178** | **142** | **144** | **131** | **150** | **100.0%** |

Source: database

**Table Annex 10-14: EUR-7 NC Non-food use net supply of main species from 1989 to 1998**

(X1000 tonnes live weight)

| Species | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av 89-98 | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fishes nei | 250 | 327 | 315 | 398 | 495 | 507 | 830 | 698 | 900 | 491 | 521 | 39.5% |
| White fishes nei | 15 | 9 | 14 | 10 | 6 | 5 | 12 | 6 | 6 | 7 | 9 | 0.7% |
| Cod | 6 | 3 | 7 | 5 | 4 | 1 | 5 | 5 | 2 | 1 | 4 | 0.3% |
| **Sub-total** | **271** | **339** | **336** | **413** | **505** | **513** | **847** | **709** | **908** | **499** | **534** | **40.5%** |
| **Total other species** | **766** | **650** | **819** | **1035** | **1011** | **600** | **591** | **611** | **779** | **978** | **784** | **59.5%** |
| **Total EUR-7 NC** | **1037** | **990** | **1155** | **1449** | **1516** | **1113** | **1438** | **1320** | **1687** | **1477** | **1318** | **100.0%** |

Source: database

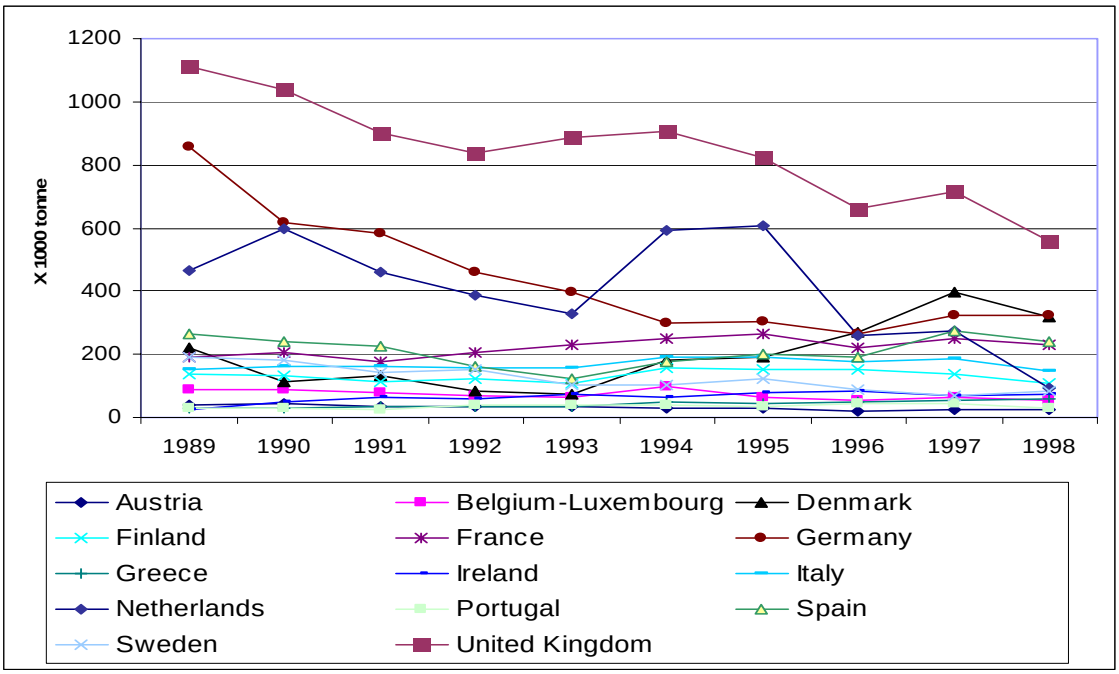


**Figure Annex 10-1: Non-food use net supply EU-15, from 1989 to 1998 (live weight)**

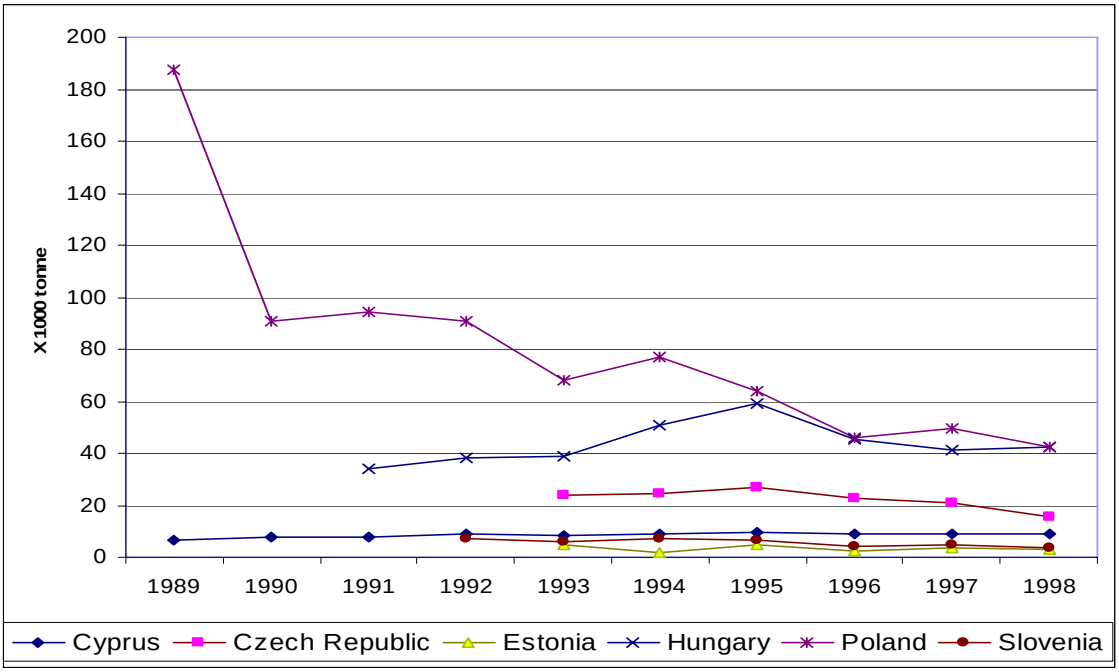


**Figure Annex 10-2: Non-food use net supply EUR-6 NC, from 1989 to 1998 (live weight)**

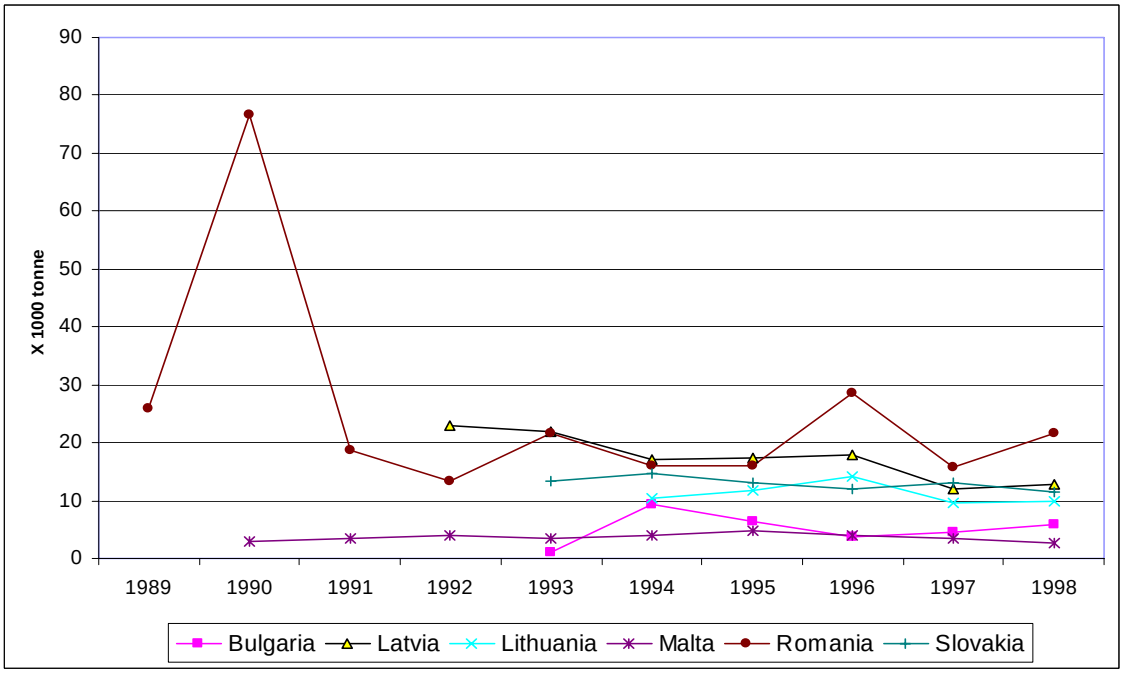


**Figure Annex 10-3: Non-food use net supply EUR-7 NC except Norway from 1989 to 1998 (live weight)**

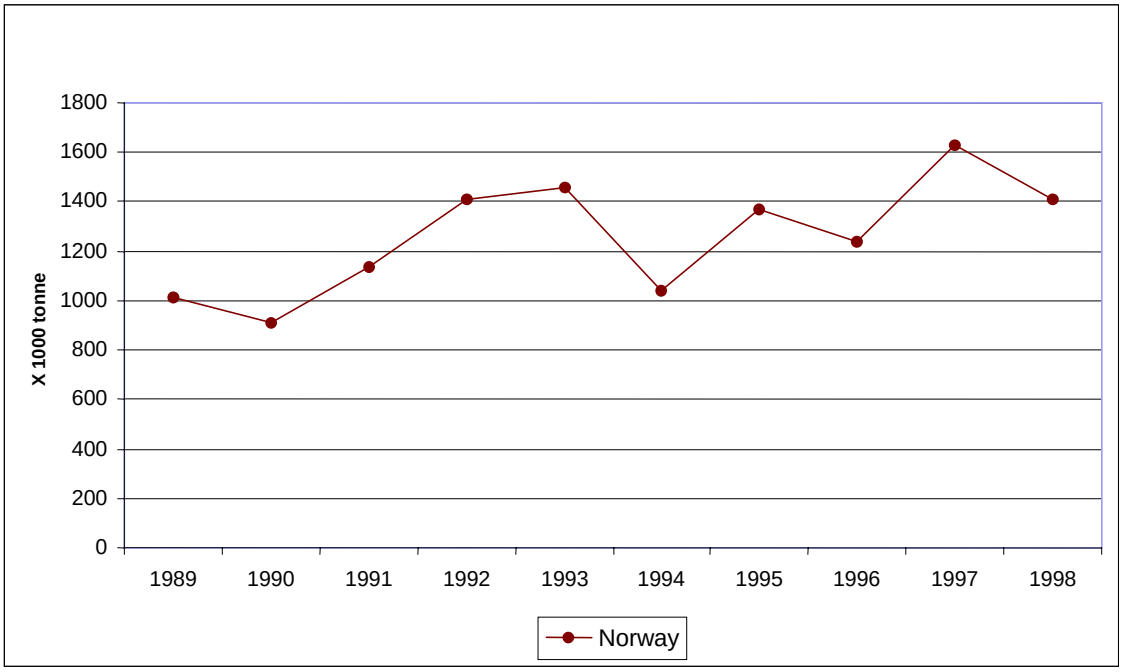


**Figure Annex 10-4: Norway non-food use net supply from 1989 to 1998 (live weight)**

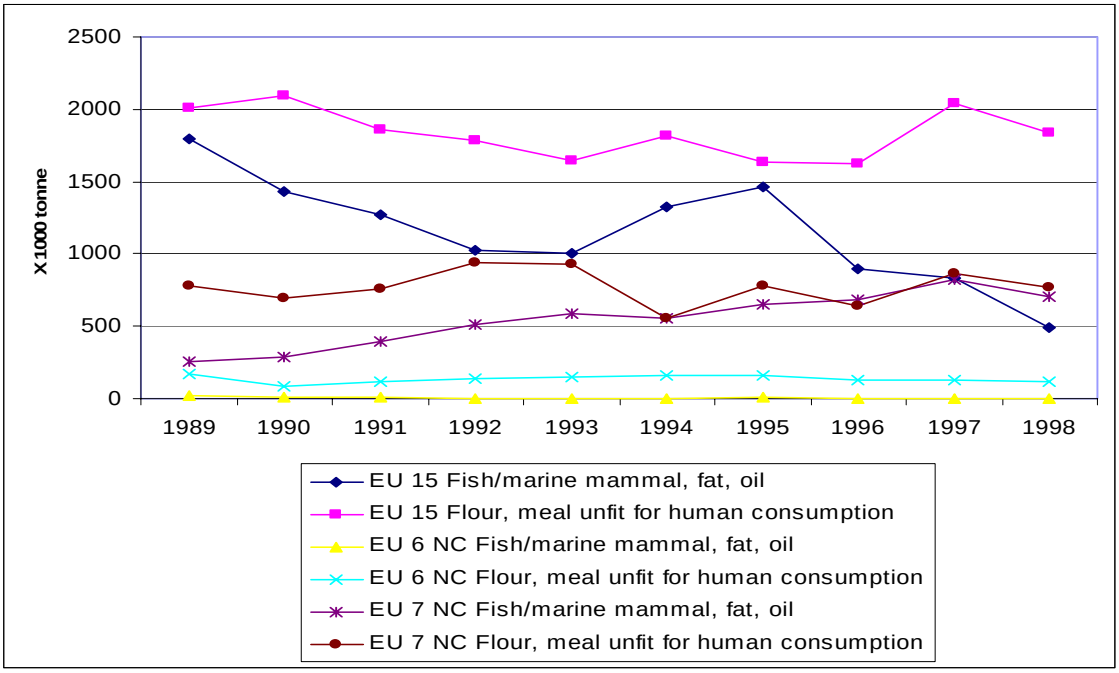


**Figure Annex 10-5: Non-food use net supply by OECD groups of commodities from 1989 to 1998 (live weight)**

# ANNEX 11: NET SUPPLY BY FAO GROUPS OF SPECIES AND SPECIES 1989-1998

**Table Annex 11-1: Food use net supply per country from 1989 to 1998**

(x 1 000 tonnes live weight)

| | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Average 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EU-15 Austria | 69 | 70 | 71 | 80 | 77 | 95 | 73 | 90 | 88 | 90 | 87 |
| EU-15 Belgium-Luxembourg | 211 | 235 | 229 | 242 | 218 | 236 | 250 | 215 | 233 | 235 | 234 |
| EU-15 Denmark | 104 | 115 | 117 | 138 | 133 | 128 | 124 | 129 | 115 | 123 | 124 |
| EU-15 Finland | 162 | 163 | 161 | 170 | 171 | 172 | 172 | 175 | 171 | 176 | 173 |
| EU-15 France | 1693 | 1825 | 1797 | 1790 | 1738 | 1759 | 1786 | 1796 | 1758 | 1865 | 1793 |
| EU-15 Germany | 887 | 982 | 909 | 939 | 960 | 1053 | 1051 | 996 | 1086 | 1202 | 1077 |
| EU-15 Greece | 199 | 214 | 228 | 237 | 242 | 270 | 265 | 271 | 293 | 276 | 275 |
| EU-15 Ireland | 77 | 71 | 65 | 65 | 84 | 69 | 81 | 68 | 77 | 78 | 75 |
| EU-15 Italy | 1211 | 1240 | 1334 | 1264 | 1244 | 1274 | 1278 | 1293 | 1276 | 1344 | 1293 |
| EU-15 Netherlands | 206 | 182 | 218 | 227 | 208 | 244 | 260 | 259 | 255 | 237 | 251 |
| EU-15 Portugal | 580 | 607 | 609 | 607 | 599 | 595 | 588 | 618 | 591 | 609 | 600 |
| EU-15 Spain | 1525 | 1556 | 1587 | 1596 | 1579 | 1593 | 1581 | 1622 | 1592 | 1619 | 1602 |
| EU-15 Sweden | 187 | 205 | 189 | 236 | 233 | 239 | 238 | 234 | 248 | 252 | 242 |
| EU-15 United Kingdom | 1254 | 1239 | 1306 | 1233 | 1280 | 1195 | 1175 | 1309 | 1353 | 1426 | 1292 |
| **TOTAL EU-15** | **8365** | **8704** | **8822** | **8824** | **8767** | **8923** | **8922** | **9075** | **9137** | **9533** | **9118** |
| EUR-21 Cyprus | 12 | 12 | 12 | 15 | 13 | 15 | 17 | 15 | 16 | 18 | 16 |
| EUR-21 Czech Republic | | | | | 76 | 96 | 93 | 104 | 101 | 94 | 98 |
| EUR-21 Estonia | | | | | 68 | 55 | 26 | 25 | 27 | 21 | 31 |
| EUR-21 Hungary | | | 40 | 39 | 36 | 40 | 37 | 35 | 40 | 43 | 39 |
| EUR-21 Poland | 553 | 433 | 354 | 379 | 359 | 500 | 485 | 426 | 478 | 439 | 466 |
| EUR-21 Slovenia | | | | 7 | 11 | 12 | 14 | 14 | 13 | 13 | 13 |
| **TOTAL NEW 6** | **565** | **446** | **406** | **440** | **564** | **718** | **672** | **619** | **676** | **628** | **663** |
| EUR-28 Bulgaria | | | | | 21 | 15 | 31 | 21 | 30 | 36 | 27 |
| EUR-28 Latvia | | | | 117 | 114 | 110 | 103 | 109 | 93 | 90 | 101 |
| EUR-28 Lithuania | | | | 174 | 120 | 77 | 44 | 90 | 67 | 55 | 67 |
| EUR-28 Malta | 8 | 10 | 11 | 13 | 6 | 8 | 10 | 10 | 11 | 12 | 10 |
| EUR-28 Norway | 191 | 191 | 194 | 198 | 200 | 202 | 206 | 199 | 204 | 203 | 203 |
| EUR-28 Romania | 213 | 149 | 122 | 90 | 43 | 66 | 80 | 60 | 42 | 71 | 64 |
| EUR-28 Slovakia | | | | | 34 | 39 | 38 | 48 | 28 | 28 | 36 |
| **TOTAL NEW 7** | **412** | **350** | **326** | **592** | **538** | **518** | **513** | **538** | **476** | **495** | **508** |
| **TOTAL EUR-28** | **9342** | **9499** | **9554** | **9856** | **9870** | **10158** | **10107** | **10232** | **10288** | **10655** | **9956** |

Source: database

**Table Annex 11-2: Food use net supply in live weight by OECD groups of commodities from 1989 to 1998**

(x 1 000 tonnes)

| OECD group of commodities | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cephalopods | 597 | 503 | 544 | 487 | 538 | 526 | 603 | 554 | 642 | 694 | 569 |
| Crus., mol. & other aquatic inv., prepared | 147 | 153 | 168 | 170 | 171 | 159 | 159 | 187 | 193 | 177 | 168 |
| Crustaceans | 473 | 581 | 613 | 642 | 638 | 638 | 585 | 577 | 569 | 646 | 596 |
| Fish, cured | 716 | 690 | 714 | 669 | 629 | 641 | 692 | 751 | 782 | 773 | 706 |
| Fish, fillets | 1272 | 1464 | 1496 | 1470 | 1508 | 1518 | 1606 | 1697 | 1732 | 1949 | 1571 |
| Fish, fresh/chilled | 927 | 1021 | 903 | 972 | 964 | 1014 | 963 | 965 | 970 | 964 | 966 |
| Fish, frozen | 2234 | 2262 | 2323 | 2226 | 2114 | 2124 | 1950 | 1796 | 1623 | 1547 | 2020 |
| Molluscs | 260 | 271 | 272 | 318 | 295 | 236 | 245 | 256 | 277 | 306 | 274 |
| Prepared/preserved fish | 1738 | 1760 | 1789 | 1869 | 1909 | 2066 | 2120 | 2291 | 2348 | 2478 | 2037 |

| OECD group of commodities | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total EU-15** | **8365** | **8704** | **8822** | **8824** | **8767** | **8923** | **8922** | **9075** | **9137** | **9533** | **8907** |
| Cephalopods | 45 | 21 | 23 | 9 | 7 | 7 | 6 | 7 | 6 | 7 | 14 |
| Crus., mol. & other aquatic inv., prepared | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |
| Crustaceans | 5 | 2 | 7 | 2 | 3 | 9 | 5 | 2 | 11 | 5 | 5 |
| Fish, cured | 91 | 63 | 62 | 77 | 83 | 86 | 98 | 72 | 84 | 50 | 76 |
| Fish, fillets | 106 | 123 | 122 | 10 | 44 | 213 | 215 | 121 | 113 | 128 | 119 |
| Fish, fresh/chilled | 5 | 5 | 6 | 31 | 42 | 11 | 12 | 26 | 8 | 15 | 16 |
| Fish, frozen | 192 | 140 | 91 | 198 | 250 | 261 | 201 | 180 | 230 | 230 | 197 |
| Molluscs | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Prepared/preserved fish | 121 | 92 | 94 | 112 | 135 | 131 | 134 | 211 | 223 | 190 | 144 |
| **Total EUR-6 NC** | **565** | **446** | **406** | **440** | **564** | **718** | **672** | **619** | **676** | **628** | **573** |
| Cephalopods | 7 | 4 | 4 | 12 | 8 | 6 | 3 | 6 | 2 | 9 | 6 |
| Crus., mol. & other aquatic inv., prepared | 2 | 3 | 3 | 3 | 2 | 2 | 5 | 2 | 3 | 3 | 3 |
| Crustaceans | 25 | 40 | 39 | 45 | 61 | 42 | 43 | 44 | 31 | 30 | 40 |
| Fish, cured | 107 | 60 | 52 | 46 | 32 | 44 | 40 | 26 | 36 | 19 | 46 |
| Fish, fillets | 7 | 19 | 7 | 8 | 17 | 26 | 29 | 34 | 29 | 88 | 27 |
| Fish, fresh/chilled | 35 | 10 | 28 | 32 | 33 | 42 | 51 | 47 | 44 | 52 | 37 |
| Fish, frozen | 145 | 119 | 109 | 311 | 243 | 247 | 250 | 279 | 227 | 173 | 210 |
| Molluscs | 2 | 3 | 1 | 2 | 1 | 3 | 11 | 11 | 9 | 12 | 5 |
| Prepared/preserved fish | 82 | 93 | 83 | 134 | 142 | 104 | 81 | 89 | 94 | 110 | 101 |
| **Total EUR-7 NC** | **412** | **350** | **326** | **592** | **538** | **518** | **513** | **538** | **476** | **495** | **476** |
| **Total EUR-28** | **9342** | **9499** | **9554** | **9856** | **9870** | **10158** | **10107** | **10232** | **10288** | **10655** | **9956** |

Source: database

**Table Annex 11-3: EU-15 Food use net supply of main species from 1989 to 1998**

(x 1 000 tonnes live weight)

| Species | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av 89-98 | %/total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tunas nei | 732 | 743 | 784 | 860 | 907 | 963 | 1042 | 1103 | 1097 | 1189 | 942 | 10.58% |
| Cod | 829 | 786 | 719 | 784 | 791 | 803 | 806 | 890 | 871 | 848 | 813 | 9.13% |
| Salmon | 323 | 386 | 436 | 446 | 425 | 484 | 529 | 587 | 598 | 615 | 483 | 5.42% |
| Shrimps nei | 332 | 438 | 469 | 552 | 555 | 524 | 473 | 501 | 483 | 555 | 488 | 5.48% |
| Herring | 324 | 361 | 308 | 320 | 422 | 437 | 404 | 382 | 432 | 462 | 385 | 4.33% |
| Hake | 431 | 410 | 433 | 352 | 360 | 403 | 360 | 387 | 379 | 373 | 389 | 4.36% |
| Common squids nei | 387 | 308 | 322 | 303 | 327 | 295 | 320 | 297 | 332 | 352 | 324 | 3.64% |
| Yellowfin tuna | 510 | 632 | 485 | 457 | 394 | 310 | 309 | 275 | 256 | 290 | 392 | 4.40% |
| Skipjack tuna | 209 | 210 | 333 | 300 | 284 | 303 | 297 | 272 | 235 | 279 | 272 | 3.06% |
| Alaska pollack | 22 | 119 | 111 | 141 | 172 | 191 | 243 | 274 | 301 | 360 | 193 | 2.17% |
| Mackerel | 320 | 283 | 326 | 336 | 256 | 243 | 278 | 281 | 246 | 185 | 275 | 3.09% |
| European pilchard | 323 | 325 | 299 | 294 | 208 | 263 | 234 | 282 | 207 | 100 | 254 | 2.85% |
| Mussel | 172 | 174 | 177 | 211 | 185 | 210 | 201 | 220 | 212 | 217 | 198 | 2.22% |
| Haddock | 161 | 137 | 136 | 132 | 168 | 174 | 185 | 228 | 221 | 243 | 178 | 2.00% |
| Anchovy | 125 | 141 | 159 | 166 | 153 | 179 | 185 | 162 | 175 | 147 | 159 | 1.79% |
| Cuttlefish | 102 | 103 | 113 | 109 | 112 | 124 | 145 | 128 | 160 | 168 | 126 | 1.42% |
| Saithe | 119 | 157 | 130 | 145 | 155 | 138 | 152 | 121 | 116 | 112 | 134 | 1.51% |
| Redfish | 115 | 146 | 140 | 130 | 136 | 123 | 113 | 114 | 109 | 110 | 123 | 1.39% |
| Plaice | 120 | 118 | 128 | 109 | 86 | 105 | 92 | 102 | 91 | 97 | 105 | 1.18% |
| Molluscs nei | 159 | 169 | 140 | 154 | 159 | 90 | 89 | 90 | 99 | 103 | 125 | 1.40% |
| **Sub total** | **5814** | **6146** | **6151** | **6300** | **6254** | **6362** | **6457** | **6695** | **6620** | **6805** | **6360** | **71.41%** |
| **Total other species** | **2551** | **2557** | **2671** | **2524** | **2513** | **2560** | **2466** | **2379** | **2516** | **2728** | **2547** | **28.59%** |
| **Toal EU-15** | **8365** | **8704** | **8822** | **8824** | **8767** | **8923** | **8922** | **9075** | **9137** | **9533** | **8907** | **100.00%** |

Source: database

**Table Annex 11-4: EUR-6 NC Food use net supply of main species from 1989 to 1998**

(x 1 000 tonnes live weight)

| Species | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av 89-98 | %/total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Herring | 82 | 58 | 48 | 68 | 64 | 166 | 208 | 119 | 130 | 121 | 82 | 18.8% |
| Mackerel | 0 | 1 | 1 | 79 | 69 | 79 | 109 | 69 | 92 | 69 | 57 | 10.0% |
| Clupeoids nei | 0 | 0 | 3 | 4 | 26 | 29 | 10 | 5 | 0 | 79 | 16 | 2.8% |
| Hake | 0 | 0 | 0 | 4 | 4 | 26 | 15 | 24 | 14 | 21 | 11 | 1.9% |
| Alaska pollack | 0 | 0 | 0 | 0 | 0 | 30 | 25 | 9 | 11 | 36 | 11 | 1.9% |
| Common squids nei | 63 | 36 | 37 | 42 | 18 | 6 | 2 | 2 | 2 | 3 | 21 | 3.7% |
| Freshwater fishes nei | 0 | 0 | 16 | 17 | 23 | 14 | 29 | 26 | 33 | 32 | 19 | 3.3% |
| Tunas nei | 1 | 1 | 1 | 3 | 5 | 5 | 8 | 9 | 10 | 14 | 6 | 1.0% |
| **Sub-total** | **146** | **96** | **105** | **216** | **210** | **356** | **406** | **261** | **291** | **374** | **246** | **43.4%** |
| **Total other species** | **414** | **348** | **295** | **218** | **358** | **364** | **259** | **346** | **368** | **237** | **321** | **56.6%** |
| **Total EUR-6 NC** | **560** | **444** | **399** | **434** | **568** | **719** | **664** | **607** | **659** | **611** | **567** | **100.0%** |

Source: database

**Table Annex 11-5: EUR-7 NC Food use net supply of main species from 1989 to 1998**

(x 1 000 tonnes live weight)

| Species | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av 89-98 | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mackerel | 61 | 53 | 99 | 70 | 98 | 117 | 124 | 159 | 116 | 196 | 109 | 23.8% |
| Cod | 95 | 79 | 85 | 65 | 18 | 104 | 108 | 129 | 118 | 165 | 97 | 21.1% |
| Clupeoids nei | -7 | 0 | 2 | 36 | 18 | 27 | 18 | 33 | 30 | 56 | 21 | 4.6% |
| Crustaceans nei | 22 | 20 | 18 | 20 | 21 | 21 | 19 | 18 | 20 | 25 | 20 | 4.4% |
| Shrimps nei | 4 | 23 | 23 | 27 | 41 | 23 | 27 | 26 | 14 | 7 | 21 | 4.7% |
| Sprat | 11 | 10 | 10 | 7 | 8 | 8 | 7 | 9 | 6 | 7 | 8 | 1.8% |
| Halibut | 2 | 6 | 12 | 7 | 7 | 4 | 2 | 3 | 1 | 3 | 5 | 1.0% |
| Molluscs nei | 4 | 5 | 2 | 3 | 3 | 3 | 6 | 6 | 10 | 12 | 5 | 1.2% |
| Hake | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 10 | 4 | 10 | 3 | 0.6% |
| Tunas nei | 0 | 2 | 4 | 5 | 3 | 4 | 6 | 6 | 5 | 7 | 4 | 0.9% |
| Char | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 8 | 6 | 9 | 4 | 0.9% |
| Cephalopods nei | 7 | 4 | 4 | 5 | 3 | 1 | 0 | 1 | 1 | 8 | 3 | 0.8% |
| European pilchard | 0 | 0 | 0 | 0 | 3 | 4 | 2 | 3 | 0 | 1 | 1 | 0.3% |
| Common squids nei | 0 | 0 | 0 | 7 | 4 | 4 | 1 | 5 | 0 | 0 | 2 | 0.4% |
| Capelin | 1 | 2 | 2 | 3 | 5 | 5 | 0 | 1 | 2 | 8 | 3 | 0.6% |
| Freshwater fishes nei | 0 | 0 | 0 | 0 | 3 | 4 | 4 | 3 | 3 | 3 | 2 | 0.4% |
| **Sub-total** | **201** | **203** | **263** | **256** | **237** | **335** | **331** | **418** | **336** | **517** | **310** | **67.5%** |
| **Total other species** | **172** | **104** | **37** | **324** | **286** | **175** | **180** | **123** | **122** | **-33** | **`149** | **32.5%** |
| **Total EUR-7 NC** | **372** | **308** | **300** | **581** | **523** | **511** | **510** | **541** | **457** | **484** | **459** | **100.0%** |

Source: database

# ANNEX 12: ACP COUNTRIES

**Table Annex 12-1**: **LAC and non-LAC within ACP group**

| ACP (77) | | | | | | |
|---|---|---|---|---|---|---|
| LAC's | | | | Non-LAC's | | |
| Africa (34) | | Caribbean (1) | Pacific (5) | Africa (14) | Caribbean (15) | Pacific (9) |
| Angola | Madagascar | Haiti | Kiribati | Botswana | Antigua et Bar. | Fiji |
| Benin | Malawi | | Salomon Isl. | Cameroon | Bahamas | Papua NG |
| Burkina Faso | Mali | | Tuvalu | Congo | Barbuda | Tonga |
| Burundi | Mauritania | | Vanuatu | Ivory-Coast | Belize | Marshall Isl. |
| Cap Verde | Mozambique | | Samoa | Gabon | Dominica | Cook isls |
| CAR | Niger | | | Ghana | Dominican Rep | Micronesia |
| Comoros | Uganda | | | Kenya | Grenada | Nauru |
| Rep. Congo | Rwanda | | | Mauritius | Guyana | Niue |
| Djibouti | Sao Tome | | | Namibia | Jamaica | Palau |
| Eritrea | Senegal | | | Nigeria | St kits and Nevis | |
| Ethiopia | Sierra Leone | | | Seychelles | St Lucia | |
| Gambia | Somalia | | | Sth Africa | St. Vincent & Gr | |
| Guinea | Sudan | | | Swaziland | Surinam | |
| Guinea Bis. | Tanzania | | | Zimbabwe | Trinidad et To. | |
| Eq. Guinea | Chad | | | | | |
| Lesotho | Togo | | | | | |
| Liberia | Zambia | | | | | |

Note: LAC: Least Developed Countries and ACP: Africa-Caribbean-Pacific.

# ANNEX 13: PRODUCTION TABLES

### Table Annex 13-1: Captures by FAO groups of species from 1989 to 1998

(tonnes)

| FAO Gp Species | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Ave 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Freshwater fish | 102161 | 101794 | 94348 | 99936 | 102978 | 97283 | 114256 | 113159 | 114032 | 117146 | 105709 |
| Diadromous fish | 39426 | 37392 | 40207 | 37288 | 35062 | 34504 | 34613 | 30210 | 30508 | 28486 | 34770 |
| Marine fish, pelagic, tunas | 462274 | 456584 | 486793 | 462935 | 495772 | 502143 | 525883 | 483556 | 439493 | 379978 | 469541 |
| Marine fish, pelagic, small | 2286048 | 2165182 | 2122177 | 2307323 | 2535148 | 2664489 | 2802572 | 2652538 | 2631509 | 2726863 | 2489385 |
| Marine fish, demersal | 3169683 | 2544942 | 2688838 | 2781594 | 2443900 | 2626173 | 2701807 | 2417490 | 2647230 | 2397146 | 2641880 |
| Marine fish, others | 135442 | 154678 | 143331 | 177352 | 185225 | 167478 | 192223 | 166473 | 137206 | 146700 | 160611 |
| Crustaceans | 179211 | 178215 | 191525 | 182534 | 179686 | 196054 | 203672 | 200649 | 227048 | 211250 | 194984 |
| Molluscs | 322751 | 311767 | 346446 | 396406 | 370201 | 344837 | 359892 | 308372 | 340120 | 381039 | 348183 |
| Cephalopods | 254973 | 217551 | 209041 | 217827 | 192235 | 206912 | 219977 | 210598 | 161255 | 149637 | 204001 |
| Others | 145701 | 142028 | 132353 | 131537 | 116959 | 137942 | 139639 | 135804 | 127745 | 121310 | 133102 |
| **Total EU-15** | **7097670** | **6310133** | **6455059** | **6794732** | **6657166** | **6977815** | **7294534** | **6718849** | **6856146** | **6659555** | **6782166** |
| Freshwater fish | 29352 | 39606 | 30742 | 36022 | 47934 | 44163 | 41010 | 38192 | 39665 | 39667 | 38635 |
| Diadromous fish | 3656 | 3803 | 1969 | 2252 | 2706 | 2504 | 2396 | 2422 | 1897 | 3116 | 2672 |
| Marine fish, pelagic, tunas | 1028 | 495 | 732 | 74 | 138 | 200 | 122 | 300 | 110 | 95 | 329 |
| Marine fish, pelagic, small | 401365 | 369740 | 355821 | 174921 | 199422 | 189479 | 189910 | 208723 | 244934 | 177259 | 251157 |
| Marine fish, demersal | 416764 | 355382 | 324417 | 344571 | 273651 | 324962 | 327102 | 186584 | 187840 | 136413 | 287769 |
| Marine fish, others | 1699 | 2048 | 2745 | 20141 | 15784 | 2808 | 1121 | 2910 | 1174 | 986 | 5142 |
| Crustaceans | 33491 | 17152 | 33173 | 10961 | 15913 | 8969 | 11765 | 23835 | 24973 | 23506 | 20374 |
| Molluscs | 0 | 0 | 0 | 1 | 0 | 1 | 6 | 5 | 10 | 12 | 4 |
| Cephalopods | 72244 | 43616 | 46892 | 33188 | 12058 | 3689 | 781 | 2737 | 304 | 414 | 21592 |
| Others | 1392 | 1216 | 908 | 0 | 0 | 411 | 548 | 163 | 2444 | 2880 | 996 |
| **Total EUR-6 NC** | **960991** | **833058** | **797399** | **622131** | **567606** | **577186** | **574761** | **465871** | **503351** | **384348** | **628670** |
| Freshwater fish | 24085 | 19528 | 15009 | 12412 | 12491 | 13952 | 12955 | 9818 | 8916 | 9582 | 13875 |
| Diadromous fish | 8991 | 3149 | 3864 | 3776 | 3013 | 3027 | 2962 | 2961 | 2967 | 3030 | 3774 |
| Marine fish, pelagic, tunas | 4407 | 8737 | 6724 | 4952 | 516 | 1526 | 786 | 1096 | 1762 | 1195 | 3170 |
| Marine fish, pelagic, small | 1569472 | 1313580 | 1880800 | 1680829 | 1458271 | 1199545 | 1224134 | 1332461 | 1380477 | 1230006 | 1426958 |
| Marine fish, demersal | 1273770 | 1070762 | 1002594 | 1054219 | 1126878 | 1283788 | 1461105 | 1442713 | 1551480 | 1675415 | 1294272 |
| Marine fish, others | 17727 | 14381 | 15795 | 24816 | 20189 | 20501 | 23618 | 19616 | 3645 | 7469 | 16776 |
| Crustaceans | 70436 | 77395 | 56876 | 50749 | 50844 | 41518 | 42953 | 46325 | 47105 | 64193 | 54839 |
| Molluscs | 6132 | 13744 | 10656 | 6915 | 10323 | 11076 | 10725 | 3343 | 4999 | 4550 | 8246 |
| Cephalopods | 51093 | 40078 | 53578 | 36808 | 20845 | 9547 | 2075 | 7372 | 204 | 14 | 22161 |
| Others | 196929 | 212585 | 205354 | 203475 | 182495 | 203448 | 201232 | 190285 | 202281 | 189408 | 198749 |
| Total EUR-7 NC | 3223042 | 2773939 | 3251250 | 3078951 | 2885865 | 2787928 | 2982545 | 3055990 | 3203836 | 3184862 | 3042821 |
| Total EUR-28 | 11281703 | 9917130 | 10503708 | 10495814 | 10110637 | 10342929 | 10851840 | 10240710 | 10563333 | 10228765 | 10453657 |

Source: database

### Table Annex 13-2: Aquaculture production by FAO groups of species from 1989 to 1998

(tonnes)

| FAO Gp Species | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Freshwater fish | 35107 | 32652 | 31467 | 29150 | 29245 | 29125 | 27884 | 27499 | 28903 | 26936 | 29797 |
| Diadromous fish | 230234 | 249684 | 264920 | 270541 | 291245 | 313118 | 329349 | 347947 | 366644 | 373837 | 303752 |
| Marine fish, pelagic, small | 3509 | 3368 | 3186 | 3300 | 3252 | 3342 | 3619 | 3727 | 3550 | 3666 | 3452 |
| Marine fish, demersal | 3700 | 7145 | 9953 | 16648 | 23507 | 26890 | 36218 | 43509 | 54162 | 67440 | 28917 |
| Marine fish, others | 0 | 0 | 0 | 0 | 0 | 0 | 68 | 325 | 595 | 1286 | 227 |
| Crustaceans | 140 | 252 | 137 | 204 | 235 | 242 | 237 | 389 | 577 | 320 | 273 |
| Molluscs | 623250 | 639430 | 628620 | 591352 | 569433 | 664211 | 712223 | 739432 | 729841 | 860237 | 675803 |

| FAO Gp Species | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Others | 43 | 5006 | 5053 | 5052 | 5070 | 5087 | 5100 | 5054 | 5054 | 3054 | 4357 |
| **Total EU-15** | **895983** | **937537** | **943336** | **916247** | **921987** | **1042015** | **1114698** | **1167882** | **1189326** | **1336776** | **1046579** |
| Freshwater fish | 42946 | 40125 | 40268 | 40574 | 43499 | 48233 | 47640 | 47618 | 47638 | 47510 | 44605 |
| Diadromous fish | 4795 | 4783 | 4993 | 5299 | 5889 | 5978 | 6601 | 7435 | 9060 | 10820 | 6565 |
| Marine fish, demersal | 26 | 52 | 60 | 71 | 186 | 282 | 386 | 733 | 931 | 1163 | 389 |
| Crustaceans | 0 | 0 | 0 | 0 | 0 | 2 | 6 | 12 | 22 | 25 | 7 |
| Molluscs | 0 | 0 | 0 | 146 | 46 | 28 | 13 | 50 | 37 | 44 | 36 |
| **Total EU 6NC** | **47767** | **44960** | **45321** | **46090** | **49620** | **54523** | **54646** | **55848** | **57688** | **59562** | **51603** |
| Freshwater fish | 67584 | 48395 | 43332 | 36275 | 31966 | 28746 | 26175 | 19861 | 17711 | 14524 | 33457 |
| Diadromous fish | 115824 | 151197 | 162136 | 138404 | 174993 | 219118 | 278373 | 322314 | 368122 | 409265 | 233975 |
| Marine fish, demersal | 0 | 0 | 200 | 732 | 1017 | 1469 | 1189 | 1750 | 2107 | 2098 | 1056 |
| Marine fish, others | 0 | 0 | 0 | 0 | 0 | 287 | 444 | 437 | 270 | 835 | 227 |
| Molluscs | 43 | 77 | 0 | 0 | 0 | 542 | 653 | 226 | 569 | 359 | 247 |
| **Total EUR-7 NC** | **183451** | **199669** | **205668** | **175411** | **207976** | **250162** | **306834** | **344588** | **388779** | **427081** | **268962** |
| **Total EUR-28** | **1127201** | **1182166** | **1194325** | **1137748** | **1179583** | **1346700** | **1476178** | **1568318** | **1635793** | **1823419** | **1367143** |

Source: Database

**Table Annex 13-3: Total production by FAO groups of species from 1989 to 1998**

(tonnes)

| FAO Gp Species | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Freshwater fish | 137268 | 134446 | 125815 | 129086 | 132223 | 126408 | 142140 | 140658 | 142935 | 144082 | 135506 |
| Diadromous fish | 269660 | 287076 | 305127 | 307829 | 326307 | 347622 | 363962 | 378157 | 397152 | 402323 | 338522 |
| Marine fish, pelagic, tunas | 462274 | 456584 | 486793 | 462935 | 495772 | 502143 | 525883 | 483556 | 439493 | 379978 | 469541 |
| Marine fish, pelagic, small | 2289557 | 2168550 | 2125363 | 2310623 | 2538400 | 2667831 | 2806191 | 2656265 | 2635059 | 2730529 | 2492837 |
| Marine fish, demersal | 3173383 | 2552087 | 2698791 | 2798242 | 2467407 | 2653063 | 2738025 | 2460999 | 2701392 | 2464586 | 2670798 |
| Marine fish, others | 135442 | 154678 | 143331 | 177352 | 185225 | 167478 | 192291 | 166798 | 137801 | 147986 | 160838 |
| Crustaceans | 179351 | 178467 | 191662 | 182738 | 179921 | 196296 | 203909 | 201038 | 227625 | 211570 | 195258 |
| Molluscs | 946001 | 951197 | 975066 | 987758 | 939634 | 1009048 | 1072115 | 1047804 | 1069961 | 1241276 | 1023986 |
| Cephalopods | 254973 | 217551 | 209041 | 217827 | 192235 | 206912 | 219977 | 210598 | 161255 | 149637 | 204001 |
| Others | 145744 | 147034 | 137406 | 136589 | 122029 | 143029 | 144739 | 140858 | 132799 | 124364 | 137459 |
| **Total EU-15** | **7993653** | **7247670** | **7398395** | **7710979** | **7579153** | **8019830** | **8409232** | **7886731** | **8045472** | **7996331** | **7828744** |
| Freshwater fish | 72298 | 79731 | 71010 | 76596 | 91433 | 92396 | 88650 | 85810 | 87303 | 87177 | 83240 |
| Diadromous fish | 8451 | 8586 | 6962 | 7551 | 8595 | 8482 | 8997 | 9857 | 10957 | 13936 | 9237 |
| Marine fish, pelagic, tunas | 1028 | 495 | 732 | 74 | 138 | 200 | 122 | 300 | 110 | 95 | 329 |
| Marine fish, pelagic, small | 401365 | 369740 | 355821 | 174921 | 199422 | 189479 | 189910 | 208723 | 244934 | 177259 | 251157 |
| Marine fish, demersal | 416790 | 355434 | 324477 | 344642 | 273837 | 325244 | 327488 | 187317 | 188771 | 137576 | 288158 |
| Marine fish, others | 1699 | 2048 | 2745 | 20141 | 15784 | 2808 | 1121 | 2910 | 1174 | 986 | 5142 |
| Crustaceans | 33491 | 17152 | 33173 | 10961 | 15913 | 8971 | 11771 | 23847 | 24995 | 23531 | 20381 |
| Molluscs | 0 | 0 | 0 | 147 | 46 | 29 | 19 | 55 | 47 | 56 | 40 |
| Cephalopods | 72244 | 43616 | 46892 | 33188 | 12058 | 3689 | 781 | 2737 | 304 | 414 | 21592 |
| Others | 1392 | 1216 | 908 | 0 | 0 | 411 | 548 | 163 | 2444 | 2880 | 996 |
| **Total EUR-6 NC** | **1008758** | **878018** | **842720** | **668221** | **617226** | **631709** | **629407** | **521719** | **561039** | **443910** | **680273** |
| Freshwater fish | 91669 | 67923 | 58341 | 48687 | 44457 | 42698 | 39130 | 29679 | 26627 | 24106 | 47332 |
| Diadromous fish | 124815 | 154346 | 166000 | 142180 | 178006 | 222145 | 281335 | 325275 | 371089 | 412295 | 237749 |
| Marine fish, pelagic, tunas | 4407 | 8737 | 6724 | 4952 | 516 | 1526 | 786 | 1096 | 1762 | 1195 | 3170 |
| Marine fish, pelagic, small | 1569472 | 1313580 | 1880800 | 1680829 | 1458271 | 1199545 | 1224134 | 1332461 | 1380477 | 1230006 | 1426958 |
| Marine fish, demersal | 1273770 | 1070762 | 1002794 | 1054951 | 1127895 | 1285257 | 1462294 | 1444463 | 1553587 | 1677513 | 1295329 |
| Marine fish, others | 17727 | 14381 | 15795 | 24816 | 20189 | 20788 | 24062 | 20053 | 3915 | 8304 | 17003 |
| Crustaceans | 70436 | 77395 | 56876 | 50749 | 50844 | 41518 | 42953 | 46325 | 47105 | 64193 | 54839 |
| Molluscs | 6175 | 13821 | 10656 | 6915 | 10323 | 11618 | 11378 | 3569 | 5568 | 4909 | 8493 |
| Cephalopods | 51093 | 40078 | 53578 | 36808 | 20845 | 9547 | 2075 | 7372 | 204 | 14 | 22161 |
| Others | 196929 | 212585 | 205354 | 203475 | 182495 | 203448 | 201232 | 190285 | 202281 | 189408 | 198749 |
| **Total EUR-7 NC** | **3406493** | **2973608** | **3456918** | **3254362** | **3093841** | **3038090** | **3289379** | **3400578** | **3592615** | **3611943** | **3311783** |
| **Total EUR-28** | **12408904** | **11099296** | **11698033** | **11633562** | **11290220** | **11689629** | **12328018** | **11809028** | **12199126** | **12052184** | **11820800** |

Source: Database

**Table Annex 13-4: Food use production by FAO groups of species from 1989 to 1998**

(tonnes live weight)

| Gp Species | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Freshwater fish | 11349 | 10011 | 10135 | 9657 | 10635 | 9197 | 8524 | 13148 | 15619 | 13373 | 11165 |
| Diadromous fish | 187773 | 183564 | 186004 | 180927 | 192599 | 188942 | 199931 | 207582 | 233748 | 256298 | 201737 |
| Marine fish, pelagic, tunas | 1032004 | 1059863 | 986622 | 985358 | 1025118 | 987829 | 1102720 | 1050693 | 1086683 | 1086381 | 1040327 |
| Marine fish, pelagic, small | 1717748 | 1636934 | 1804304 | 2033834 | 2099380 | 2021591 | 2134883 | 2095508 | 2146772 | 2092192 | 1978315 |
| Marine fish, demersal | 1111947 | 963121 | 981342 | 823781 | 872057 | 922284 | 749624 | 779822 | 766008 | 827784 | 879777 |
| Marine fish, others | 1258702 | 1198235 | 1291576 | 1391525 | 1474078 | 1451429 | 1547430 | 1528602 | 1595975 | 1658455 | 1439601 |
| Crustaceans | 194612 | 187418 | 190942 | 219735 | 236724 | 182290 | 152520 | 134240 | 147587 | 157889 | 180396 |
| Molluscs | 289564 | 286398 | 295423 | 326702 | 277109 | 274785 | 273360 | 327539 | 355252 | 339379 | 304551 |
| Cephalopods | 276755 | 209087 | 209501 | 205788 | 252668 | 234032 | 269979 | 240633 | 245006 | 281845 | 242529 |
| Aquatic animals | 3537 | 3786 | 3617 | 1714 | 2793 | 2331 | 1778 | 2086 | 2517 | 2713 | 2687 |
| **Total FU Production EU-15** | **6083989** | **5738415** | **5959468** | **6179020** | **6443161** | **6274710** | **6440747** | **6379853** | **6595167** | **6716309** | **6281084** |
| Freshwater fish | 0 | 0 | 20522 | 19489 | 45781 | 43540 | 41327 | 41559 | 46870 | 44189 | 30328 |
| Diadromous fish | 77 | 90 | 83 | 111 | 1659 | 1897 | 517 | 476 | 428 | 1008 | 635 |
| Marine fish, pelagic, small | 91407 | 65218 | 55875 | 81102 | 113793 | 139157 | 200790 | 138457 | 201314 | 173601 | 126071 |
| Marine fish, demersal | 2500 | 2160 | 2281 | 1969 | 3610 | 3339 | 5785 | 3513 | 2617 | 2996 | 3077 |
| Marine fish, others | 314518 | 288886 | 285583 | 345442 | 410145 | 448731 | 348544 | 352827 | 316920 | 219160 | 333075 |
| Crustaceans | 4822 | 1991 | 6540 | 12010 | 2690 | 5356 | 8173 | 12448 | 16648 | 16485 | 8716 |
| Molluscs | 0 | 0 | 0 | 456 | 453 | 654 | 765 | 654 | 456 | 654 | 409 |
| Cephalopods | 61737 | 35505 | 35667 | 40303 | 17109 | 5463 | 810 | 362 | 344 | 457 | 19776 |
| **Total FU Production EUR-6 NC** | **475061** | **393850** | **406550** | **500882** | **595240** | **648137** | **606711** | **550296** | **585597** | **458549** | **522087** |
| Freshwater fish | 0 | 0 | 0 | 0 | 3418 | 4242 | 4003 | 3014 | 3154 | 2416 | 2025 |
| Diadromous fish | 166931 | 196499 | 195792 | 189824 | 197985 | 225868 | 266117 | 322713 | 382163 | 414662 | 255855 |
| Marine fish, pelagic, tunas | 916 | 6357 | 3650 | 2178 | 503 | 797 | 752 | 664 | 687 | 789 | 1729 |
| Marine fish, pelagic, small | 243676 | 254425 | 350930 | 407179 | 465773 | 659447 | 724083 | 883990 | 926811 | 697461 | 561378 |
| Marine fish, demersal | 261674 | 209073 | 261718 | 279655 | 326929 | 380301 | 376744 | 424275 | 419439 | 402568 | 334238 |
| Marine fish, others | 447150 | 360035 | 323402 | 584037 | 490505 | 401714 | 449663 | 293518 | 307099 | 301663 | 395879 |
| Crustaceans | 44220 | 59630 | 53397 | 51061 | 57917 | 60211 | 42590 | 45352 | 44949 | 48543 | 50787 |
| Molluscs | 3546 | 4528 | 2392 | 2935 | 4897 | 6329 | 8020 | 6080 | 8453 | 8533 | 5571 |
| Cephalopods | 1793 | 591 | 0 | 6501 | 3544 | 4475 | 1774 | 6126 | 122 | 2128 | 2705 |
| **Total FU Production EUR-7 NC** | **1169905** | **1091138** | **1191281** | **1523370** | **1551472** | **1743384** | **1873747** | **1985730** | **2092877** | **1878762** | **1610167** |
| **Total FU Production EUR-28** | **7728956** | **7223404** | **7557299** | **8203271** | **8589873** | **8666231** | **8921205** | **8915879** | **9273641** | **9053621** | **8413338** |

Source: database

**Table Annex 13-5: Food use production by OECD groups of commodities from 1989 to 1998**

(tonnes live weight)

| OECD gp | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cephalopods | 276755 | 209087 | 209501 | 205788 | 252668 | 234032 | 269979 | 240633 | 245006 | 281845 | 242529 |
| Crus., mol. & other aquatic inv., prepared | 112315 | 101365 | 113799 | 130435 | 143097 | 122478 | 122651 | 140119 | 136588 | 137468 | 126031 |
| Crustaceans | 182286 | 172207 | 173025 | 175004 | 185408 | 168553 | 136652 | 122476 | 135651 | 142501 | 159376 |
| Fish, cured | 462787 | 427525 | 464391 | 420736 | 382294 | 391331 | 430763 | 454388 | 481860 | 503330 | 441940 |
| Fish, fillets | 895539 | 882428 | 929720 | 809730 | 880110 | 801466 | 808116 | 863122 | 878739 | 951172 | 870014 |
| Fish, fresh/chilled | 472872 | 451681 | 550435 | 628558 | 681500 | 600180 | 612975 | 621998 | 686628 | 694216 | 600104 |
| Fish, frozen | 2148095 | 1998843 | 2049244 | 2260889 | 2372359 | 2342069 | 2308527 | 2077158 | 2138062 | 2052214 | 2174746 |
| Molluscs | 193111 | 204029 | 203158 | 242711 | 188122 | 168374 | 168354 | 201269 | 233117 | 220013 | 202226 |
| Prepared/preserved fish | 1340228 | 1291250 | 1266195 | 1305169 | 1357602 | 1446227 | 1582731 | 1658690 | 1659516 | 1733552 | 1464116 |
| **Total FU Production EU-15** | **6083989** | **5738415** | **5959468** | **6179020** | **6443161** | **6274710** | **6440747** | **6379853** | **6595167** | **6716309** | **6281084** |
| Cephalopods | 61737 | 35505 | 35667 | 40303 | 17109 | 5463 | 810 | 362 | 344 | 457 | 19776 |
| Crustaceans | 4822 | 1991 | 6540 | 12010 | 2690 | 5356 | 8173 | 12448 | 16648 | 16485 | 8716 |
| Fish, cured | 77270 | 53774 | 54940 | 69710 | 80671 | 93821 | 111247 | 82359 | 103272 | 68283 | 79535 |
| Fish, fillets | 105290 | 121657 | 117889 | 134588 | 108001 | 132703 | 124425 | 99070 | 83041 | 55610 | 108227 |
| Fish, fresh/chilled | 4470 | 4708 | 8171 | 33380 | 55658 | 71315 | 55870 | 67055 | 83869 | 46090 | 43059 |
| Fish, frozen | 132716 | 112094 | 106152 | 106230 | 176405 | 168793 | 124362 | 94183 | 82309 | 91259 | 119450 |

| OECD gp | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Molluscs | 0 | 0 | 0 | 456 | 453 | 654 | 765 | 654 | 456 | 654 | 409 |
| Prepared/preserved fish | 88756 | 64121 | 77190 | 104205 | 154252 | 170032 | 181060 | 194165 | 215659 | 179711 | 142915 |
| **Total FU Production EU 6NC** | **475061** | **393850** | **406550** | **500882** | **595240** | **648137** | **606711** | **550296** | **585597** | **458549** | **522087** |
| Cephalopods | 1793 | 591 | 0 | 6501 | 3544 | 4475 | 1774 | 6126 | 122 | 2128 | 2705 |
| Crus., mol. & other aquatic inv., prepared | 21903 | 20098 | 18186 | 20573 | 20371 | 20713 | 16988 | 16173 | 20173 | 23806 | 19898 |
| Crustaceans | 22317 | 39531 | 35211 | 30488 | 37545 | 39498 | 25602 | 29179 | 24775 | 24737 | 30888 |
| Fish, cured | 226700 | 160454 | 176066 | 184115 | 201807 | 268545 | 268146 | 258388 | 250534 | 231389 | 222614 |
| Fish, fillets | 128942 | 96470 | 88317 | 137183 | 185004 | 267351 | 278804 | 303456 | 311224 | 359580 | 215633 |
| Fish, fresh/chilled | 275955 | 272770 | 239021 | 247633 | 252886 | 275285 | 297791 | 296236 | 355566 | 369914 | 288306 |
| Fish, frozen | 381483 | 383176 | 518783 | 731785 | 655318 | 698389 | 825565 | 869265 | 884823 | 651292 | 659988 |
| Molluscs | 3546 | 4528 | 2392 | 2935 | 4897 | 6329 | 8020 | 6080 | 8453 | 8533 | 5571 |
| Prepared/preserved fish | 107267 | 113518 | 113304 | 162158 | 190099 | 162799 | 151057 | 200829 | 237206 | 207383 | 164562 |
| **Total FU Production EUR-7 NC** | **1169905** | **1091138** | **1191281** | **1523370** | **1551472** | **1743384** | **1873747** | **1985730** | **2092877** | **1878762** | **1610167** |
| **Total FU Production EUR-28** | **7728956** | **7223404** | **7557299** | **8203271** | **8589873** | **8666231** | **8921205** | **8915879** | **9273641** | **9053621** | **8413338** |

Source: database

**Table Annex 13-6: Aquaculture production by FAO groups of species from 2005 to 2030**

(tonnes)

| FAO Gp Species | Av 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | % 98-30 |
|---|---|---|---|---|---|---|---|---|
| Freshwater fish | 28069 | 22567 | 20788 | 19760 | 19275 | 19189 | 19408 | -28% |
| Diadromous fish | 346179 | 395525 | 412630 | 431118 | 451039 | 472454 | 495436 | 33% |
| Marine fish, pelagic, small | 3581 | 3725 | 3830 | 4015 | 4317 | 4792 | 5526 | 51% |
| Marine fish, demersal | 45644 | 74375 | 79818 | 85711 | 92094 | 99012 | 106516 | 58% |
| Marine fish, others | 455 | 1477 | 1631 | 1801 | 1988 | 2195 | 2424 | 88% |
| Crustaceans | 353 | 347 | 375 | 408 | 446 | 489 | 537 | 68% |
| Molluscs | 741189 | 889766 | 913300 | 938666 | 965779 | 994609 | 1025169 | 19% |
| Others | 4670 | 3509 | 3875 | 4280 | 4727 | 5220 | 5765 | 89% |
| **Total EU-15** | **1170139** | **1391292** | **1436247** | **1485759** | **1539664** | **1597960** | **1660780** | 24% |
| Freshwater fish | 47728 | 45723 | 45592 | 46187 | 47390 | 49130 | 51367 | 8% |
| Diadromous fish | 7979 | 11733 | 12447 | 13220 | 14060 | 14976 | 15983 | 48% |
| Marine fish, demersal | 699 | 1336 | 1475 | 1628 | 1798 | 1985 | 2192 | 88% |
| Crustaceans | 13 | 29 | 32 | 35 | 39 | 43 | 47 | 88% |
| Molluscs | 34 | 51 | 56 | 62 | 68 | 75 | 83 | 89% |
| **Total EU 6NC** | **56453** | **58872** | **59601** | **61132** | **63355** | **66209** | **69672** | 17% |
| Freshwater fish | 21403 | 15123 | 15662 | 16315 | 17108 | 18073 | 19246 | 33% |
| Diadromous fish | 319438 | 466446 | 512269 | 562725 | 618290 | 679488 | 746897 | 82% |
| Marine fish, demersal | 1723 | 2410 | 2661 | 2938 | 3243 | 3581 | 3954 | 88% |
| Marine fish, others | 455 | 959 | 1059 | 1169 | 1291 | 1425 | 1574 | 89% |
| Molluscs | 470 | 412 | 455 | 503 | 555 | 613 | 677 | 89% |
| **Total EUR-7 NC** | **343489** | **485351** | **532106** | **583650** | **640488** | **703180** | **772347** | 81% |
| **Total EUR-28** | **1570082** | **1935515** | **2027954** | **2130541** | **2243506** | **2367349** | **2502799** | 37% |

Source: database

**Table Annex 13-7: Total production (capture and aquaculture) by country from 2005 to 2030**

(tonnes)

| Country | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Austria | 3386 | 2516 | 2139 | 1867 | 1675 | 1545 | 1461 |
| Belgium | 33266 | 33203 | 33190 | 33190 | 33202 | 33225 | 33258 |
| Denmark | 1831913 | 1835414 | 1837862 | 1840453 | 1843197 | 1846101 | 1849177 |
| Finland | 191274 | 188878 | 187844 | 186890 | 186009 | 185198 | 184451 |
| France | 938019 | 939243 | 946709 | 954902 | 963777 | 973311 | 983491 |
| Germany | 306885 | 312964 | 313809 | 315372 | 317484 | 320027 | 322923 |
| Greece | 206375 | 228941 | 233271 | 237941 | 242975 | 248401 | 254253 |
| Ireland | 394423 | 405477 | 408903 | 412630 | 416686 | 421102 | 425912 |
| Italy | 589123 | 622515 | 629115 | 636245 | 643914 | 652144 | 660965 |

| Country | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Netherlands | 553802 | 577053 | 581199 | 585529 | 590052 | 594781 | 599727 |
| Portugal | 256269 | 256689 | 256589 | 256762 | 257151 | 257719 | 258451 |
| Spain | 1362193 | 1452214 | 1462823 | 1474079 | 1486011 | 1498687 | 1512215 |
| Sweden | 393243 | 391218 | 390971 | 390774 | 390623 | 390518 | 390456 |
| United Kingdom | 1011348 | 1046347 | 1053201 | 1060505 | 1068287 | 1076581 | 1085419 |
| **Total EU-15** | **8071519** | **8292672** | **8337626** | **8387138** | **8441043** | **8499339** | **8562159** |
| Cyprus | 3310 | 3966 | 4143 | 4350 | 4592 | 4878 | 5218 |
| Czech Republic | 21794 | 23525 | 25585 | 27859 | 30370 | 33143 | 36204 |
| Estonia | 122884 | 122845 | 122845 | 122845 | 122845 | 122845 | 122845 |
| Hungary | 16937 | 14861 | 13610 | 12806 | 12311 | 12031 | 11902 |
| Poland | 389547 | 391508 | 391147 | 390884 | 390719 | 390653 | 390686 |
| Slovenia | 3084 | 3269 | 3375 | 3491 | 3620 | 3762 | 3920 |
| **Total EUR-6 NC** | **557557** | **559975** | **560705** | **562236** | **564458** | **567312** | **570775** |
| Bulgaria | 14098 | 13915 | 14451 | 15101 | 15890 | 16848 | 18014 |
| Latvia | 128046 | 128014 | 128014 | 128014 | 128014 | 128014 | 128014 |
| Lithuania | 39872 | 39757 | 39757 | 39757 | 39757 | 39757 | 39757 |
| Malta | 2290 | 3109 | 3342 | 3600 | 3884 | 4198 | 4544 |
| Norway | 3163097 | 3310400 | 3356241 | 3406716 | 3462303 | 3523524 | 3590959 |
| Romania | 36322 | 30920 | 30989 | 31066 | 31152 | 31249 | 31356 |
| Slovakia | 2796 | 2268 | 2344 | 2428 | 2520 | 2623 | 2736 |
| **Total EUR-7 NC** | **3386521** | **3528383** | **3575138** | **3626682** | **3683520** | **3746212** | **3815379** |
| **Total EUR-28** | **12015597** | **12381030** | **12473469** | **12576056** | **12689021** | **12812864** | **12948314** |

Source: database

### Table Annex 13-8: Total production (capture and aquaculture) by FAO groups of species from 2005 to 2030

(tonnes)

| FAO Gp Species | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Freshwater fish | 139245 | 133742 | 131963 | 130935 | 130450 | 130364 | 130583 |
| Diadromous fish | 377843 | 427189 | 444294 | 462782 | 482703 | 504118 | 527100 |
| Marine fish, pelagic, tunas | 466211 | 466211 | 466211 | 466211 | 466211 | 466211 | 466211 |
| Marine fish, pelagic, small | 2699175 | 2699319 | 2699424 | 2699609 | 2699911 | 2700386 | 2701120 |
| Marine fish, demersal | 2603613 | 2632344 | 2637787 | 2643680 | 2650063 | 2656982 | 2664485 |
| Marine fish, others | 162471 | 163493 | 163647 | 163817 | 164004 | 164211 | 164440 |
| Crustaceans | 208088 | 208082 | 208109 | 208142 | 208180 | 208223 | 208272 |
| Molluscs | 1088041 | 1236618 | 1260152 | 1285518 | 1312631 | 1341461 | 1372021 |
| Cephalopods | 189676 | 189676 | 189676 | 189676 | 189676 | 189676 | 189676 |
| Others | 137157 | 135997 | 136363 | 136768 | 137214 | 137708 | 138252 |
| **Total EU-15** | **8071519** | **8292672** | **8337626** | **8387138** | **8441043** | **8499339** | **8562159** |
| Freshwater fish | 88267 | 86263 | 86131 | 86727 | 87930 | 89669 | 91907 |
| Diadromous fish | 10446 | 14200 | 14914 | 15687 | 16527 | 17443 | 18450 |
| Marine fish, pelagic, tunas | 165 | 165 | 165 | 165 | 165 | 165 | 165 |
| Marine fish, pelagic, small | 202061 | 202061 | 202061 | 202061 | 202061 | 202061 | 202061 |
| Marine fish, demersal | 233279 | 233916 | 234055 | 234209 | 234378 | 234565 | 234772 |
| Marine fish, others | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 | 1800 |
| Crustaceans | 18623 | 18638 | 18641 | 18645 | 18648 | 18652 | 18657 |
| Molluscs | 41 | 57 | 63 | 68 | 75 | 82 | 90 |
| Cephalopods | 1585 | 1585 | 1585 | 1585 | 1585 | 1585 | 1585 |
| Others | 1289 | 1289 | 1289 | 1289 | 1289 | 1289 | 1289 |
| **Total EUR-6 NC** | **557557** | **559975** | **560705** | **562236** | **564458** | **567312** | **570775** |
| Freshwater fish | 32448 | 26168 | 26706 | 27359 | 28153 | 29117 | 30291 |
| Diadromous fish | 322428 | 469435 | 515258 | 565715 | 621279 | 682477 | 749886 |
| Marine fish, pelagic, tunas | 1273 | 1273 | 1273 | 1273 | 1273 | 1273 | 1273 |
| Marine fish, pelagic, small | 1273325 | 1273325 | 1273325 | 1273325 | 1273325 | 1273325 | 1273325 |
| Marine fish, demersal | 1484623 | 1485310 | 1485561 | 1485838 | 1486144 | 1486481 | 1486854 |
| Marine fish, others | 15424 | 15929 | 16029 | 16139 | 16261 | 16395 | 16543 |
| Crustaceans | 48419 | 48419 | 48419 | 48419 | 48419 | 48419 | 48419 |
| Molluscs | 7408 | 7351 | 7394 | 7441 | 7494 | 7551 | 7615 |
| Cephalopods | 3842 | 3842 | 3842 | 3842 | 3842 | 3842 | 3842 |
| Others | 197331 | 197331 | 197331 | 197331 | 197331 | 197331 | 197331 |

| FAO Gp Species | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| **Total EUR-7 NC** | **3386521** | **3528383** | **3575138** | **3626682** | **3683520** | **3746212** | **3815379** |
| **Total EUR-28** | **12015597** | **12381030** | **12473469** | **12576056** | **12689021** | **12812864** | **12948314** |

Source: database

**Table Annex 13-9: Food use commodity production by FAO groups of species from 2005 to 2030**

(tonnes live weight)

| Gp Species | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Freshwater fish | 11972 | 12765 | 12420 | 12139 | 11911 | 11729 | 11585 |
| Diadromous fish | 217300 | 257063 | 257628 | 258209 | 258806 | 259419 | 260050 |
| Marine fish, pelagic, tunas | 1062861 | 1096630 | 1104064 | 1111594 | 1119220 | 1126945 | 1134769 |
| Marine fish, pelagic, small | 2098189 | 2100069 | 2105881 | 2111858 | 2118006 | 2124335 | 2130854 |
| Marine fish, demersal | 809104 | 830035 | 831689 | 833382 | 835115 | 836889 | 838706 |
| Marine fish, others | 1556378 | 1671266 | 1680596 | 1690078 | 1699717 | 1709516 | 1719478 |
| Crustaceans | 154905 | 157891 | 157892 | 157892 | 157893 | 157894 | 157895 |
| Molluscs | 314063 | 345101 | 349309 | 353619 | 358036 | 362562 | 367199 |
| Cephalopods | 254299 | 281845 | 281845 | 281845 | 281845 | 281845 | 281845 |
| Aquatic animals | 2285 | 2770 | 2812 | 2856 | 2900 | 2946 | 2993 |
| **Total FU Production EU-15** | **6481357** | **6755435** | **6784137** | **6813473** | **6843451** | **6874081** | **6905374** |
| Freshwater fish | 43497 | 44232 | 44264 | 44296 | 44328 | 44360 | 44393 |
| Diadromous fish | 865 | 1008 | 1008 | 1008 | 1008 | 1008 | 1008 |
| Marine fish, pelagic, small | 170664 | 173785 | 173918 | 174053 | 174188 | 174324 | 174461 |
| Marine fish, demersal | 3650 | 2996 | 2996 | 2996 | 2996 | 2996 | 2996 |
| Marine fish, others | 337236 | 219607 | 219930 | 220255 | 220582 | 220912 | 221245 |
| Crustaceans | 11822 | 16485 | 16485 | 16485 | 16485 | 16485 | 16485 |
| Molluscs | 637 | 654 | 654 | 654 | 654 | 654 | 654 |
| Cephalopods | 1487 | 457 | 457 | 457 | 457 | 457 | 457 |
| **Total FU Production EUR-6 NC** | **569858** | **459225** | **459712** | **460203** | **460697** | **461196** | **461698** |
| Freshwater fish | 3366 | 2416 | 2416 | 2416 | 2416 | 2416 | 2416 |
| Diadromous fish | 322304 | 426757 | 435695 | 444890 | 454350 | 464082 | 474094 |
| Marine fish, pelagic, tunas | 738 | 789 | 789 | 789 | 789 | 789 | 789 |
| Marine fish, pelagic, small | 778359 | 698538 | 699321 | 700115 | 700922 | 701741 | 702572 |
| Marine fish, demersal | 400665 | 406119 | 408701 | 411322 | 413982 | 416682 | 419423 |
| Marine fish, others | 350731 | 306016 | 309213 | 312485 | 315835 | 319264 | 322774 |
| Crustaceans | 48329 | 48543 | 48543 | 48543 | 48543 | 48543 | 48543 |
| Molluscs | 7483 | 8533 | 8533 | 8533 | 8533 | 8533 | 8533 |
| Cephalopods | 2925 | 2128 | 2128 | 2128 | 2128 | 2128 | 2128 |
| **Total FU Production EUR-7 NC** | **1914900** | **1899838** | **1915338** | **1931222** | **1947498** | **1964178** | **1981271** |
| **Total FU Production EUR-28** | **8966115** | **9114498** | **9159187** | **9204897** | **9251646** | **9299454** | **9348344** |

Source: database

**Table Annex 13-10: Food use commodity production by OECD groups of commodities from 2005 to 2030**

(tonnes live weight)

| OECD gp | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Cephalopods | 254299 | 281845 | 281845 | 281845 | 281845 | 281845 | 281845 |
| Crus., mol. & other aquatic inv., prepared | 131861 | 137954 | 138306 | 138663 | 139025 | 139391 | 139763 |
| Crustaceans | 141167 | 142502 | 142503 | 142504 | 142505 | 142506 | 142507 |
| Fish, cured | 452334 | 505966 | 508060 | 510323 | 512754 | 515352 | 518117 |
| Fish, fillets | 860523 | 957389 | 961953 | 966624 | 971404 | 976296 | 981304 |
| Fish, fresh/chilled | 643199 | 701716 | 707198 | 712785 | 718482 | 724289 | 730211 |
| Fish, frozen | 2183606 | 2054460 | 2056079 | 2057711 | 2059355 | 2061012 | 2062681 |
| Molluscs | 198225 | 225306 | 229203 | 233201 | 237300 | 241505 | 245818 |
| Prepared/preserved fish | 1616143 | 1748297 | 1758989 | 1769817 | 1780781 | 1791885 | 1803129 |
| **Total FU Production EU-15** | **6481357** | **6755435** | **6784137** | **6813473** | **6843451** | **6874081** | **6905374** |
| Cephalopods | 1487 | 457 | 457 | 457 | 457 | 457 | 457 |
| Crustaceans | 11822 | 16485 | 16485 | 16485 | 16485 | 16485 | 16485 |
| Fish, cured | 91796 | 68683 | 68972 | 69263 | 69556 | 69851 | 70149 |

| OECD gp | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Fish, fillets | 98970 | 55610 | 55610 | 55610 | 55610 | 55610 | 55610 |
| Fish, fresh/chilled | 64840 | 46366 | 46564 | 46764 | 46966 | 47169 | 47374 |
| Fish, frozen | 112181 | 91259 | 91259 | 91259 | 91259 | 91259 | 91259 |
| Molluscs | 637 | 654 | 654 | 654 | 654 | 654 | 654 |
| Prepared/preserved fish | 188125 | 179711 | 179711 | 179711 | 179711 | 179711 | 179711 |
| **Total FU Production EUR-6 NC** | **569858** | **459225** | **459712** | **460203** | **460697** | **461196** | **461698** |
| Cephalopods | 2925 | 2128 | 2128 | 2128 | 2128 | 2128 | 2128 |
| Crus., mol. & other aquatic inv., prepared | 19571 | 23806 | 23806 | 23806 | 23806 | 23806 | 23806 |
| Crustaceans | 28758 | 24737 | 24737 | 24737 | 24737 | 24737 | 24737 |
| Fish, cured | 255400 | 235943 | 239255 | 242616 | 246028 | 249490 | 253005 |
| Fish, fillets | 304083 | 359580 | 359580 | 359580 | 359580 | 359580 | 359580 |
| Fish, fresh/chilled | 318959 | 384561 | 395387 | 406525 | 417985 | 429776 | 441908 |
| Fish, frozen | 785867 | 651292 | 651292 | 651292 | 651292 | 651292 | 651292 |
| Molluscs | 7483 | 8533 | 8533 | 8533 | 8533 | 8533 | 8533 |
| Prepared/preserved fish | 191855 | 209258 | 210621 | 212005 | 213409 | 214835 | 216282 |
| **Total FU Production EUR-7 NC** | **1914900** | **1899838** | **1915338** | **1931222** | **1947498** | **1964178** | **1981271** |
| **Total FU Production EUR-28** | **8966115** | **9114498** | **9159187** | **9204897** | **9251646** | **9299454** | **9348344** |

Source: database

# ANNEX 14: TRADE TABLES

### Table Annex 14-1: Food use imports by FAO groups of species from 1989 to 1998

(tonnes live weight)

| Gp Species | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Freshwater fish | 38813 | 44429 | 49620 | 58940 | 60841 | 86860 | 90960 | 113483 | 130234 | 152297 | 82648 |
| Diadromous fish | 366740 | 443466 | 496602 | 526112 | 525743 | 622884 | 667996 | 750535 | 777522 | 806465 | 598407 |
| Marine fish, pelagic, tunas | 569818 | 698287 | 703636 | 656169 | 658165 | 698830 | 709192 | 770751 | 757274 | 883474 | 710560 |
| Marine fish, pelagic, small | 980425 | 1143812 | 1151610 | 1088167 | 1038935 | 1161782 | 1083594 | 959826 | 1055503 | 1140192 | 1080385 |
| Marine fish, demersal | 1875140 | 2174964 | 2156222 | 2191956 | 2247839 | 2417545 | 2420579 | 2631146 | 2627296 | 2622925 | 2336561 |
| Marine fish, others | 574510 | 661142 | 703698 | 741215 | 606756 | 645045 | 588398 | 744404 | 758039 | 795912 | 681912 |
| Crustaceans | 521161 | 639631 | 683206 | 710452 | 698716 | 790544 | 745638 | 808459 | 811955 | 900786 | 731055 |
| Molluscs | 333288 | 361730 | 401108 | 433759 | 411575 | 352071 | 356771 | 403052 | 400077 | 425967 | 387940 |
| Cephalopods | 432575 | 413538 | 471276 | 414995 | 446318 | 468602 | 507572 | 529900 | 598521 | 618968 | 490227 |
| Aquatic animals | 17626 | 20995 | 24593 | 22925 | 24831 | 24495 | 28682 | 36996 | 44004 | 33963 | 27911 |
| **Total FU Imports EU-15** | **5710096** | **6601994** | **6841571** | **6844691** | **6719717** | **7268658** | **7199382** | **7748552** | **7960426** | **8380949** | **7127604** |
| Freshwater fish | 21 | 46 | 530 | 4633 | 6605 | 4476 | 4690 | 3553 | 2898 | 9094 | 3655 |
| Diadromous fish | 716 | 650 | 638 | 3312 | 2841 | 4808 | 6693 | 5630 | 8025 | 12674 | 4599 |
| Marine fish, pelagic, tunas | 1176 | 1000 | 1296 | 3347 | 5316 | 5795 | 8166 | 9924 | 10246 | 14713 | 6098 |
| Marine fish, pelagic, small | 1172 | 1207 | 4415 | 85806 | 98921 | 281082 | 281161 | 187043 | 221475 | 245556 | 140784 |
| Marine fish, demersal | 2461 | 2125 | 2418 | 10785 | 11335 | 73627 | 49787 | 45708 | 47902 | 117904 | 36405 |
| Marine fish, others | 215268 | 168555 | 113207 | 52738 | 92634 | 85679 | 79392 | 190872 | 218518 | 148479 | 136534 |
| Crustaceans | 411 | 440 | 746 | 1297 | 11777 | 12568 | 14170 | 9715 | 8319 | 8517 | 6796 |
| Molluscs | 77 | 48 | 107 | 1240 | 899 | 1176 | 1259 | 1683 | 1590 | 1531 | 961 |
| Cephalopods | 2395 | 2660 | 2428 | 4921 | 4330 | 5296 | 5798 | 6559 | 6086 | 6632 | 4710 |
| Aquatic animals | 0 | 0 | 4 | 22 | 111 | 139 | 107 | 54 | 112 | 136 | 69 |
| **Total FU Imports EUR-6 NC** | **223697** | **176731** | **125789** | **168102** | **234769** | **474645** | **451223** | **460741** | **525172** | **565235** | **340610** |
| Freshwater fish | 1 | 4 | 62 | 50 | 2345 | 2895 | 2658 | 3819 | 1657 | 2030 | 1552 |
| Diadromous fish | 12469 | 9085 | 4010 | 2368 | 12107 | 4398 | 3441 | 2718 | 3424 | 4826 | 5885 |
| Marine fish, pelagic, tunas | 929 | 2680 | 3795 | 4647 | 3858 | 5597 | 6061 | 6398 | 5597 | 8088 | 4765 |
| Marine fish, pelagic, small | 10534 | 27276 | 93739 | 73590 | 101548 | 166623 | 163108 | 287208 | 323539 | 356492 | 160366 |
| Marine fish, demersal | 37086 | 53714 | 62686 | 89977 | 107490 | 112402 | 132322 | 156606 | 144923 | 130094 | 102730 |
| Marine fish, others | 24455 | 34012 | 9956 | 21355 | 45859 | 56065 | 70565 | 75507 | 84397 | 92647 | 51482 |
| Crustaceans | 14174 | 14349 | 17550 | 26236 | 37123 | 19082 | 28853 | 30010 | 22943 | 23620 | 23394 |
| Molluscs | 1027 | 643 | 349 | 707 | 560 | 3081 | 7677 | 8223 | 5997 | 4638 | 3290 |
| Cephalopods | 6628 | 4022 | 6561 | 6304 | 5104 | 2169 | 1879 | 1411 | 1716 | 8919 | 4471 |
| **Total FU Imports EUR-7 NC** | **107303** | **145784** | **198707** | **225234** | **315994** | **372312** | **416565** | **571901** | **594193** | **631355** | **357935** |
| **Total FU Imports EUR-28** | **6041095** | **6924509** | **7166067** | **7238027** | **7270479** | **8115616** | **8067170** | **8781195** | **9079791** | **9577539** | **7826149** |

Source: database

### Table Annex 14-2: Food use imports by OECD groups of commodities from 1989 to 1998

(tonnes live weight)

| OECD gp | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cephalopods | 432575 | 413538 | 471276 | 414995 | 446318 | 468602 | 507572 | 529900 | 598521 | 618968 | 490227 |
| Crus., mol. & other aquatic inv., prepared | 95092 | 114677 | 112229 | 114577 | 102657 | 121736 | 119032 | 128595 | 135004 | 118282 | 116188 |
| Crustaceans | 513159 | 630473 | 673803 | 699956 | 688980 | 777831 | 731001 | 791691 | 792452 | 882192 | 718154 |
| Fish, cured | 399687 | 429381 | 420402 | 392099 | 384650 | 425472 | 430328 | 488584 | 499855 | 470916 | 434137 |
| Fish, fillets | 781668 | 1004508 | 1001242 | 1062514 | 1057235 | 1160979 | 1210795 | 1226730 | 1243742 | 1397682 | 1114709 |
| Fish, fresh/chilled | 1308328 | 1433282 | 1399290 | 1458747 | 1421379 | 1617577 | 1560223 | 1695064 | 1748409 | 1768622 | 1541092 |
| Fish, frozen | 1200882 | 1482241 | 1542038 | 1412152 | 1281551 | 1326742 | 1285306 | 1315019 | 1310270 | 1363464 | 1351967 |
| Molluscs | 263825 | 277206 | 322875 | 352604 | 343485 | 267543 | 281058 | 328221 | 328581 | 360242 | 312564 |
| Prepared/preserved fish | 714882 | 816687 | 898416 | 937046 | 993463 | 1102176 | 1074068 | 1244747 | 1303593 | 1400582 | 1048566 |
| **Total FU Imports EU-15** | **5710096** | **6601994** | **6841571** | **6844691** | **6719717** | **7268658** | **7199382** | **7748552** | **7960426** | **8380949** | **7127604** |
| Cephalopods | 2395 | 2660 | 2428 | 4921 | 4330 | 5296 | 5798 | 6559 | 6086 | 6632 | 4710 |

| OECD gp | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Crus., mol. & other aquatic inv., prepared | 62 | 34 | 59 | 793 | 560 | 698 | 941 | 1246 | 769 | 1179 | 634 |
| Crustaceans | 411 | 440 | 746 | 1297 | 11777 | 12356 | 13889 | 9715 | 8319 | 8203 | 6715 |
| Fish, cured | 13688 | 9196 | 8519 | 8475 | 6766 | 8844 | 9043 | 7831 | 6278 | 4185 | 8283 |
| Fish, fillets | 1137 | 980 | 3772 | 17881 | 41609 | 189029 | 168246 | 82382 | 72503 | 122693 | 70023 |
| Fish, fresh/chilled | 336 | 505 | 1133 | 9585 | 15722 | 14850 | 18236 | 34304 | 36555 | 22530 | 15375 |
| Fish, frozen | 172473 | 134599 | 91323 | 105247 | 114480 | 174712 | 168412 | 172260 | 236549 | 246836 | 161689 |
| Molluscs | 15 | 14 | 52 | 470 | 450 | 828 | 706 | 491 | 933 | 802 | 476 |
| Prepared/preserved fish | 33180 | 28304 | 17757 | 19433 | 39074 | 68031 | 65953 | 145952 | 157180 | 152176 | 72704 |
| **Total FU Imports EUR-6 NC** | **223697** | **176731** | **125789** | **168102** | **234769** | **474645** | **451223** | **460741** | **525172** | **565235** | **340610** |
| Cephalopods | 6628 | 4022 | 6561 | 6304 | 5104 | 2169 | 1879 | 1411 | 1716 | 8919 | 4471 |
| Crus., mol. & other aquatic inv., prepared | 1008 | 1314 | 1373 | 2166 | 1924 | 2326 | 2123 | 2559 | 2796 | 3015 | 2060 |
| Crustaceans | 13738 | 13119 | 16352 | 24530 | 35556 | 17189 | 27223 | 27861 | 20827 | 21032 | 21743 |
| Fish, cured | 5680 | 7780 | 5649 | 2377 | 4805 | 8293 | 6379 | 9235 | 8638 | 10929 | 6976 |
| Fish, fillets | 2172 | 4233 | 5190 | 3854 | 13968 | 16842 | 29607 | 37065 | 30057 | 24515 | 16750 |
| Fish, fresh/chilled | 27603 | 43359 | 116234 | 129249 | 157751 | 162879 | 201122 | 257764 | 269575 | 276733 | 164227 |
| Fish, frozen | 32538 | 54544 | 34256 | 39953 | 68205 | 125935 | 112287 | 188028 | 214939 | 234732 | 110542 |
| Molluscs | 455 | 559 | 174 | 248 | 204 | 2648 | 7183 | 7814 | 5317 | 4211 | 2881 |
| Prepared/preserved fish | 17481 | 16855 | 12917 | 16554 | 28478 | 34032 | 28762 | 40165 | 40329 | 47268 | 28284 |
| **Total FU Imports EUR-7 NC** | **107303** | **145784** | **198707** | **225234** | **315994** | **372312** | **416565** | **571901** | **594193** | **631355** | **357935** |
| **Total FU Imports EUR-28** | **6041095** | **6924509** | **7166067** | **7238027** | **7270479** | **8115616** | **8067170** | **8781195** | **9079791** | **9577539** | **7826149** |

Source: database

### Table Annex 14-3: Food use exports by FAO groups of species from 1989 to 1998

(tonnes live weight)

| Gp Species | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Freshwater fish | 11461 | 11780 | 25653 | 33150 | 22139 | 33340 | 27796 | 31817 | 50524 | 54400 | 30206 |
| Diadromous fish | 122876 | 132115 | 142645 | 147126 | 201568 | 230329 | 245022 | 287868 | 323242 | 362463 | 219525 |
| Marine fish, pelagic, tunas | 185704 | 195764 | 255545 | 190823 | 266612 | 293260 | 348544 | 360839 | 400129 | 375286 | 287250 |
| Marine fish, pelagic, small | 1268264 | 1386130 | 1543485 | 1717168 | 1778118 | 1701277 | 1798365 | 1767855 | 1955524 | 2083824 | 1700001 |
| Marine fish, demersal | 854411 | 897241 | 884550 | 811953 | 854668 | 1019075 | 988698 | 1089990 | 1110889 | 1093772 | 960525 |
| Marine fish, others | 394682 | 398395 | 444628 | 580668 | 564434 | 574302 | 564795 | 606864 | 654306 | 655660 | 543873 |
| Crustaceans | 222498 | 222221 | 233766 | 233119 | 236330 | 308102 | 282754 | 337248 | 361176 | 380285 | 281750 |
| Molluscs | 251255 | 265484 | 301454 | 338053 | 298755 | 272553 | 274840 | 339675 | 346690 | 336268 | 302503 |
| Cephalopods | 111931 | 119970 | 136852 | 133608 | 160507 | 176177 | 174995 | 216668 | 201761 | 206397 | 163887 |
| Aquatic animals | 6110 | 7633 | 10354 | 13949 | 12621 | 12429 | 11835 | 14955 | 14604 | 16134 | 12062 |
| **Total FU Exports EU-15** | **3429192** | **3636732** | **3978933** | **4199617** | **4395751** | **4620843** | **4717644** | **5053778** | **5418844** | **5564487** | **4501582** |
| Freshwater fish | 11 | 12 | 3472 | 3907 | 13869 | 18592 | 13931 | 14251 | 12503 | 18406 | 9895 |
| Diadromous fish | 0 | 0 | 38 | 1256 | 2389 | 4967 | 3829 | 3317 | 1910 | 5513 | 2322 |
| Marine fish, pelagic, tunas | 0 | 0 | 773 | 27 | 80 | 315 | 385 | 893 | 509 | 561 | 354 |
| Marine fish, pelagic, small | 3 | 0 | 12 | 4838 | 41523 | 137919 | 147754 | 185473 | 265881 | 214417 | 99782 |
| Marine fish, demersal | 0 | 0 | 94 | 5462 | 5033 | 56747 | 41808 | 16695 | 11081 | 59858 | 19678 |
| Marine fish, others | 114826 | 107811 | 106754 | 164619 | 176076 | 171753 | 159233 | 149856 | 127883 | 77231 | 135604 |
| Crustaceans | 0 | 0 | 95 | 11781 | 11774 | 9061 | 17558 | 19866 | 14356 | 19738 | 10423 |
| Molluscs | 0 | 0 | 2 | 801 | 503 | 1056 | 933 | 1020 | 773 | 297 | 539 |
| Cephalopods | 18912 | 17064 | 15153 | 35952 | 14676 | 4096 | 226 | 256 | 206 | 192 | 10673 |
| Aquatic animals | 0 | 0 | 0 | 20 | 1 | 1 | 2 | 0 | 0 | 0 | 2 |
| **Total FU Exports EUR-6 NC** | **133752** | **124887** | **126394** | **228662** | **265925** | **404508** | **385660** | **391626** | **435102** | **396213** | **289273** |
| Freshwater fish | 1 | 1 | 12 | 1 | 516 | 774 | 451 | 371 | 362 | 348 | 284 |
| Diadromous fish | 138860 | 161818 | 171736 | 179376 | 192769 | 221733 | 265062 | 322447 | 362763 | 404042 | 242061 |
| Marine fish, pelagic, tunas | 679 | 599 | 310 | 74 | 577 | 976 | 198 | 767 | 315 | 1222 | 572 |
| Marine fish, pelagic, small | 250324 | 279670 | 435858 | 433490 | 530799 | 702882 | 802385 | 978058 | 1119284 | 896414 | 642916 |
| Marine fish, demersal | 295524 | 253577 | 283470 | 348623 | 431056 | 481982 | 499243 | 527668 | 544670 | 422132 | 408795 |
| Marine fish, others | 143973 | 157305 | 138953 | 163331 | 136073 | 148702 | 181600 | 156681 | 145168 | 248251 | 162004 |
| Crustaceans | 32353 | 31208 | 29131 | 29871 | 31947 | 34992 | 23619 | 29740 | 34164 | 39903 | 31693 |
| Molluscs | 2286 | 2479 | 1731 | 1455 | 4246 | 5755 | 4708 | 3101 | 4713 | 1001 | 3147 |
| Cephalopods | 1431 | 370 | 2398 | 767 | 1095 | 305 | 424 | 1098 | 116 | 1803 | 981 |

| Gp Species | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total FU Exports EUR-7 NC** | **865430** | **887028** | **1063598** | **1156987** | **1329078** | **1598100** | **1777690** | **2019932** | **2211554** | **2015116** | **1492451** |
| **Total FU Exports EUR-28** | **4428373** | **4648647** | **5168925** | **5585266** | **5990754** | **6623451** | **6880994** | **7465336** | **8065500** | **7975816** | **6283306** |

Source: database

### Table Annex 14-4: Food use exports by OECD groups of commodities from 1989 to 1998

(tonnes live weight)

| OECD gp | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | Av. 89-98 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cephalopods | 111931 | 119970 | 136852 | 133608 | 160507 | 176177 | 174995 | 216668 | 201761 | 206397 | 163887 |
| Crus., mol. & other aquatic inv., prepared | 60414 | 62933 | 58106 | 75150 | 74925 | 85634 | 82932 | 81261 | 78434 | 79222 | 73901 |
| Crustaceans | 222197 | 221992 | 233588 | 232938 | 236202 | 307967 | 282191 | 336786 | 359395 | 378836 | 281209 |
| Fish, cured | 146073 | 167208 | 170907 | 143504 | 138191 | 175573 | 169257 | 192020 | 199800 | 200877 | 170341 |
| Fish, fillets | 404840 | 422591 | 435362 | 402438 | 429290 | 444932 | 413247 | 392802 | 390112 | 399966 | 413558 |
| Fish, fresh/chilled | 853921 | 864316 | 1046252 | 1114844 | 1138517 | 1203838 | 1210436 | 1351907 | 1465063 | 1499175 | 1174827 |
| Fish, frozen | 1115459 | 1219277 | 1268551 | 1447023 | 1539673 | 1544380 | 1643421 | 1596403 | 1824835 | 1868996 | 1506802 |
| Molluscs | 197251 | 210412 | 253880 | 277033 | 236579 | 199483 | 204306 | 273830 | 284640 | 274629 | 241204 |
| Prepared/preserved fish | 317106 | 348032 | 375435 | 373079 | 441867 | 482859 | 536859 | 612101 | 614804 | 656391 | 475853 |
| **Total FU Exports EU-15** | **3429192** | **3636732** | **3978933** | **4199617** | **4395751** | **4620843** | **4717644** | **5053778** | **5418844** | **5564487** | **4501582** |
| Cephalopods | 18912 | 17064 | 15153 | 35952 | 14676 | 4096 | 226 | 256 | 206 | 192 | 10673 |
| Crus., mol. & other aquatic inv., prepared | 0 | 0 | 0 | 543 | 266 | 255 | 126 | 685 | 317 | 106 | 230 |
| Crustaceans | 0 | 0 | 95 | 11781 | 11774 | 9061 | 17558 | 19866 | 14356 | 19738 | 10423 |
| Fish, cured | 193 | 246 | 1126 | 1356 | 4695 | 17018 | 22520 | 18549 | 25535 | 22816 | 11405 |
| Fish, fillets | 0 | 0 | 112 | 142215 | 106070 | 108598 | 77854 | 60540 | 42859 | 50016 | 58826 |
| Fish, fresh/chilled | 11 | 12 | 2818 | 11785 | 29459 | 75526 | 62466 | 75599 | 112483 | 53191 | 42335 |
| Fish, frozen | 113451 | 107070 | 106151 | 13038 | 40829 | 82542 | 91294 | 86812 | 88959 | 108270 | 83841 |
| Molluscs | 0 | 0 | 2 | 278 | 239 | 802 | 809 | 336 | 456 | 191 | 311 |
| Prepared/preserved fish | 1185 | 495 | 936 | 11716 | 57917 | 106610 | 112808 | 128984 | 149933 | 141695 | 71228 |
| **Total FU Exports EUR-6 NC** | **133752** | **124887** | **126394** | **228662** | **265925** | **404508** | **385660** | **391626** | **435102** | **396213** | **289273** |
| Cephalopods | 1431 | 370 | 2398 | 767 | 1095 | 305 | 424 | 1098 | 116 | 1803 | 981 |
| Crus., mol. & other aquatic inv., prepared | 21042 | 18106 | 16866 | 20215 | 19996 | 20745 | 14052 | 16659 | 20113 | 23995 | 19179 |
| Crustaceans | 11311 | 13102 | 12265 | 9656 | 11951 | 14248 | 9587 | 13114 | 14227 | 15928 | 12539 |
| Fish, cured | 125262 | 108663 | 129477 | 140935 | 174827 | 232885 | 234405 | 241319 | 222907 | 223651 | 183433 |
| Fish, fillets | 123639 | 81397 | 86415 | 132970 | 182372 | 258134 | 279157 | 306199 | 311911 | 296542 | 205874 |
| Fish, fresh/chilled | 268731 | 305950 | 326848 | 345010 | 377718 | 396297 | 448190 | 507376 | 581224 | 594363 | 415171 |
| Fish, frozen | 269273 | 319125 | 444388 | 460934 | 480108 | 577013 | 688125 | 778772 | 872797 | 713410 | 560395 |
| Molluscs | 2286 | 2479 | 1731 | 1455 | 4246 | 5753 | 4688 | 3068 | 4537 | 981 | 3122 |
| Prepared/preserved fish | 42455 | 37835 | 43211 | 45044 | 76766 | 92720 | 99063 | 152326 | 183722 | 144443 | 91759 |
| **Total FU Exports EUR-7 NC** | **865430** | **887028** | **1063598** | **1156987** | **1329078** | **1598100** | **1777690** | **2019932** | **2211554** | **2015116** | **1492451** |
| **Total FU Exports EUR-28** | **4428373** | **4648647** | **5168925** | **5585266** | **5990754** | **6623451** | **6880994** | **7465336** | **8065500** | **7975816** | **6283306** |

Source: database

### Table Annex 14-5: Food use imports by OECD groups of commodities from 2005 to 2030

(tonnes live weight)

| OECD gp | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Cephalopods | 544713 | 643121 | 661144 | 679838 | 699231 | 719351 | 740228 |
| Crus., mol. & other aquatic inv., prepared | 124530 | 126469 | 133051 | 140320 | 148350 | 157228 | 167046 |
| Crustaceans | 795034 | 910457 | 933050 | 957858 | 985084 | 1014955 | 1047720 |
| Fish, cured | 463031 | 481257 | 489815 | 499487 | 510417 | 522763 | 536707 |
| Fish, fillets | 1247985 | 1463699 | 1513266 | 1564944 | 1618830 | 1675022 | 1733625 |
| Fish, fresh/chilled | 1677979 | 1772125 | 1775674 | 1780140 | 1785567 | 1792007 | 1799519 |
| Fish, frozen | 1320160 | 1321621 | 1295469 | 1272113 | 1251313 | 1232852 | 1216538 |
| Molluscs | 313129 | 363349 | 365779 | 368404 | 371244 | 374324 | 377667 |
| Prepared/preserved fish | 1225033 | 1467703 | 1518963 | 1573165 | 1630477 | 1691075 | 1755150 |

| OECD gp | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| **Total FU Imports EU-15** | **7711594** | **8549802** | **8686210** | **8836269** | **9000513** | **9179576** | **9374200** |
| Cephalopods | 6074 | 6651 | 6667 | 6685 | 6705 | 6727 | 6751 |
| Crus., mol. & other aquatic inv., prepared | 967 | 1340 | 1472 | 1620 | 1787 | 1976 | 2189 |
| Crustaceans | 10496 | 8792 | 9247 | 9734 | 10254 | 10810 | 11404 |
| Fish, cured | 7236 | 3846 | 3648 | 3479 | 3334 | 3209 | 3100 |
| Fish, fillets | 126971 | 121512 | 120774 | 120131 | 119590 | 119159 | 118846 |
| Fish, fresh/chilled | 25295 | 24305 | 25676 | 27140 | 28704 | 30375 | 32161 |
| Fish, frozen | 199754 | 258991 | 268393 | 278433 | 289145 | 300568 | 312742 |
| Molluscs | 752 | 846 | 881 | 920 | 963 | 1010 | 1062 |
| Prepared/preserved fish | 117858 | 181333 | 205729 | 233586 | 265401 | 301742 | 343259 |
| **Total FU Imports EUR-6 NC** | **495403** | **607616** | **642487** | **681728** | **725882** | **775575** | **831515** |
| Cephalopods | 3219 | 8984 | 9036 | 9093 | 9155 | 9223 | 9298 |
| Crus., mol. & other aquatic inv., prepared | 2564 | 3007 | 3002 | 2996 | 2991 | 2985 | 2980 |
| Crustaceans | 22826 | 21640 | 22144 | 22714 | 23359 | 24092 | 24925 |
| Fish, cured | 8695 | 11134 | 11290 | 11455 | 11629 | 11815 | 12013 |
| Fish, fillets | 27617 | 28482 | 31733 | 35384 | 39487 | 44102 | 49298 |
| Fish, fresh/chilled | 233614 | 283161 | 288412 | 294296 | 300899 | 308321 | 316680 |
| Fish, frozen | 175184 | 246114 | 255072 | 264796 | 275366 | 286867 | 299395 |
| Molluscs | 5435 | 4921 | 5503 | 6158 | 6893 | 7720 | 8649 |
| Prepared/preserved fish | 38111 | 53091 | 58019 | 63724 | 70351 | 78075 | 87108 |
| **Total FU Imports EUR-7 NC** | **517265** | **660536** | **684211** | **710615** | **740131** | **773201** | **810347** |
| **Total FU Imports EUR-28** | **8724262** | **9817953** | **10012909** | **10228612** | **10466526** | **10728352** | **11016063** |

Source: database

### Table Annex 14-6: Food use imports by FAO groups of species from 2005 to 2030

(tonnes live weight)

| Gp Species | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Freshwater fish | 114767 | 153215 | 154000 | 154895 | 155900 | 157017 | 158251 |
| Diadromous fish | 725081 | 813754 | 820294 | 827963 | 836795 | 846841 | 858168 |
| Marine fish, pelagic, tunas | 763904 | 894525 | 904631 | 916560 | 930303 | 945861 | 963241 |
| Marine fish, pelagic, small | 1080179 | 1155100 | 1168126 | 1183165 | 1200256 | 1219453 | 1240822 |
| Marine fish, demersal | 2543898 | 2676910 | 2719595 | 2765773 | 2815516 | 2868913 | 2926074 |
| Marine fish, others | 706360 | 812901 | 826539 | 841494 | 857833 | 875634 | 894983 |
| Crustaceans | 811476 | 929842 | 953101 | 978671 | 1006772 | 1037648 | 1071566 |
| Molluscs | 387588 | 434627 | 441533 | 449110 | 457427 | 466564 | 476609 |
| Cephalopods | 544713 | 643121 | 661144 | 679838 | 699231 | 719351 | 740228 |
| Aquatic animals | 33628 | 35806 | 37246 | 38800 | 40479 | 42294 | 44258 |
| **Total FU Imports EU-15** | **7711594** | **8549802** | **8686210** | **8836269** | **9000513** | **9179576** | **9374200** |
| Freshwater fish | 4942 | 9837 | 10410 | 11021 | 11673 | 12369 | 13111 |
| Diadromous fish | 7566 | 13351 | 13890 | 14479 | 15123 | 15824 | 16589 |
| Marine fish, pelagic, tunas | 9769 | 16432 | 17864 | 19492 | 21343 | 23444 | 25829 |
| Marine fish, pelagic, small | 243263 | 260472 | 272537 | 285924 | 300778 | 317268 | 335584 |
| Marine fish, demersal | 66985 | 121160 | 123798 | 126721 | 129952 | 133519 | 137449 |
| Marine fish, others | 144588 | 168736 | 185722 | 205132 | 227306 | 252629 | 281546 |
| Crustaceans | 10658 | 9151 | 9642 | 10169 | 10733 | 11337 | 11984 |
| Molluscs | 1448 | 1661 | 1766 | 1884 | 2017 | 2165 | 2331 |
| Cephalopods | 6074 | 6651 | 6667 | 6685 | 6705 | 6727 | 6751 |
| Aquatic animals | 110 | 166 | 191 | 220 | 254 | 294 | 341 |
| **Total FU Imports EUR-6 NC** | **495403** | **607616** | **642487** | **681728** | **725882** | **775575** | **831515** |
| Freshwater fish | 2612 | 2136 | 2231 | 2347 | 2489 | 2665 | 2883 |
| Diadromous fish | 3762 | 5089 | 5298 | 5527 | 5778 | 6054 | 6359 |
| Marine fish, pelagic, tunas | 6348 | 9053 | 9856 | 10772 | 11820 | 13024 | 14413 |
| Marine fish, pelagic, small | 259394 | 372706 | 385894 | 400632 | 417140 | 435674 | 456534 |
| Marine fish, demersal | 135269 | 131537 | 132655 | 133856 | 135149 | 136544 | 138054 |
| Marine fish, others | 75836 | 101461 | 108592 | 116522 | 125357 | 135220 | 146252 |
| Crustaceans | 24902 | 24229 | 24732 | 25302 | 25948 | 26681 | 27513 |

| Gp Species | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Molluscs | 5923 | 5340 | 5917 | 6566 | 7296 | 8117 | 9041 |
| Cephalopods | 3219 | 8984 | 9036 | 9093 | 9155 | 9223 | 9298 |
| **Total FU Imports EUR-7 NC** | **517265** | **660536** | **684211** | **710615** | **740131** | **773201** | **810347** |
| **Total FU Imports EUR-28** | **8724262** | **9817953** | **10012909** | **10228612** | **10466526** | **10728352** | **11016063** |

Source: database

**Table Annex 14-7: Non-food use imports by FAO groups of species from 2005 to 2030**

(tonnes live weight)

| Gp Species | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Marine fish, pelagic, small | 1378343 | 1190370 | 1190370 | 1190370 | 1190370 | 1190370 | 1190370 |
| Marine fish, others | 1356494 | 847149 | 847149 | 847149 | 847149 | 847149 | 847149 |
| Crustaceans | 6 | 0 | 0 | 0 | 0 | 0 | 0 |
| Aquatic animals | 49190 | 58180 | 58180 | 58180 | 58180 | 58180 | 58180 |
| Aquatic mammals | 3308 | 3410 | 3410 | 3410 | 3410 | 3410 | 3410 |
| **Total NFU Imports EU-15** | **2787341** | **2099109** | **2099109** | **2099109** | **2099109** | **2099109** | **2099109** |
| Marine fish, pelagic, small | 87889 | 74778 | 74778 | 74778 | 74778 | 74778 | 74778 |
| Marine fish, others | 5216 | 2403 | 2403 | 2403 | 2403 | 2403 | 2403 |
| Aquatic animals | 593 | 365 | 365 | 365 | 365 | 365 | 365 |
| Aquatic mammals | 45 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total NFU Imports EUR-6 NC** | **93743** | **77546** | **77546** | **77546** | **77546** | **77546** | **77546** |
| Marine fish, pelagic, small | 73020 | 55534 | 55534 | 55534 | 55534 | 55534 | 55534 |
| Marine fish, demersal | 1953 | 642 | 660 | 679 | 699 | 719 | 740 |
| Marine fish, others | 744658 | 774672 | 806931 | 841217 | 877736 | 916722 | 958436 |
| Aquatic animals | 348 | 296 | 300 | 305 | 309 | 314 | 319 |
| Aquatic mammals | 1290 | 375 | 375 | 375 | 375 | 375 | 375 |
| **Total NFU Imports EUR-7 NC** | **821269** | **831518** | **863800** | **898109** | **934653** | **973664** | **1015403** |
| **Total NFU Imports EUR-28** | **3702353** | **3008173** | **3040455** | **3074765** | **3111308** | **3150319** | **3192059** |

Source: database

**Table Annex 14-8: Non-food use imports by OECD groups of commodities from 2005 to 2030**

(tonnes live weight)

| OECD gp | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Fish/marine mammal, fat, oil | 1114933 | 536191 | 536191 | 536191 | 536191 | 536191 | 536191 |
| Flour, meal unfit for human consumption | 1672408 | 1562918 | 1562918 | 1562918 | 1562918 | 1562918 | 1562918 |
| **Total NFU Imports EU-15** | **2787341** | **2099109** | **2099109** | **2099109** | **2099109** | **2099109** | **2099109** |
| Fish/marine mammal, fat, oil | 3822 | 1336 | 1336 | 1336 | 1336 | 1336 | 1336 |
| Flour, meal unfit for human consumption | 89921 | 76210 | 76210 | 76210 | 76210 | 76210 | 76210 |
| **Total NFU Imports EUR-6 NC** | **93743** | **77546** | **77546** | **77546** | **77546** | **77546** | **77546** |
| Fish/marine mammal, fat, oil | 511284 | 505778 | 530256 | 556536 | 584818 | 615328 | 648322 |
| Flour, meal unfit for human consumption | 309985 | 325740 | 333544 | 341574 | 349835 | 358336 | 367082 |
| **Total NFU Imports EUR-7 NC** | **821269** | **831518** | **863800** | **898109** | **934653** | **973664** | **1015403** |
| **Total NFU Imports EUR-28** | **3702353** | **3008173** | **3040455** | **3074765** | **3111308** | **3150319** | **3192059** |

Source: database

**Table Annex 14-9: Food use exports by FAO groups of species from 2005 to 2030**

(tonnes live weight)

| Gp Species | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Freshwater fish | 39576 | 54426 | 54444 | 54463 | 54483 | 54503 | 54523 |
| Diadromous fish | 289785 | 362996 | 363387 | 363786 | 364193 | 364610 | 365037 |
| Marine fish, pelagic, tunas | 355611 | 375324 | 375351 | 375380 | 375409 | 375439 | 375470 |
| Marine fish, pelagic, small | 1861369 | 2091900 | 2097905 | 2104119 | 2110555 | 2117224 | 2124141 |
| Marine fish, demersal | 1060485 | 1095873 | 1097402 | 1098956 | 1100534 | 1102137 | 1103766 |
| Marine fish, others | 611185 | 656032 | 656303 | 656578 | 656857 | 657140 | 657428 |
| Crustaceans | 333913 | 380732 | 381057 | 381388 | 381723 | 382063 | 382408 |
| Molluscs | 314005 | 337525 | 338445 | 339384 | 340342 | 341320 | 342319 |
| Cephalopods | 195199 | 206397 | 206397 | 206397 | 206397 | 206397 | 206397 |

| Gp Species | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Aquatic animals | 13991 | 16244 | 16327 | 16413 | 16503 | 16597 | 16695 |
| **Total FU Exports EU-15** | **5075119** | **5577449** | **5587019** | **5596863** | **5606996** | **5617431** | **5628185** |
| Freshwater fish | 15537 | 18406 | 18406 | 18406 | 18406 | 18406 | 18406 |
| Diadromous fish | 3907 | 5660 | 5772 | 5890 | 6015 | 6146 | 6284 |
| Marine fish, pelagic, tunas | 533 | 561 | 561 | 561 | 561 | 561 | 561 |
| Marine fish, pelagic, small | 190289 | 214468 | 214508 | 214549 | 214593 | 214639 | 214687 |
| Marine fish, demersal | 37238 | 59858 | 59858 | 59858 | 59858 | 59858 | 59858 |
| Marine fish, others | 137191 | 77384 | 77501 | 77624 | 77753 | 77889 | 78033 |
| Crustaceans | 16116 | 19738 | 19738 | 19738 | 19738 | 19738 | 19738 |
| Molluscs | 816 | 297 | 297 | 297 | 297 | 297 | 297 |
| Cephalopods | 995 | 192 | 192 | 192 | 192 | 192 | 192 |
| Aquatic animals | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total FU Exports EUR-6 NC** | **402622** | **396565** | **396832** | **397115** | **397412** | **397725** | **398055** |
| Freshwater fish | 461 | 349 | 351 | 352 | 353 | 354 | 355 |
| Diadromous fish | 315210 | 411656 | 417210 | 422862 | 428614 | 434468 | 440426 |
| Marine fish, pelagic, tunas | 696 | 1235 | 1245 | 1255 | 1265 | 1276 | 1286 |
| Marine fish, pelagic, small | 899805 | 900965 | 904284 | 907662 | 911099 | 914596 | 918155 |
| Marine fish, demersal | 495139 | 429057 | 434100 | 439224 | 444432 | 449723 | 455101 |
| Marine fish, others | 176080 | 248472 | 248634 | 248797 | 248964 | 249133 | 249305 |
| Crustaceans | 32484 | 39903 | 39903 | 39903 | 39903 | 39903 | 39903 |
| Molluscs | 3856 | 1001 | 1001 | 1001 | 1001 | 1001 | 1001 |
| Cephalopods | 749 | 1803 | 1803 | 1803 | 1803 | 1803 | 1803 |
| **Total FU Exports EUR-7 NC** | **1924478** | **2034441** | **2048529** | **2062859** | **2077433** | **2092257** | **2107335** |
| **Total FU Exports EUR-28** | **7402219** | **8008455** | **8032381** | **8056836** | **8081841** | **8107413** | **8133575** |

Source: database

**Table Annex 14-10: Food use exports by OECD groups of commodities from 2005 to 2030**

(tonnes live weight)

| OECD gp | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Cephalopods | 195199 | 206397 | 206397 | 206397 | 206397 | 206397 | 206397 |
| Crus., mol. & other aquatic inv., prepared | 81497 | 79564 | 79822 | 80091 | 80374 | 80670 | 80980 |
| Crustaceans | 333035 | 379283 | 379608 | 379938 | 380273 | 380613 | 380959 |
| Fish, cured | 187506 | 202012 | 202917 | 203909 | 204997 | 206189 | 207496 |
| Fish, fillets | 408212 | 399966 | 399966 | 399966 | 399966 | 399966 | 399966 |
| Fish, fresh/chilled | 1346084 | 1506191 | 1511305 | 1516506 | 1521797 | 1527178 | 1532653 |
| Fish, frozen | 1695607 | 1871989 | 1874212 | 1876508 | 1878880 | 1881329 | 1883859 |
| Molluscs | 247378 | 275655 | 276400 | 277155 | 277921 | 278697 | 279484 |
| Prepared/preserved fish | 580603 | 656391 | 656391 | 656391 | 656391 | 656391 | 656391 |
| **Total FU Exports EU-15** | **5075119** | **5577449** | **5587019** | **5596863** | **5606996** | **5617431** | **5628185** |
| Cephalopods | 995 | 192 | 192 | 192 | 192 | 192 | 192 |
| Crus., mol. & other aquatic inv., prepared | 298 | 106 | 106 | 106 | 106 | 106 | 106 |
| Crustaceans | 16116 | 19738 | 19738 | 19738 | 19738 | 19738 | 19738 |
| Fish, cured | 21287 | 23168 | 23435 | 23717 | 24015 | 24328 | 24658 |
| Fish, fillets | 67973 | 50016 | 50016 | 50016 | 50016 | 50016 | 50016 |
| Fish, fresh/chilled | 75853 | 53191 | 53191 | 53191 | 53191 | 53191 | 53191 |
| Fish, frozen | 91575 | 108270 | 108270 | 108270 | 108270 | 108270 | 108270 |
| Molluscs | 519 | 191 | 191 | 191 | 191 | 191 | 191 |
| Prepared/preserved fish | 128006 | 141695 | 141695 | 141695 | 141695 | 141695 | 141695 |
| **Total FU Exports EUR-6 NC** | **402622** | **396565** | **396832** | **397115** | **397412** | **397725** | **398055** |
| Cephalopods | 749 | 1803 | 1803 | 1803 | 1803 | 1803 | 1803 |
| Crus., mol. & other aquatic inv., prepared | 19113 | 23995 | 23995 | 23995 | 23995 | 23995 | 23995 |
| Crustaceans | 13421 | 15928 | 15928 | 15928 | 15928 | 15928 | 15928 |
| Fish, cured | 231033 | 228307 | 231693 | 235131 | 238621 | 242164 | 245761 |
| Fish, fillets | 290388 | 296542 | 296542 | 296542 | 296542 | 296542 | 296542 |
| Fish, fresh/chilled | 505490 | 609034 | 619736 | 630627 | 641712 | 652993 | 664474 |

| OECD gp | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Fish, frozen | 726023 | 713410 | 713410 | 713410 | 713410 | 713410 | 713410 |
| Molluscs | 3805 | 981 | 981 | 981 | 981 | 981 | 981 |
| Prepared/preserved fish | 134455 | 144443 | 144443 | 144443 | 144443 | 144443 | 144443 |
| **Total FU Exports EUR-7 NC** | **1924478** | **2034441** | **2048529** | **2062859** | **2077433** | **2092257** | **2107335** |
| **Total FU Exports EUR-28** | **7402219** | **8008455** | **8032381** | **8056836** | **8081841** | **8107413** | **8133575** |

Source: database

# ANNEX 15: NET SUPPLY 2005-2030

**Table Annex 15-1: Comparative figures and growth rates of the population and the net supply from 1998 to 2030**

(million inhabitants for the population and tonnes live weight for the net supply)

| Country | Population 1998 | Population 2030 | % total | FU net supply 1998 | FU net supply 2030 | % total |
|---|---|---|---|---|---|---|
| Austria | 8075 | 8562 | 6% | 89535 | 109669 | 22% |
| Belgium-Luxembourg | 10616 | 11368 | 7% | 234703 | 270533 | 15% |
| Denmark | 5295 | 5601 | 6% | 123444 | 164790 | 33% |
| Finland | 5147 | 5411 | 5% | 176148 | 200570 | 14% |
| France | 58727 | 64307 | 10% | 1865484 | 2115815 | 13% |
| Germany | 82057 | 84486 | 3% | 1201620 | 1489333 | 24% |
| Greece | 10511 | 11462 | 9% | 276272 | 313891 | 14% |
| Ireland | 3694 | 4064 | 10% | 77983 | 83148 | 7% |
| Italy | 57563 | 55473 | -4% | 1343852 | 1613894 | 20% |
| Netherlands | 15654 | 17766 | 13% | 236982 | 281140 | 19% |
| Portugal | 9957 | 10737 | 8% | 609050 | 616144 | 1% |
| Spain | 39348 | 40242 | 2% | 1619497 | 1574320 | -3% |
| Sweden | 8848 | 9773 | 10% | 252292 | 265327 | 5% |
| United Kingdom | 59090 | 61943 | 5% | 1425908 | 1552815 | 9% |
| Cyprus | 700 | 1029 | 47% | 17842 | 23716 | 33% |
| Czech Republic | 10300 | 10463 | 2% | 94300 | 135130 | 43% |
| Estonia | 1400 | 1531 | 9% | 20660 | 21088 | 2% |
| Hungary | 10100 | 10325 | 2% | 42727 | 63009 | 47% |
| Poland | 38700 | 39238 | 1% | 438640 | 634663 | 45% |
| Slovenia | 2000 | 2050 | 3% | 13402 | 17552 | 31% |
| Bulgaria | 8200 | 8222 | 0% | 35933 | 60490 | 68% |
| Latvia | 2400 | 2565 | 7% | 89939 | 99037 | 10% |
| Lithuania | 3700 | 3982 | 8% | 55327 | 108758 | 97% |
| Malta | 400 | 453 | 13% | 11634 | 16092 | 38% |
| Norway | 4400 | 5046 | 15% | 203121 | 226851 | 12% |
| Romania | 22500 | 25194 | 12% | 71262 | 127732 | 79% |
| Slovakia | 5400 | 5436 | 1% | 27785 | 45324 | 63% |

Source: database

**Table Annex 15-2: Food use net supply by country from 2005 to 2030**

(tonnes live weight)

| | Average 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Austria | 87134 | 92634 | 95258 | 98246 | 101622 | 105417 | 109669 |
| Belgium-Luxembourg | 233818 | 239885 | 244427 | 249717 | 255797 | 262717 | 270533 |
| Denmark | 124197 | 131540 | 137624 | 143976 | 150610 | 157542 | 164790 |
| Finland | 173045 | 179909 | 183044 | 186612 | 190675 | 195302 | 200570 |
| France | 1793053 | 1914031 | 1950669 | 1989055 | 2029297 | 2071509 | 2115815 |
| Germany | 1077468 | 1254561 | 1295588 | 1339439 | 1386249 | 1436162 | 1489333 |
| Greece | 275107 | 283470 | 288932 | 294683 | 300744 | 307139 | 313891 |
| Ireland | 74604 | 79028 | 79804 | 80604 | 81428 | 82276 | 83148 |
| Italy | 1292772 | 1394100 | 1432691 | 1473746 | 1517475 | 1564107 | 1613894 |
| Netherlands | 250981 | 245747 | 252299 | 259105 | 266173 | 273515 | 281140 |
| Portugal | 600298 | 609791 | 610568 | 611572 | 612820 | 614336 | 616144 |
| Spain | 1601512 | 1600354 | 1590153 | 1582621 | 1577577 | 1574859 | 1574320 |
| Sweden | 242337 | 252070 | 252963 | 254716 | 257338 | 260859 | 265327 |

| | Average 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| United Kingdom | 1291507 | 1450670 | 1469306 | 1488787 | 1509162 | 1530485 | 1552815 |
| **Total EU-15** | **9117832** | **9727788** | **9883328** | **10052879** | **10236968** | **10436226** | **10651389** |
| Cyprus | 16069 | 18811 | 19596 | 20469 | 21439 | 22517 | 23716 |
| Czech Republic | 97977 | 100521 | 105760 | 111745 | 118565 | 126322 | 135130 |
| Estonia | 30682 | 20407 | 20334 | 20358 | 20487 | 20727 | 21088 |
| Hungary | 39026 | 45717 | 48251 | 51179 | 54564 | 58478 | 63009 |
| Poland | 465628 | 470716 | 496759 | 525780 | 558147 | 594281 | 634663 |
| Slovenia | 13258 | 14104 | 14666 | 15285 | 15967 | 16720 | 17552 |
| **Total EUR-6 NC** | **662639** | **670276** | **705367** | **744816** | **789168** | **839046** | **895158** |
| Bulgaria | 26710 | 39752 | 42920 | 46514 | 50592 | 55225 | 60490 |
| Latvia | 101140 | 91112 | 92158 | 93419 | 94943 | 96791 | 99037 |
| Lithuania | 66929 | 64764 | 72181 | 80224 | 88954 | 98441 | 108758 |
| Malta | 10208 | 12449 | 13081 | 13758 | 14483 | 15260 | 16092 |
| Norway | 202625 | 207259 | 210542 | 214120 | 218015 | 222250 | 226851 |
| Romania | 63803 | 79918 | 87115 | 95315 | 104681 | 115410 | 127732 |
| Slovakia | 36271 | 30678 | 33023 | 35630 | 38526 | 41746 | 45324 |
| **Total EUR-7 NC** | **507687** | **525932** | **551020** | **578978** | **610195** | **645122** | **684283** |
| **Total EUR-28** | **10288158** | **10923996** | **11139715** | **11376673** | **11636331** | **11920393** | **12230831** |

Source: database

**Table Annex 15-3: Food use net supply by OECD groups of commodities from 2005 to 2030**

(X 1000 tonnes live weight)

| OECD group of commodities | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | % 98-30 |
|---|---|---|---|---|---|---|---|---|
| Cephalopods | 604 | 719 | 737 | 755 | 775 | 795 | 816 | 17% |
| Crus., mol. & other aquatic inv., prepared | 175 | 185 | 192 | 199 | 207 | 216 | 226 | 28% |
| Crustaceans | 603 | 674 | 696 | 720 | 747 | 777 | 809 | 25% |
| Fish, cured | 728 | 785 | 794 | 805 | 818 | 831 | 847 | 10% |
| Fish, fillets | 1700 | 2021 | 2075 | 2132 | 2190 | 2251 | 2315 | 19% |
| Fish, fresh/chilled | 975 | 968 | 972 | 976 | 982 | 989 | 997 | 3% |
| Fish, frozen | 1808 | 1504 | 1477 | 1453 | 1432 | 1413 | 1395 | -10% |
| Molluscs | 264 | 313 | 319 | 324 | 331 | 337 | 344 | 13% |
| Prepared/preserved fish | 2261 | 2560 | 2622 | 2687 | 2755 | 2827 | 2902 | 17% |
| **Total EU-15** | **9118** | **9727** | **9883** | **10052** | **10236** | **10436** | **10651** | 12% |
| Cephalopods | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 2% |
| Crus., mol. & other aquatic inv., prepared | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 94% |
| Crustaceans | 6 | 6 | 6 | 6 | 7 | 8 | 8 | 65% |
| Fish, cured | 78 | 49 | 49 | 49 | 49 | 49 | 49 | -2% |
| Fish, fillets | 158 | 127 | 126 | 126 | 125 | 125 | 124 | -3% |
| Fish, fresh/chilled | 14 | 17 | 19 | 21 | 22 | 24 | 26 | 71% |
| Fish, frozen | 220 | 242 | 251 | 261 | 272 | 284 | 296 | 29% |
| Molluscs | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 21% |
| Prepared/preserved fish | 178 | 219 | 244 | 272 | 303 | 340 | 381 | 100% |
| **Total EUR-6 NC** | **663** | **670** | **705** | **745** | **789** | **839** | **895** | 43% |
| Cephalopods | 5 | 9 | 9 | 9 | 9 | 10 | 10 | 4% |
| Crus., mol. & other aquatic inv., prepared | 3 | 3 | 3 | 3 | 3 | 3 | 3 | -1% |
| Crustaceans | 38 | 30 | 31 | 32 | 32 | 33 | 34 | 13% |
| Fish, cured | 33 | 19 | 19 | 19 | 19 | 19 | 19 | 3% |
| Fish, fillets | 41 | 92 | 95 | 98 | 103 | 107 | 112 | 28% |
| Fish, fresh/chilled | 47 | 59 | 64 | 70 | 77 | 85 | 94 | 80% |
| Fish, frozen | 235 | 184 | 193 | 203 | 213 | 225 | 237 | 37% |
| Molluscs | 9 | 12 | 13 | 14 | 14 | 15 | 16 | 38% |
| Prepared/preserved fish | 96 | 118 | 124 | 131 | 139 | 148 | 159 | 44% |
| **Total EUR-7 NC** | **508** | **526** | **551** | **579** | **610** | **645** | **684** | 38% |

| OECD group of commodities | Av. 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | % 98-30 |
|---|---|---|---|---|---|---|---|---|
| **Total EUR-28** | **10288** | **10923** | **11139** | **11376** | **11636** | **11920** | **12230** | 15% |

Source: database

**Table Annex 15-4: food use net supply by FAO groups of species from 2005 to 2030**

(X 1000 tonnes live weight)

| FAO Group of species | Av 94-98 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|
| Freshwater fish | 87 | 112 | 112 | 113 | 113 | 114 | 115 |
| Diadromous fish | 653 | 707 | 714 | 722 | 731 | 741 | 753 |
| Marine fish, pelagic, tunas | 1471 | 1616 | 1633 | 1653 | 1674 | 1697 | 1723 |
| Marine fish, pelagic, small | 1317 | 1163 | 1176 | 1191 | 1208 | 1227 | 1248 |
| Marine fish, demersal | 2293 | 2411 | 2454 | 2500 | 2550 | 2604 | 2661 |
| Marine fish, others | 1652 | 1828 | 1851 | 1875 | 1901 | 1928 | 1957 |
| Crustaceans | 632 | 707 | 730 | 755 | 783 | 813 | 847 |
| Molluscs | 388 | 442 | 452 | 463 | 475 | 488 | 501 |
| Cephalopods | 604 | 719 | 737 | 755 | 775 | 795 | 816 |
| Aquatic animals | 22 | 22 | 24 | 25 | 27 | 29 | 31 |
| **Total EU-15** | **9118** | **9727** | **9883** | **10052** | **10236** | **10436** | **10651** |
| Freshwater fish | 33 | 36 | 36 | 37 | 38 | 38 | 39 |
| Diadromous fish | 5 | 9 | 9 | 10 | 10 | 11 | 11 |
| Marine fish, pelagic, tunas | 9 | 16 | 17 | 19 | 21 | 23 | 25 |
| Marine fish, pelagic, small | 224 | 220 | 232 | 245 | 260 | 277 | 295 |
| Marine fish, demersal | 33 | 64 | 67 | 70 | 73 | 77 | 81 |
| Marine fish, others | 345 | 311 | 328 | 348 | 370 | 396 | 425 |
| Crustaceans | 6 | 6 | 6 | 7 | 7 | 8 | 9 |
| Molluscs | 1 | 2 | 2 | 2 | 2 | 3 | 3 |
| Cephalopods | 7 | 7 | 7 | 7 | 7 | 7 | 7 |
| Aquatic animals | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **TotalEUR-6 NC** | **663** | **670** | **705** | **745** | **789** | **839** | **895** |
| Freshwater fish | 6 | 4 | 4 | 4 | 5 | 5 | 5 |
| Diadromous fish | 11 | 20 | 24 | 28 | 32 | 36 | 40 |
| Marine fish, pelagic, tunas | 6 | 9 | 9 | 10 | 11 | 13 | 14 |
| Marine fish, pelagic, small | 138 | 170 | 181 | 193 | 207 | 223 | 241 |
| Marine fish, demersal | 41 | 109 | 107 | 106 | 105 | 104 | 102 |
| Marine fish, others | 250 | 159 | 169 | 180 | 192 | 205 | 220 |
| Crustaceans | 41 | 33 | 33 | 34 | 35 | 35 | 36 |
| Molluscs | 10 | 13 | 13 | 14 | 15 | 16 | 17 |
| Cephalopods | 5 | 9 | 9 | 9 | 9 | 10 | 10 |
| **TotalEUR-7 NC** | **508** | **526** | **551** | **579** | **610** | **645** | **684** |
| **Total EUR-28** | **10288** | **10923** | **11139** | **11376** | **11636** | **11920** | **12230** |

Source: database

**Table Annex 15-5: Non-food use net supply by country from 2005 to 2030**

(tonnes live weight)

| Country | Average 94-98 | 2005 | 2030 |
|---|---|---|---|
| Austria | 24464 | 22824 | 22824 |
| Belgium-Luxembourg | 66729 | 53232 | 53232 |
| Denmark | 271576 | 317634 | 317634 |
| Finland | 140595 | 107587 | 107587 |
| France | 243730 | 230037 | 230037 |
| Germany | 302473 | 321783 | 321783 |
| Greece | 50384 | 56406 | 56406 |
| Ireland | 72906 | 71119 | 71119 |
| Italy | 177369 | 145412 | 145412 |

| Country | Average 94-98 | 2005 | 2030 |
|---|---|---|---|
| Netherlands | 366081 | 94769 | 94769 |
| Portugal | 37615 | 28756 | 28756 |
| Spain | 216112 | 241407 | 241407 |
| Sweden | 93214 | 83645 | 83645 |
| United Kingdom | 732094 | 558278 | 558278 |
| **Total EU-15** | **2795343** | **2332890** | **2332890** |
| Cyprus | 8951 | 8768 | 8768 |
| Czech Republic | 22009 | 15317 | 15317 |
| Estonia | 3005 | 2716 | 2716 |
| Hungary | 47749 | 42302 | 42302 |
| Poland | 55658 | 52725 | 52725 |
| Slovenia | 5213 | 3414 | 3414 |
| **Total EUR-6 NC** | **142585** | **125242** | **125242** |
| Bulgaria | 5974 | 5867 | 5867 |
| Latvia | 15450 | 12711 | 12711 |
| Lithuania | 11150 | 9775 | 9775 |
| Malta | 3817 | 2740 | 2740 |
| Norway | 1338302 | 1455286 | 1639172 |
| Romania | 19641 | 21747 | 21747 |
| Slovakia | 12805 | 11431 | 11431 |
| **Total EUR-7 NC** | **1407139** | **1519557** | **1703442** |
| **Total EUR-28** | **4345067** | **3977689** | **4161574** |

Source: database

**Table Annex 15-6: Non-food use net supply by OECD groups of commodities**

(tonnes live weight)

| OECD group of commodities | Av 94-98 | 2005 | 2030 |
|---|---|---|---|
| EU-15 Fish/marine mammal, fat, oil | 1004 | 496 | 496 |
| EU-15 Flour, meal unfit for human consumption | 1792 | 1837 | 1837 |
| **Total EU-15** | **2795** | **2333** | **2333** |
| EUR-6 NC Fish/marine mammal, fat, oil | 4 | 1 | 1 |
| EUR-6 NC Flour, meal unfit for human consumption | 139 | 124 | 124 |
| **Total EUR-6 NC** | **143** | 125 | 125 |
| EUR-7 NC Fish/marine mammal, fat, oil | 685 | 737 | 880 |
| EUR-7 NC Flour, meal unfit for human consumption | 722 | 782 | 823 |
| **Total EUR-7 NC** | **1407** | **1520** | **1703** |
| **Total EUR-28** | **4341** | **3976** | **4160** |

Source: database

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