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Review of the fish market in Finland

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In this paper Finnish fish market is described on the basis of the compiled official fisheries statistics and studies carried out by the Finnish Game and Fisheries Research Institute. The total fish consumption in Finland was about 320 000 tonnes in 1996, FIM 1 400 million in value. One half of the fish was used for human consumption and the other half as feed for fur animals. Baltic herring (*Clupea harengus*) and rainbow trout (*Oncorynchus mykiss*) are the most important species to Finnish consumers. In 1996, the Finns consumed 30.4 kg fish in ungutted weight per capita, of which these two species covered nearly one half. There are over 200 fish wholesale and processing companies in Finland, most of them are very small. In 1995, 30 000 tonnes of fish, mainly Baltic herring and rainbow trout, were used for processing. In 1992, there were some 250 specialized fish retail stores. However, nowadays the most important shopping places for fresh and processed fish are self-service shops and supermarkets.

Introduction

Consumption of fish in Finland is considerable compared to many countries in the world (FAO 1996). With thousands of lakes and a large archipelago, Finland has ideal conditions for developing commercial as well as subsistence and recreational fisheries. Even today, recreational and subsistence fishery account for a remarkable part in the food management, especially in inland area.

Baltic herring and freshwater species had traditionally been important to Finnish consumers until rainbow trout farming expanded in the 1980s. During the last few years imported farmed salmon (*Salmo salar*) from Norway has also captured a new market at the expence of Finnish farmed fish and wild fish.

Fresh fish as well as processed fish products are distributed to consumers by a wide network of small companies. Finland is a leading fur farming and pelt producer in the world and a remarkable proportion of fish is used in fur farms.

Fish research in Finland has traditionally concentrated on fish stocks and fisheries. Thus, fish market research is a rather new phenomenon. Na-

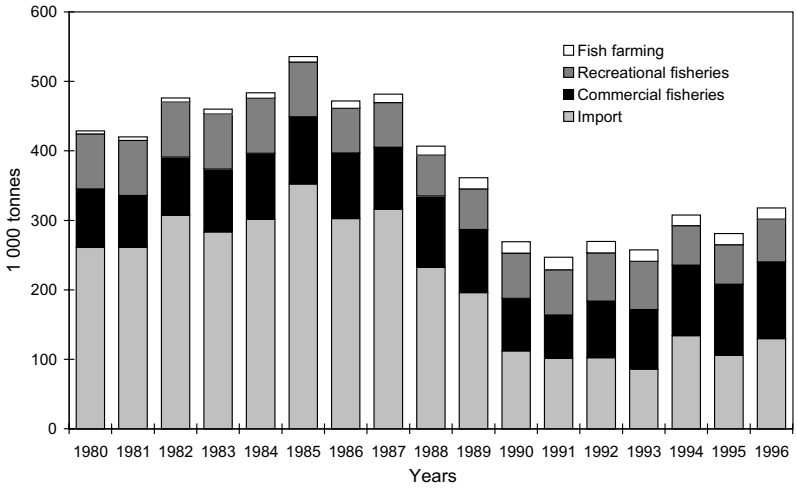

Fig. 1. Fish supply in 1980–1996.

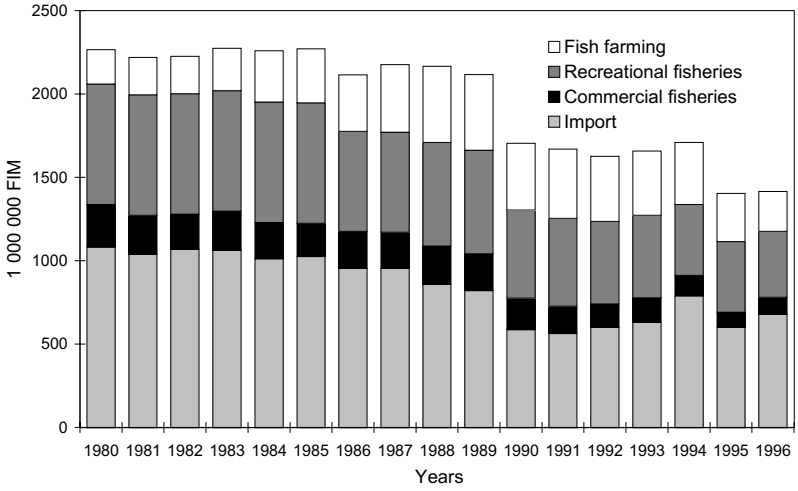

Fig. 2. Real value of fish supply in 1980–1996.

tionwide surveys of Finnish fish consumption were started in the late 1980s. Price statistics and published time series concerning fish market have been available since the 1990s. In this study, the volume, structure and development of Finnish fish market are described mainly basing on the statistics compiled and surveys run by the Finnish Game and Fisheries Research Institute.

The Finnish Game and Fisheries Research Institute regularly compiles statistics on commercial fisheries in the sea area and inland waters, recreational fisheries, fish farming, stockings of fish and crayfish, fish prices, foreign trade of fish and fish processing. Each statistics publication has a description of the methods used (e.g., Finnish Game and Fisheries Research Institute 1997a, 1997b, 1997c, 1997d, 1997e, 1997f, 1998a, 1998b). In this context, fish consumption covers aggregate fish supply without storage changes. The term "edible fish weight" covers fillet weight when domestic fish is concerned, and product weight when imported fish is concerned. The methods of calculating fish consumption are itemized by Vihervuori and Ahvonen (1997).

The review of Finnish fish consumption are based on several surveys made by Finnish Game and Fisheries Research Institute. The material and methods of those surveys have been published in separate research reports (Honkanen 1996, Honkanen *et al*. 1991, 1997, 1998).

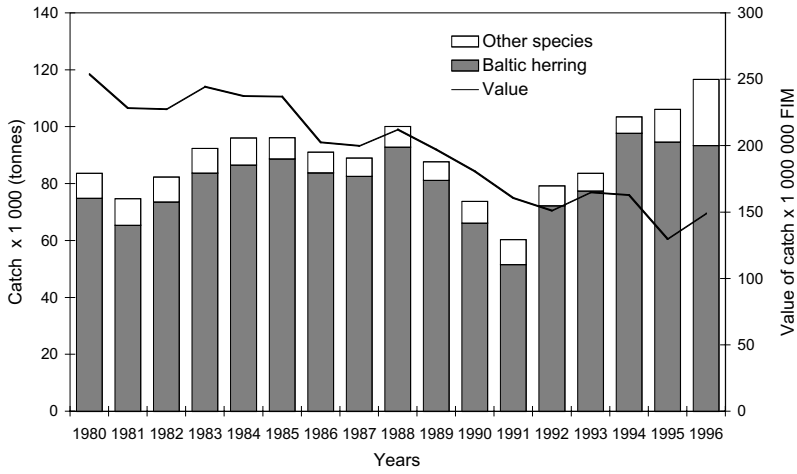

Fig. 3. Catches in commercial fisheries and the share of Baltic herring in the marine catch.

Total supply of fish

The total fish supply (fisheries, aquaculture and foreign trade) in Finland was about 320 000 tonnes (FIM 1 400 million in value) in 1996. The supply of domestic fish was 200 000 tonnes in ungutted weight. The commercial fisheries accounted for 62%, recreational and subsistence fisheries 29% and fish farming 9% of the domestic supply. Imported fish and fish products accounted for about 130 000 tonnes in product weight (FIM 678 million in value). Finland exported 12 000 tonnes of fish of the value FIM 100 million in 1996. The amount of imported fish is almost equal to that of domestic fish in human consumption, if both are counted as ungutted weight.

One half of the fish supply was used for human consumption, and the other half as feed for fur animals. As much as 70%–80% of Baltic herring, the most important species in commercial fisheries, was used as fur-animal feed. The fur animals were also fed with other fish, mainly sprat (*Sprattus sprattus*) and low value species caught in mass removal inland fisheries, as well as imported fish offals (Nylander and Savolainen 1997). Of the fish or fish products imported to Finland, nearly 70% was fish offals, meal and oil for animal feed in 1996 (Finnish Game and Fisheries Research Institute 1997d).

In the 1980s and 1990s, the total fish supply varied between 250 000 and 540 000 tonnes and the value of supply between FIM 1 400 000 and 2 200 000 million (Figs. 1 and 2). The supply decreased strongly at the end of the 1980s. At that time the import of fish waste and the demand of Baltic herring for fur-animal feed dropped because of the depression in fur industry. During the 1980s, the rainbow farming grew and import of fish and fish products for human consumption increased (Söderkultalahti *et al.* 1997).

Commercial fisheries

In the sea area of Finland, there were 3 000 fishermen in 1996. Their total catch was 116 600 tonnes. The most important fish species was Baltic herring, which accounted for 80%–90% of the total catch (Fig. 3). About two thirds of Baltic herring is used for fur-animal feed. Thus, the variations in the annual catches of Baltic herring are highly dependent on the demand for fish for fur-animal feed.

In 1995–96, catches of sprat have considerably increased due to the strengthened fish stocks. In 1996, 14 000 tonnes of sprat was caught, mainly for feed. As to the volume of catch, the other important species in the commercial catches in sea area are cod (*Gadus morhua*), whitefish (*Coregonus lavaretus*) and smelt (*Osmerus eperlanus*). However, cod catches are almost totally landed abroad, eg. in Denmark.

In addition to Baltic herring, other important species, by the value of catch, are whitefish, cod and salmon. The value of the total catch in com-

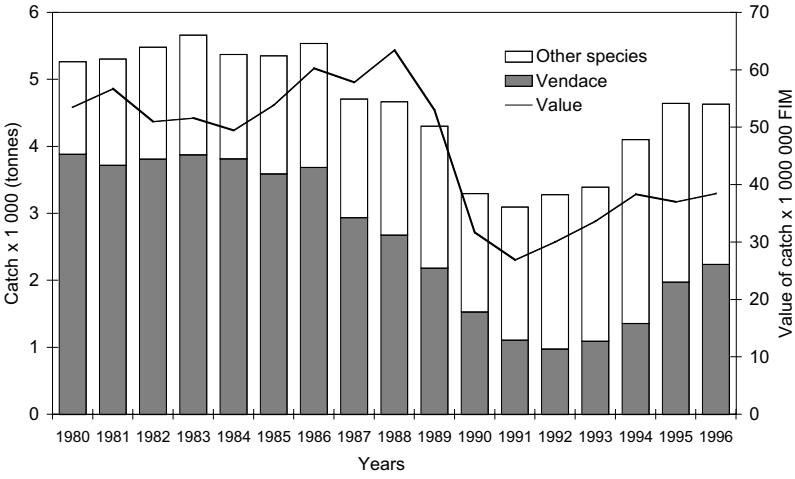

Fig. 4. Catches in commercial fisheries and the share of vendace in the catch in inland waters.

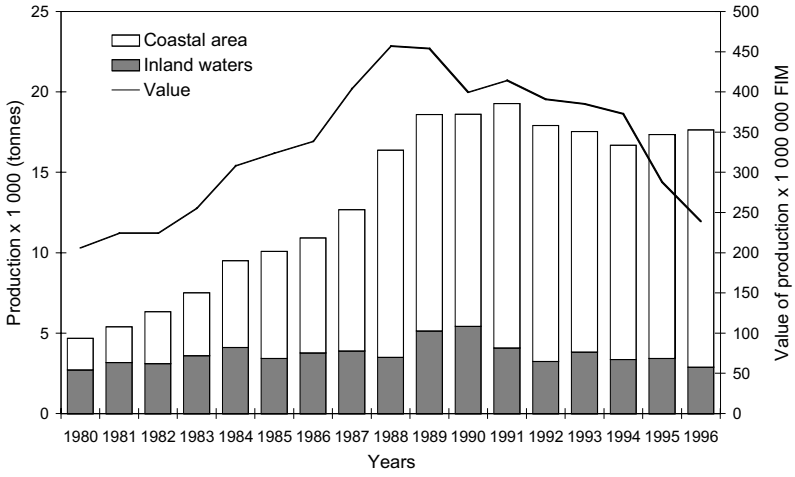

Fig. 5. Production of farmed edible fish in sea area and in inland waters in 1980–1996.

mercial sea fisheries in 1996 was FIM 149 million, basing on the average price paid to commercial fishermen. The value of Baltic herring was FIM 76.7 million.

In inland waters, about 1 200 commercial fishermen caught 4 600 tonnes of fish, FIM 38 million in value in 1996. The most important species was vendace (*Coregonus albula*), in both the amount and the value of the catch. In 1996, commercial fishermen caught 2 200 tonnes of vendace, FIM 25.7 million in value (Fig. 4) (Söderkultalahti *et al.* 1997).

Fish farming

In 1996, there were 238 food fish farms in coastal area and 93 by inland waters. Their production totalled 17 700 tonnes, and 99% of the farmed food fish was rainbow trout. The value of production was FIM 239 million (Fig. 5).

Fish farming became a source of livelihood in Finland in the 1960s. Up to the early 1970s fish was farmed in inland waters only. In the 1980s fish farming in brackish water in the Baltic coastal area expanded strongly. In the beginning of the 1990s the growth of production volume reached its top level and has after that remained at quite a stable level of 18 000 tonnes. Today, 80% of food fish is farmed in the coastal area. Rainbow trout farming in Finland differs essentially from that in most European countries, where the main product is a portion-sized rainbow trout. All the rainbow trout culture in Finland is based on the production of large rainbow trout, weighting one to three kilograms (Savolainen 1994).

The profitability of fish farming has decreased since 1988 due to the declining fish prices. The

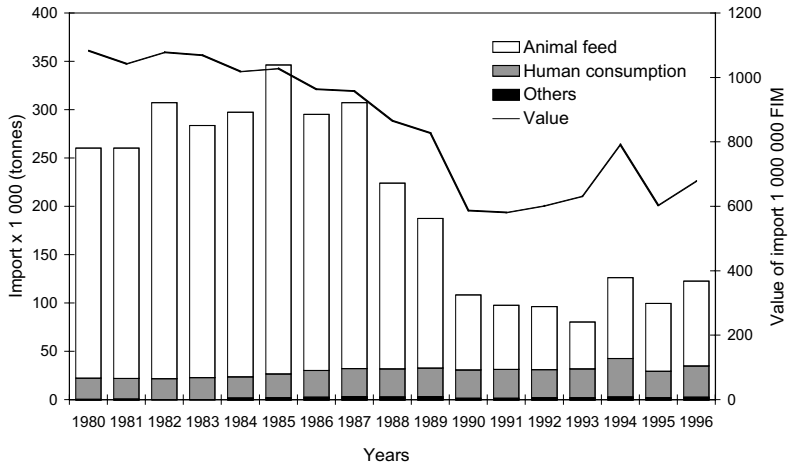

Fig. 6. The amount and the real value of fish and fish products imported to Finland in 1980–1996.

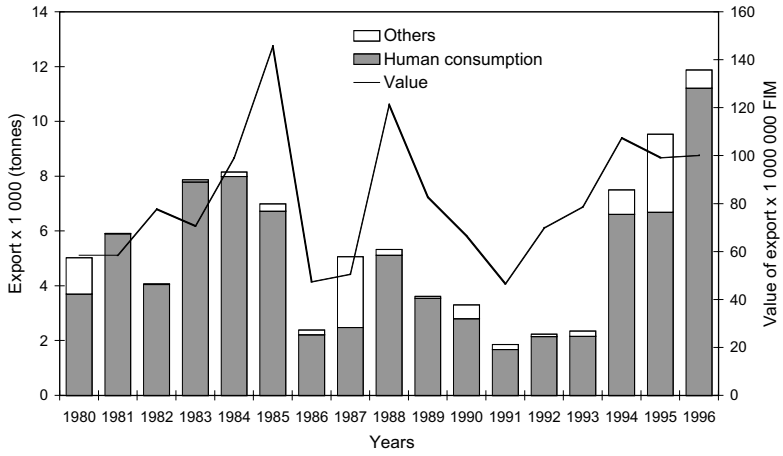

Fig. 7. The amount and the real value of fish and fish products exported from Finland in 1980–1996.

price drop was mainly a consequence of tightened competition in the Finnish fish market caused by a high domestic aquaculture production and an increased import of fish. The expansion of fish farming is restricted by national legislation in order to diminish environmental impacts (Söderkultalahti *et al*. 1997).

Foreign trade

The volume of the import of fish and fish products to Finland is over ten times larger than the volume of exports. 130 000 tonnes of fish and fish products, FIM 678 million in value, were imported to Finland in 1996. One quarter of the imported fish was used for human consumption and the rest for animal feed. Two thirds of the imported feed fish was fish offals and one third was fish meal. The import of feed fish decreased considerably at the end of the 1980s because of the depression in fur animal farming. In recent years, the import of feed fish has increased again due to the recovery of fur farming industry (Fig. 6). The fish for human consumption accounted for 75% of the total value of imported fish in 1996.

In 1996, 16 000 tonnes of fish preparations and preserves was imported to Finland, covering 46% of the volume of the fish imported for human consumption. Fresh or chilled fish imports totalled 6 000 tonnes and frozen fish fillets 5 400 tonnes. In 1996, almost half of the imported fish, 43% of the value and 45% of the volume, came from Norway. Other important countries where fish were imported from were Denmark, Iceland and Sweden.

In 1996, less than 12 000 tonnes of fish and fish products was exported from Finland. The value of export was FIM 100 million (Fig. 7). The

exported fish was mainly for human consumption. Finland exported mostly rainbow trout, Baltic herring and roe of these species. Less than 20% of the exported fish was processed. More than 80% of the volume of export was to Russia, but by the value the export to Japan was the greatest. In recent years, the fish export to Russia has grown strongly (Söderkultalahti *et al*. 1997).

The volume of foreign trade of fish in Finland is very small as compared to that of other European countries. In 1992, the amount of fish and fish products imported to Finland was 2% of the total import of fish and fish products to EU countries. The respective percentage concerning export was 0.1 (Vihervuori 1994).

Fish processing

Over 200 companies processed fish in Finland in 1995. Most companies are very small. Ten of the biggest companies processed over 50% and 170 smaller companies only 10% of the total production. The supply and demand for domestic fish in the Finnish fish market vary depending on season and a region. Fish catches are substantially small as compared to the catches in many European countries (Karttunen 1994, Tuunainen 1994). The low volumes and high variations in the volume of fish make it risky for the Finnish fish processing industry to invest in modern technology and to compete economically. The uneven supply of domestic fish has been compensated by imported fish.

In 1995, 30 000 tonnes of fish was used for processing. Fish processing was mainly based on domestic fish and only 17% of raw material was imported. The total volume of fish in processing has remained rather stable in the 1990s, but farmed rainbow trout has captured market from Baltic herring. These species covered 90% of the domestic processed fish. The most important species of the imported fish used in processing industry were herring, whitefish, mackerel (*Scomber scombrus*) and salmon.

Altogether 13 500 tonnes of Baltic herring, 8 500 tonnes of rainbow trout and about 2 000 tonnes of whitefish were processed. Most of the fish was filleted or smoked. Of the Baltic herring, 69% was filleted and 12% smoked. Half of the rainbow trout was filleted, one fifth was smoked and one fifth was cold smoked or slightly salted. Three quarters of whitefish was smoked and the same amount of salmon was filleted (Table 1). Of all fillets, 85% consisted of Baltic herring and rainbow trout. Baltic herring, rainbow trout and whitefish each represent approximately 25% of the Finnish smoked fish market (Table 2). According to Nylander and Vihervuori 1997, 10% of domestic and 40% of imported fish was used for preserves or preparations.

Diversity between the processing firms is high. Small firms often operate regionally and process fish manually. Baltic herring, however, is mostly filleted by machine. In 1994, there were about 40 Baltic herring filleting machines in Finland. Production processes in preserving industry are highly automated. Also smokehouses mainly use automated equipment, but a lot of handling and packing is done manually. The average effective utilization rate of machines in the Finnish processing companies is rather low, under 30% (Setälä *et al*. 1994).

Table 1. Products processed of Baltic herring, rainbow trout, whitefish and salmon in 1995.

	Baltic herring (%)	Rainbow trout (%)	Whitefish (%)	Salmon (%)
Fillet	69	43	24	69
Smoked	12	17	68	10
Cold smoked	0	15	0	14
Deep frozen	7	0	0	0
Slightly salted	0	7	0	0
Ready to eat	4	0	0	0
Others	8	18	8	7
TOTAL	100	100	100	100

Fish trade and distribution

In Finland, the collecting, processing and trading of fish are done by private wholesale and processing companies. In 1994, there were over 200 companies of that kind. Their total sales was about FIM 1 billion and they employed about 1 100 persons. Over half of the firms were very small (sales under FIM 1 million a year). The sales of the 25 biggest companies exceeded FIM 10 million a year and they accounted for over 70% of the total sales in the fish business. Only two cooperating groups of companies had sales exceeding FIM 50 million a year.

It is typical, especially for the largest enterprises, that they have several kinds of activities. The smaller processing firms mainly focus on processing and their distribution channels vary. The largest companies collect raw material from several sources, process various fish products and sell them to different market segments (Setälä *et al*. 1994).

Fish wholesalers and processors buy most of the domestic fish from fishermen and fish farmers. The largest fish processing companies also import raw material mainly from Norway, Sweden and Canada. Small companies usually resell fish to companies specialized in distribution and located in population centres. The biggest wholesalers collect fish and distribute their products themselves or use widespread distribution channels such as central trade chains. The big central trade chains and import companies import fish products such as frozen fish fillets from Norway, canned fish products from Asian countries and semipreserved fish products from Sweden (Setälä *et al*. 1994). Most of domestic fish is distributed by wholesalers and a major part of imported fish products is sold to catering sector (Honkanen *et al*. 1991).

In 1992, there were some 250 specialized fish retail stores in Finland. However, most fish is sold to consumers via 1 500 food shops or fish departments in supermarkets or department stores. Fishmongers, fishermen and fish farmers and ambulating fish processors also sell fish to consumers in annual fish marketing events arranged in many places around Finland (Matkailun koulutus- ja tutkimuskeskus 1992). Some 15 000 catering places and institutional kitchens serve fish in Finland (Honkanen 1996).

The fish used for feed is mainly bought by the freezing plants on the coast. Fish and filleting remains are frozen there and resold to feed preparation plants located near the fur animal farms. There it is mixed with other feed components. In 1996, there were seven freezing plants and seventeen feed preparation plants in Finland. The feed is consumed by 2 000 fur animal farms (Suomen Turkiseläinten Kasvattajain Liitto ry. 1996).

Fish consumption and consumers' attitudes

Fish consumption in Finland is nearly double compared to the average consumption in Europe (Fig. 8). The Finns annually consume about 14.5 kg of fish per person in edible fish weight (Vihervuori *et al*. 1997). Recreational and subsistence fishery cover one quarter, commercial fisheries covers one fifth, farmed fish one tenth and imported fish nearly half of the total consumption. Nearly half of the consumption of domestic fish is Baltic herring and rainbow trout. This is mainly due to the fact that the supply of these two species is more stable than that of most other fish species. Whitefish has traditionally been one of the most important species in the Finnish fish industry. The consumption of salmon has increased remarkably due to the increased import from Norway. The growth of supply, the extension of the range of products available and the low prices have made salmon more popular among Finnish consumers.

Table 2. Fillets and smoked products processed by species in 1995.

	Fillets (%)	Smoked (%)
Baltic herring	63	28
Rainbow trout	24	25
Salmon	4	0
Whitefish	3	23
Mackerel	0	13
Halibut	0	4
Others	6	7
TOTAL	100	100

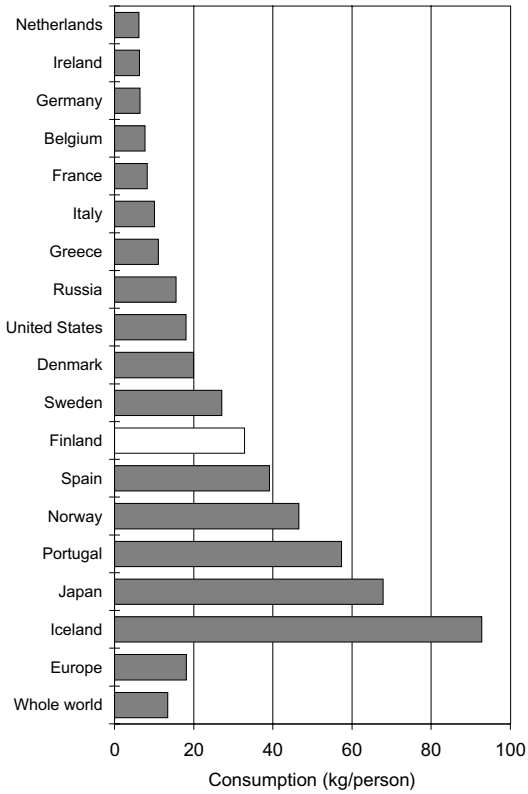

Fig. 8. Fish consumption in some countries in 1993 (FAO 1996).

Traditional Finnish fish species such as pike (*Esox lucius*), perch (*Perca fluviatilis*), bream (*Abramis brama*) and burbot (*Lota lota*) are partly replaced by salmonides. Although Finns still consume a lot of these species caught by recreational and subsistence fishermen, the interest to purchase these species is decreasing. A common problem with most wild fish species is seasonal fluctuation in catches leading to an uneven supply on the market (Setälä *et al.* 1996). There is, however, one exception; the consumption of pike perch (*Stizostedion lucioperca*) has increased. Catches of pike perch have increased in the last few years and the supply is rather stable.

Rainbow trout and Baltic herring are frequently sold in supermarkets and local shops. The popularity of these species among consumers can be partly explained by the habit of buying fish and fish products at the same store where other food supplies are bought (Honkanen *et al.* 1997). The other fish species are mainly sold in special fish stores, at market halls and market places, although the range of fresh fish products available in supermarkets has expanded.

Finnish consumers' attitudes towards fish are generally quite positive: fish is considered to be a light foodstuff with a high nutritional value and a reasonable price. In addition, there are considerable similarities between the fish consumption patterns of private consumers and catering establishments. In particular, the opinions about quality and availability of fresh fish are almost identical (Honkanen 1996). Despite the large changes in the market for fish and fish products in Finland during the last years, the consumers' attitudes seem to remain rather stable (Honkanen *et al.* 1997). However, some changes in consumers' patterns have created a demand for advanced processed products. A modern consumer prefer highly processed products which are easy to buy and prepare (Honkanen *et al.* 1991, Salmi *et al.* 1994).

Discussion

In 1995, when Finland joined the EU, the Finnish fisheries sector had to adopt rapidly the Common Fishery Policy and adapt to the Single Market. The profitability of Finnish commercial fisheries declined considerably due to several reasons during the first year of membership. The barriers of trade were removed between the EU states and new impediments were set up to some other nations. The price of food products competing with fish products decreased. The new value-added-tax made the burden of fish producers more heavier. The price support paid for Baltic herring delivered to fish processing industry was removed.

These immediate impacts of the EU membership reduced the competitiveness and prices of fish products on the Finnish food market. Most of the above changes would have been realized even if Finland had not joined the EU due to EEA and GATT agreements. However, the rapidity of changes made the adaptation to the new situation difficult. On the positive side, new prospects to Finnish fish industry opened on account of a new export market for Finnish fish in the EU and the new financial aids through EU. Structural aid can be paid to the fisheries sector to solve the problem of overcapacity, to improve the industrial structure and enhance its international competi-

tiveness. Finnish fish processing companies have successfully used new investment subsidies to modernize their production activities and to improve their product quality.

The future development of Finnish fish market depends on several circumstances. Finnish consumers' attitudes towards fish are generally quite positive, yet there is one aspect to be noticed. Fish is not as popular among young people as it is within older age groups. Some young people are biased against fish and its smell. They consider eating fish difficult and they do not share the tradition of handling and preparing self-caught fish as previous generations do (Honkanen *et al.*1998). Therefore, the processing industry has to develope new easy to use fish products that meet the requirements of the busy lifestyle. Consumers demand high-quality food products at a competitive price. Thus, further improvement on quality and diversification of far advanced processed products is needed. The distribution of fish products may be concentrated in Finland in the future. It is probable that big central trade chains will only rely on largest fish wholesale and processing companies, which have the most reliable deliveries of diverse fish products and developed computerized order systems.

Fish farming has significantly levelled down the seasonal changes in supply, but it is almost totally based on the production of rainbow trout. Currently, remarkable research input is made to find new fish species for cultivation. New cultivated fish species may diversify and expand the Finnish fish market. Whitefish, crayfish, arctic char and perch are under research work at this moment (e.g., Koskela *et. al.* 1998a, 1998b).

The supply of wild fish depends on the state of fishing waters. The rapid eutrofication of the Baltic Sea may have an impact on the fish stocks and the quality of fish. The Baltic herring trawling has intensified and it is concentrated on certain areas along the Finnish coast. Up to now, the Baltic herring stocks on the Finnish coast have tolerated intensified fishing, but in the last few years there has been discussion about overfishing in some fishing areas among fisheries biologists (International Council for the Exploration of the Sea 1998). Also consumers seem to pay more attention to ethic and conservational aspects.

When joining the EU, Finland was given a permission to continue direct feed fishing, although it is normally forbidden in the EU. If the state of Baltic herring stocks weakens, it will firstly affect feed fishing. On the other hand, Baltic herring fisheries is highly dependent on the demand for feed fish in the fur animal industry. Market for luxury products such as fur depends mostly on the economic state in the Western countries. The economic situation in Russia affects especially the demand for Baltic herring for export. The overall internationalizing of trade means that the prices of Finnish fish products also depend more and more on the development of world fish prices.

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