PART 3: EUR-7 nC (Bulgaria, Latvia, Lithuania, Malta, Romania, Slovakia and Norway)

BULGARIA

Bulgaria has a coastline of 378 km and a population of approximately 8 million. The Bulgarian economy has undergone a difficult period of transformation and adjustment from a centrally planned structure to a market economy over the last decade. As a result, the national fleet operating in the Black Sea suffered through lack of investments and government subsidies. A reliance on trade with the disintegrating former Soviet Union hit the national economy badly in the 1990s and resulted in a severe loss in international trade and foreign exchange. In recent years, the fisheries sector has also been badly affected by water pollution but there are signs of habitat improvements both in the Black Sea and the Danube River. This, coupled with increasing foreign support, may help to revitalise the sector. Prospects for the development of the aquaculture sub-sector, particularly with respect to mussel cultivation, appear to be good.

Production: captures, aquaculture and commodities 1989-1998

In 1998, Bulgaria produced 15 000 tonnes of live weight product, with aquaculture contributing to approximately 30 percent of total production (Eurofish, 2003).

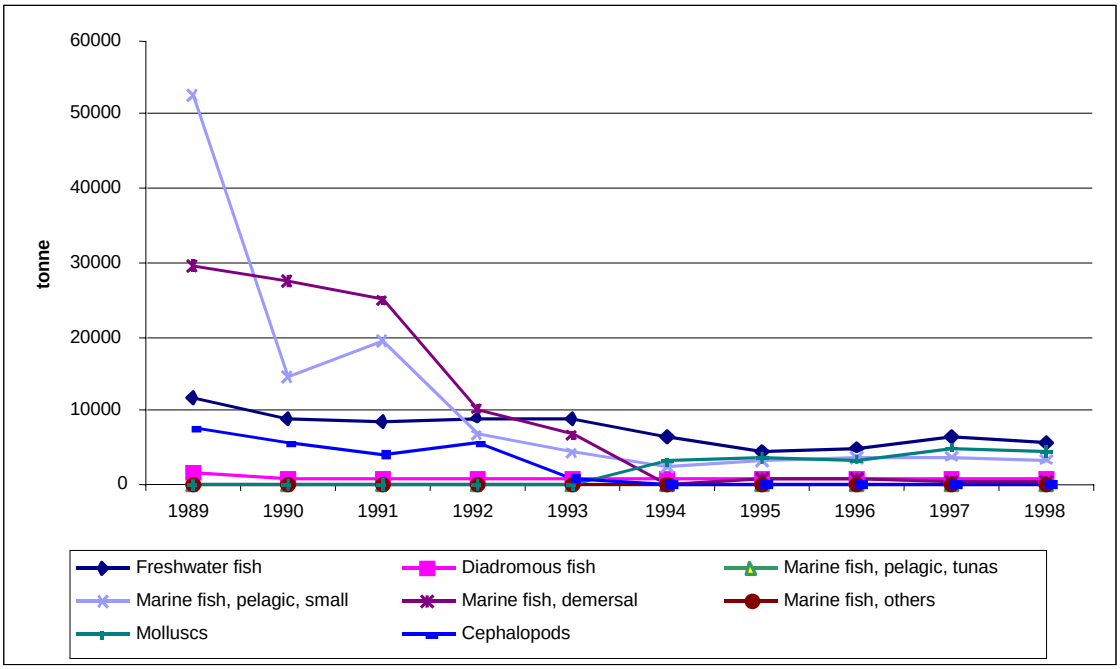

Figure 103: Bulgaria - Capture and aquaculture production 1989-1998

Captures

Catches decreased from 49 000 tonnes in 1990 to approximately 11 000 tonnes in 1998. This decline can be attributed to a significant fall in productivity of the distant water fleet. Due largely to a lack of state subsidy, the high seas fishery, the mainstay of the sector for thirty years, ceased operations in 1995 (Anon., 1998b). Marine landings now consist mainly of sprats, anchovy, horse mackerel and whiting (European Parliament, 1998).

Freshwater production is quite important in Bulgaria, with about half of the country's 61 000 hectares of freshwater bodies suitable for fisheries production (FAO, 1997d).

Table 544: Bulgaria - Captures by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Freshwater fish	1400	1554	1391	1576	1623	960	703	972	1733	2168	1408
Diadromous fish	112	90	80	55	66	50	173	264	225	231	135
Marine fish, pelagic, tunas	3	17	15	12	8	0	25	33	16	51	18
Marine fish, pelagic, small	52696	14473	19538	6623	4376	2294	3015	3665	3768	3386	11383
Marine fish, demersal	29418	27428	24901	10203	6546	93	899	603	524	473	10109
Marine fish, others	4	13	7	14	7	8	70	49	51	107	33
Molluscs	0	0	0	0	0	3000	3302	3260	4900	4300	1876
Cephalopods	7581	5524	4079	5503	1062	0	0	0	0	0	2375
Total gp of species	91214	49099	50011	23986	13688	6405	8187	8846	11217	10716	27337

Source: database

Aquaculture

There are 8 500 hectares of specialised carp and trout farms in Bulgaria and, in 1997 there were 4 000 tonnes of carp and 700 tonnes of trout harvested, out of a total production of 5 500 tonnes. Other species produced include sturgeons, pike-perch and catfish.

Production from freshwater fisheries and aquaculture has been limited by a lack of interest from the national government due to its preoccupation with the distant water fleet and by the degradation and pollution of the freshwater system. Still, in recent years, the Bulgarian government has committed to expand activities at the 21 state-run fish farms, improving aquaculture prospects. Finally, although mussel cultivation is in its infancy in Bulgaria, with production levels of only around 30-40 tonnes, further development is expected in this sub sector (Anon. 1998b). Additional mussel farms, with Japanese assistance, are already planned.

Table 545: Bulgaria - Aquaculture by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Freshwater fish	10160	7149	7112	7397	7185	5400	3700	4100	4630	3600	6043
Diadromous fish	1455	700	686	735	712	700	650	585	740	550	751
Molluscs	0	0	0	0	0	0	265	42	67	92	47
Total gp of species	11615	7849	7798	8132	7897	6100	4615	4727	5437	4242	6841

Source: database

Commodities production

Food use commodities production

Bulgarian food use commodities production was around 23 000 tonnes on average between 1993 and 1998. The major food use commodity produced in Bulgaria is frozen fish, followed by prepared/preserved fish, fish cured and molluscs.

Table 546: Bulgaria - FU Commodities Production by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish, cured	na	na	na	na	5129	3226	4197	4027	3444	3737	3960
Fish, fresh/chilled	na	na	na	na	653	765	453	658	543	432	584
Fish, frozen	na	na	na	na	9191	6754	15432	14326	9048	6578	10221
Molluscs	na	na	na	na	2345	3421	4321	3221	3543	3425	3379
Prepared/preserved fish	na	na	na	na	7265	4395	5730	4833	4162	4643	5171
Total FU Production	na	na	na	na	24583	18562	30133	27066	20740	18815	23316

Source: database

Commodities of freshwater origin have been declining in line with the production problems of the sector. The erratic pattern of production of commodities from marine origin reflects the difficulties encountered in relying on imports to supply the industry since the collapse of the production of the distant water fleet.

Table 547: Bulgaria - FU Commodities Production by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Freshwater fish	na	na	na	na	653	765	453	658	543	432	584
Marine fish, pelagic, small	na	na	na	na	1222	459	706	748	0	0	523
Marine fish, others	na	na	na	na	20363	13916	24653	22439	16654	14958	18831
Molluscs	na	na	na	na	2345	3421	4321	3221	3543	3425	3379
Total FU Production	na	na	na	na	24583	18562	30133	27066	20740	18815	23316

Source: database

Non-food use commodities production

Bulgaria does not produce any non-food use commodities.

Non-food use: trade and net supply 1989-1998

The majority of domestic production is used for human consumption. Therefore, the industry for non-food use is mainly supplied by imports. From 1994 to 1998, the average volume of imports was 9 300 tonnes and the volume of exports was nearly 3 400 tonnes. In 1995, only 290 tonnes of fish were processed for animal feed or other purposes (FAO, 1997d).

Non-food use imports

As the majority of Bulgarian production is made of algae-eating fish (common and grass carp), there are very low levels of non-food use commodities imports such as fishmeal. Also, the trend is decreasing as re-exportation has fallen dramatically and as vegetal substitutes begin to replace fish in the ingredients of fishmeal.

Table 548: Bulgaria - NFU Commodities Imports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish/marine mammal, fat, oil	na	Na	na	na	141	0	123	6	18	12	50
Flour, meal unfit for human cons.	na	Na	na	na	960	11464	12371	10752	6224	5992	7960
Total NFU Imports	na	Na	na	na	1101	11464	12494	10758	6242	6004	8010

Source: database

Table 549: Bulgaria - NFU Commodities Imports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, small	na	na	na	na	960	11464	12371	10752	6224	5992	7960
Marine fish, others	na	na	na	na	141	0	123	6	18	12	50
Total NFU Imports	na	na	na	na	1101	11464	12494	10758	6242	6004	8010

Source: database

Non-food use exports

Exports have fallen dramatically since 1996. Exports consisted mostly of re-exportations, as national production is nonexistent.

Table 550: Bulgaria - NFU Commodities Exports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish/marine mammal, fat, oil	na	Na	na	na	0	0	120	0	0	0	20
Flour, meal unfit for human cons.	na	Na	na	na	0	2018	5976	7076	1763	137	2828
Total NFU Exports	na	Na	na	na	0	2018	6096	7076	1763	137	2848

Source: database

Table 551: Bulgaria - NFU Commodities Exports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, small	na	na	na	na	0	2018	5976	7076	1763	137	2828
Marine fish, others	na	na	na	na	0	0	120	0	0	0	20
Total NFU Export	na	na	na	na	0	2018	6096	7076	1763	137	2848

Source: database

Non-food use net supply

As there is no Bulgarian production of non-food commodities, non-food use net supply is only made up of imports, with a small share of these imports being re-exported.

Table 552: Bulgaria - NFU net supply by OECD group of commodities 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Fish/marine mammal, fat, oil	na	na	na	na	141	0	3	6	18	12	30
Flour, meal unfit for human consumption	na	na	na	na	960	9445	6395	3676	4462	5855	5132
Total NFU net supply	na	na	na	na	1101	9445	6398	3682	4480	5867	5162

Source: database

Table 553: Bulgaria - NFU net supply by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Marine fish, pelagic, small	na	na	na	0	960	9445	6395	3676	4462	5855	5132
Marine fish, others	na	na	na	0	141	0	3	6	18	12	30
NFU net supply	na	na	na	0	1101	9445	6398	3682	4480	5867	5162

Source: database

Market for human consumption

Trade

As a result of declining catches during the 1990s, a formerly well-supplied industry with a positive trade balance has been forced to import increasing quantities of fish for domestic consumption. Overall, as much as 80 percent of the national demand is now met through imports. This dramatic increase is mainly due to the rise of frozen fish imports, which accounted for 18 000 tonnes in 1998. On average, Bulgaria imported 11 000 tonnes of food use commodities between 1993 and 1998, while exports amounted to 8 000 tonnes. In terms of value, Bulgarian imports accounted for US$18 million in 1995, whereas exports represented US$ 10 million.

Food use imports

Frozen and fresh fish products represent the first food use Bulgarian import with 70 percent percent of total imports on average over the period considered. Frozen mackerel is the most important frozen commodity imported into Bulgaria. The second ranked item, with 20 percent of the imports, is crustaceans.

Table 554: Bulgaria - FU Commodities Imports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Cephalopods	na	na	na	na	108	59	166	48	13	52	74
Crus., mol. & other aquatic inv., prepared	na	na	na	na	5	5	40	14	2	3	12
Crustaceans	na	na	na	na	1477	1460	3775	2314	1943	2129	2183
Fish, cured	na	na	na	na	305	273	126	35	144	23	151
Fish, fillets	na	na	na	na	178	290	575	185	130	201	260
Fish, fresh/chilled and frozen	na	na	na	na	3008	3664	3469	884	14563	18599	7365
Molluscs	na	na	na	na	8	102	286	454	86	50	164
Prepared/preserved fish	na	na	na	na	546	744	1045	279	82	392	515
Total FU Imports	na	na	na	na	5637	6597	9481	4213	16963	21450	10724

Source: database

The main species imported frozen are small pelagic species such as mackerels and various clupeoids, while shrimp and prawns form the bulk of crustaceans imports. Other species imported in Bulgaria include hake for demersal species and tuna for large pelagic species.

Table 555: Bulgaria - FU Commodities Imports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Diadromous fish	na	na	na	na	97	71	289	133	93	128	135
Marine fish, pelagic, tunas	na	na	na	na	59	222	342	75	45	468	202
Marine fish, pelagic, small	na	na	na	na	829	1647	1924	225	12153	14531	5218
Marine fish, demersal	na	na	na	na	336	1345	241	196	215	462	466
Marine fish, others	na	na	na	na	2716	1686	2419	754	2415	3626	2269
Crustaceans	na	na	na	na	1477	1460	3775	2314	1943	2129	2183
Molluscs	na	na	na	na	14	107	326	468	88	53	176
Cephalopods	na	na	na	na	108	59	166	48	13	52	74
Total FU Imports	na	na	na	na	5637	6597	9481	4213	16963	21450	10724

Source: database

Food use exports

The main change with respect to exports has been the large decline in trade of chilled and frozen products. Exports of these products fell from 19 000 to 1 000 tonnes between 1990 and 1995 (Anon., 1998b), mostly because of the loss of their supply source with the disappearance of the distant water fleet. The countries of Western Europe remain the main destinations for Bulgarian products (FAO, 1997d).

Table 556: Bulgaria - FU Commodities Exports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Crustaceans	na	na	na	na	487	729	589	407	633	682	588
Fish, cured	na	na	na	na	731	835	98	46	447	25	364
Fish, fillets	na	na	na	na	0	81	6	34	28	8	26
Fish, fresh/chilled	na	na	na	na	652	726	394	385	274	175	434
Fish, frozen	na	na	na	na	3863	2588	4507	8548	5486	2858	4642
Molluscs	na	na	na	na	2260	3184	1779	645	666	554	1515
Prepared/preserved fish	na	na	na	na	1127	1808	891	173	150	31	697
Total FU Exports	na	na	na	na	9121	9950	8264	10238	7685	4332	8265

Source: database

Table 557: Bulgaria - FU Commodities Exports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Freshwater fish	na	na	na	na	516	657	394	173	234	175	358
Diadromous fish	na	na	na	na	92	30	128	34	58	120	77
Marine fish, pelagic, tunas	na	na	na	na	17	197	0	0	0	0	36
Marine fish, pelagic, small	na	na	na	na	2000	2043	2350	948	2767	215	1721
Marine fish, demersal	na	na	na	na	210	135	91	36	3	28	84
Marine fish, others	na	na	na	na	3538	2974	2932	7993	3324	2558	3887
Crustaceans	na	na	na	na	487	729	589	407	633	682	588
Molluscs	na	na	na	na	2260	3184	1779	645	666	554	1515
Total FU Export	na	na	na	na	9121	9950	8264	10238	7685	4332	8265

Source: database

Food use net supply and consumption

Between 1989 and 1998 the net supply of fisheries products was equivalent to 26 000 tonnes. The market is dominated by relatively affordable fresh fish, which has been gutted and headed, while processed products are generally canned or frozen. Although the principal species consumed are herring and mackerel, there is also a market for fillets and value added items such as fish fingers, portions, surimi-based products together with a growing range of high priced products (shrimp, lobster, smoked salmon, etc.), which supply a limited luxury market for the more affluent. As

processing capacity improves in the country, the range of products available on the domestic market will increase and products such as tinned mackerel and herring will become more widely spread (FAO, 1997d).

The net supply was dominated by fresh and frozen products that represented on average around 50 percent of Bulgarian consumption. Second in rank with 20 percent come prepared/preserved products, mostly composed of canned pelagic species. Cured fish and crustaceans come next.

Table 558: Bulgaria - FU net supply by OECD group of commodities 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Cephalopods	na	Na	na	na	108	59	166	48	13	52	74
Crus., mol. & other aquatic inv., prepared	na	Na	na	na	5	5	40	14	2	3	12
Crustaceans	na	Na	na	na	990	731	3186	1907	1310	1447	1595
Fish, cured	na	Na	na	na	4702	2665	4225	4016	3140	3736	3747
Fish, fillets	na	Na	na	na	178	209	569	152	102	194	234
Fish, fresh/chilled and frozen	na	Na	na	na	8337	7870	14453	6935	18394	22576	13095
Molluscs	na	Na	na	na	93	339	2828	3030	2962	2922	2029
Prepared/preserved fish	na	na	na	na	6685	3331	5884	4940	4095	5004	4990
Total FU net supply	na	na	na	na	21099	15209	31350	21041	30018	35933	25775

Source: database

Table 559: Bulgaria - FU net supply by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Freshwater fish	na	na	na	0	137	108	59	485	309	257	226
Diadromous fish	na	na	na	0	5	40	160	98	35	9	58
Marine fish, pelagic, tunas	na	na	na	0	42	25	342	75	45	468	166
Marine fish, pelagic, small	na	na	na	0	51	63	280	24	9386	14316	4020
Marine fish, demersal	na	na	na	0	126	1210	150	160	212	434	382
Marine fish, others	na	na	na	0	19541	12628	24140	15200	15745	16026	17213
Crustaceans	na	na	na	0	990	731	3186	1907	1310	1447	1595
Molluscs	na	na	na	0	99	344	2868	3044	2964	2925	2041
Cephalopods	na	na	na	0	108	59	166	48	13	52	74
FU net supply	na	na	na	0	21099	15209	31350	21041	30018	35933	25775

Source: database

In 1995, consumption per capita was approximately 3 kg per year, a significant decrease from 6-8 kg level of the 1980s. This rate of consumption is low by European standards and results, in part, from the consumers' low purchasing power as current uncertainty and economic climate continues in the country (FAO, 1997d). In addition, the Bulgarian consumer has traditionally preferred meat and although fish may be purchased for special occasions, fish has only had a limited role in the national diet (Anon., 1998b). To improve the distribution and domestic marketing of fishery products, the trade must guarantee a better shelf life for fresh and frozen fish. This requires installation of freezer chambers and refrigerated display equipment (Eurofish, 2003).

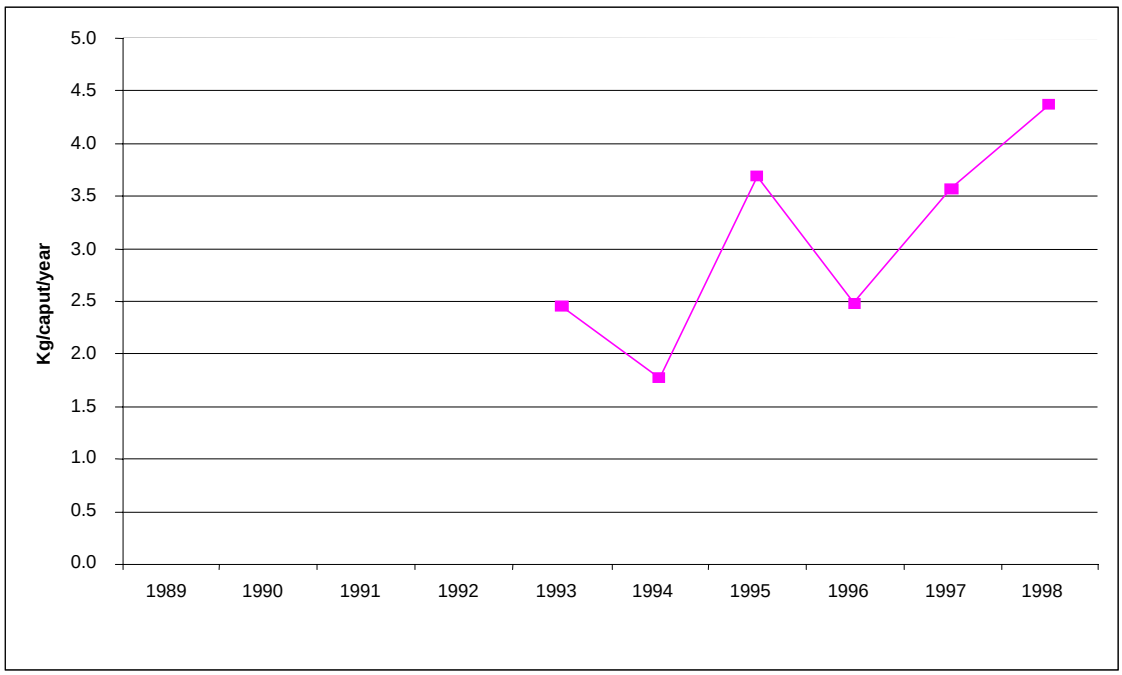

Figure 104: Fish consumption per capita per year in Bulgaria 1989-1998

Mackerel dominates fish consumption on Bulgaria with nearly a 40 percent share.

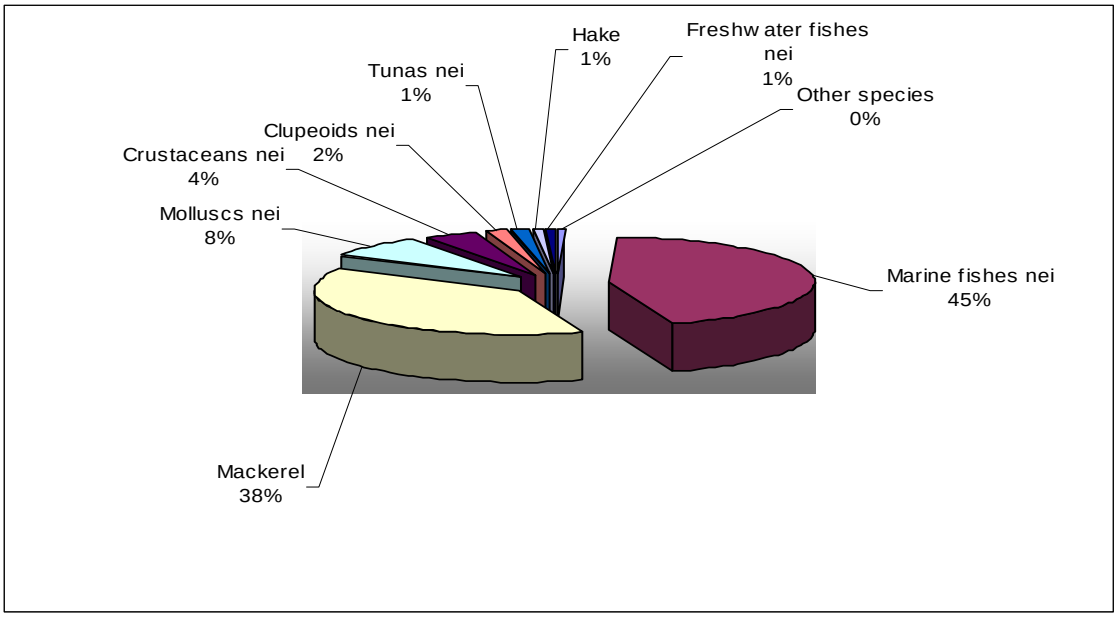

Figure 105: Bulgaria - Main species consumed in 1998

Assumptions for projection 2005-2030 and main results

Consumption trends for the OECD group of products form the basis of the model's assumptions (see methodology in Part 1 of the study). Further assumptions regarding production, imports and exports and the need for fish in Bulgaria between 2005 and 2030 take into account and extrapolate previous trends.

In Bulgaria, the main consumption trends for the period 2005-2030 assume:

- A large increase of the demand for frozen fish (100 percent) as well as a 50 percent rise in fresh fish and crustaceans. A lesser increase in consumption of prepared/preserved products (25 percent), cephalopods (10 percent), and fish fillets (10 percent).
- A small decrease (10 percent) in crustaceans and molluscs prepared.
- A stagnation of all other commodities.
- Large increases in imports of prepared preserved products and fresh and frozen fish.

This growth of Bulgarian fish consumption can be explained by the low level of fish consumption during the last decade, coupled with an expected increase in Bulgarian standard of living. The latter will allow the removal an important obstacle to increased consumption of value added products, namely low disposable income (IMES, 2001).

Also expansion of supermarket chains throughout the country (IMES, 2001) is likely to increase seafood consumption through increased availability and diversity of products. Supermarkets will be able to guarantee a better shelf life for fresh and frozen fish, which has been identified as one of the major obstacle to improve distribution and domestic marketing of fish products (Eurofish, 2003).

Table 560: Bulgaria - Assumptions for projection

OECD group	94-98% annual %	Prod T % 99-30	Imp T % 99-30	Exp T % 99-30	Cons T 99-30	Prod % Annual	Imp % Annual	Exp% Annual	Cons % Annual
Cephalopods	11%	2%	0%	10%	0%	10%		0.3%		0.3%
Crus., mol. & other aquatic inv., prepared	-29%	-6%	0%	-11%	0%	-10%		-0.3%		-0.3%
Crustaceans	58%	12%	0%	34%	0%	50%		0.9%	0.0%	1.3%
Fish, cured	9%	2%	0%	0%	0%	0%	0.0%	0.0%	0.0%	0.0%
Fish, fillets	3%	1%	0%	10%	0%	10%		0.3%	0.0%	0.3%
Fish, fresh/chilled	76%	15%	0%	163%	0%	50%		3.1%	0.0%	1.3%
Fish, frozen	184%	37%	0%	121%	0%	100%	0.0%	2.5%	0.0%	2.2%
Molluscs	37%	7%	0%	0%	0%	0%	0.0%	0.0%	0.0%	0.0%
Prepared/preserved fish	25%	5%	0%	320%	0%	25%	0.0%	4.6%	0.0%	0.7%
Fish/marine mammal, fat, oil	1129%	226%	0%	0%	0%		0.0%	0.0%	0.0%	0.0%
Flour, meal unfit for hum. Cons.	-48%	-10%	0%	0%	0%		0.0%	0.0%	0.0%	0.0%

Source: database

Aquaculture will increase production to 9 000 tonnes in 2030, on a par with capture production, which remains stable over the period considered. Imports will increase to satisfy a growing demand for fish that cannot be met by increase in production form fish farming. Major imports will consist of prepared/preserved fish, fresh and frozen fish. Exports will not increase, as national consumption will swallow all surpluses available.

Table 561: Bulgaria - Main results for projection

Nature	Average 94-98	2005	2010	2015	2020	2025	2030
Exports FU (t live wt)	8094	4332	4332	4332	4332	4332	4332
Imports FU (t live wt)	11741	25269	28437	32030	36109	40741	46007
Production FU (t live wt)	23063	18815	18815	18815	18815	18815	18815
Fish supply FU (t live wt)	26710	39752	42920	46514	50592	55225	60490
Population (X1000)	8417	8205	8208	8212	8215	8218	8222
Per caput supply (kg/h)	3	5	5	6	6	7	7
Production NFU (t live wt)	0	0	0	0	0	0	0
Imports NFU (t live wt)	9392	6004	6004	6004	6004	6004	6004
Exports NFU (t live wt)	3418	137	137	137	137	137	137
Net supply NFU (t live wt)	5974	5867	5867	5867	5867	5867	5867
Aquaculture (t live wt)	5024	4841	5377	6027	6816	7774	8940
Capture (t live wt)	9074	9074	9074	9074	9074	9074	9074
Production total (t live wt)	14098	13915	14451	15101	15890	16848	18014

Source: database

Food use net supply and human consumption 2005-2030

Net supply of fish for food consumption will have increased by 50 percent by 2030. This impressive growth in Bulgarian fish consumption can be explained by the abnormally low level of fish consumption in 1998 coupled with an expected increase in Bulgarian standard of living. As national production is very low and not increasing, except for aquaculture, consumption needs will have to be met through imports. Therefore the net supply commodities pattern will reflect the import commodities pattern, with an increase of frozen and fresh fish consumption, as well as an increase in demand for prepared preserved products and crustaceans. This variety in the increase of the net supply reflects the trend towards the expansion in the range of new products in the Bulgarian market (FAO, 2002).

Table 562: Bulgaria - FU net supply by OECD group of commodities 2005-2030 (t live weight)

Gp of commodities	Ave. 94-98	2005	2010	2015	2020	2025	2030
Cephalopods	68	53	54	55	56	57	57
Crus., mol. & other aquatic inv., prepared	13	3	3	3	3	3	3
Crustaceans	1716	1588	1694	1805	1922	2044	2171
Fish, cured	3556	3736	3736	3736	3736	3736	3736
Fish, fillets	245	198	201	204	207	211	214
Fish, fresh/chilled and frozen	14046	26103	29026	32336	36083	40325	45128
Molluscs	2416	2922	2922	2922	2922	2922	2922
Prepared/preserved fish	4651	5149	5284	5453	5664	5929	6260
Total FU net supply	26710	39752	42920	46514	50592	55225	60490

Source: database

Small pelagic species like mackerel and herring are the major species consumed in Bulgaria. Consumption of tuna is also on the increase.

Table 563: Bulgaria - FU net supply by FAO group of species 2005-2030 (t live weight)

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Freshwater fish	244	257	257	257	257	257	257
Diadromous fish	69	33	53	76	102	131	164
Marine fish, pelagic, tunas	191	575	668	777	906	1059	1241
Marine fish, pelagic, small	4814	17093	19399	22015	24983	28352	32175
Marine fish, demersal	433	521	594	676	769	874	993
Marine fish, others	16748	16707	17276	17928	18673	19527	20507
Crustaceans	1716	1588	1694	1805	1922	2044	2171
Molluscs	2429	2925	2925	2924	2924	2924	2924
Cephalopods	68	53	54	55	56	57	57
FU net supply	26710	39752	42920	46514	50592	55225	60490

Source: database

As the population growth rate (less than 1 percent) over the period considered is lower than the growth rate of the net supply (68 percent), apparent consumption per capita will increase over the next 30 years, from 5 to 7 kg per capita per year.

In 2001, more than 95 percent of fish was sold through fishmonger outlets, of which there were approximately 325 throughout Bulgaria (75 in the capital Sofia, which in value terms accounts for some 25 percent of the market). Supermarkets accounted for less than 1 percent of fish sales but, with a large expansion programme, they are likely to account for between 5 percent and 10 percent of sales by 2005. The largest supermarket in Bulgaria is Billa, which plans to have twenty-five outlets by 2005 (IMES, 2001). This development is likely to broaden availability of fish throughout the country and exert a positive influence on Bulgarian fish consumption.

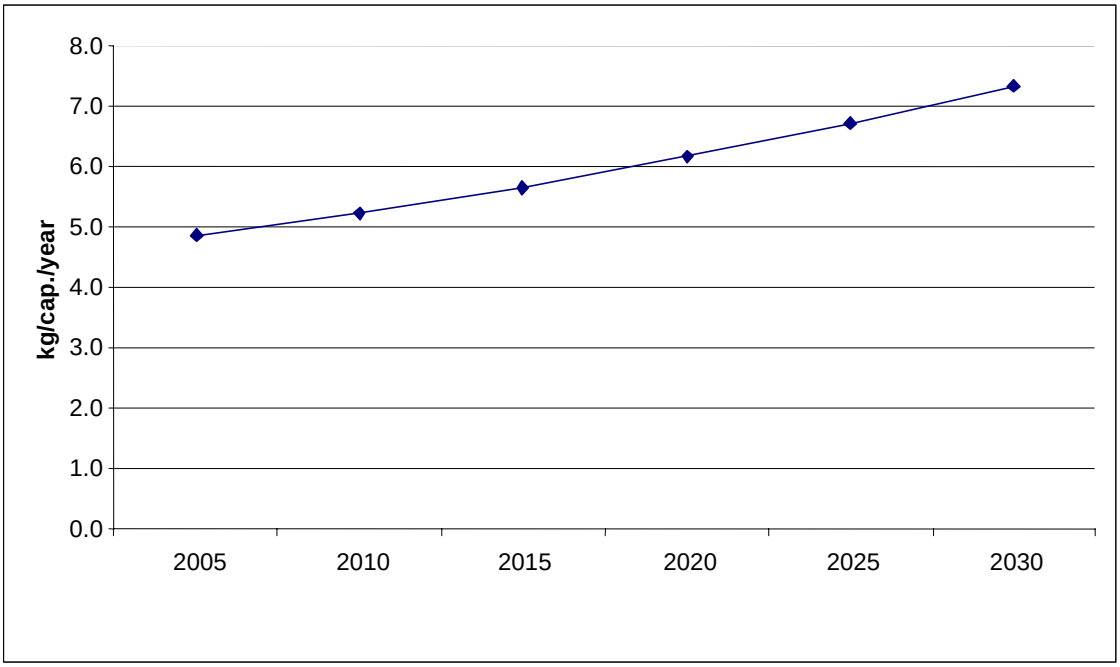

Figure 106: Fish consumption per capita per year in Bulgaria 2005-2030

The main species consumed in 2030 remain more or less the same as in 1998. Mackerel increases its market share from 38 to 51 %. Tuna and molluscs are also on the increase.

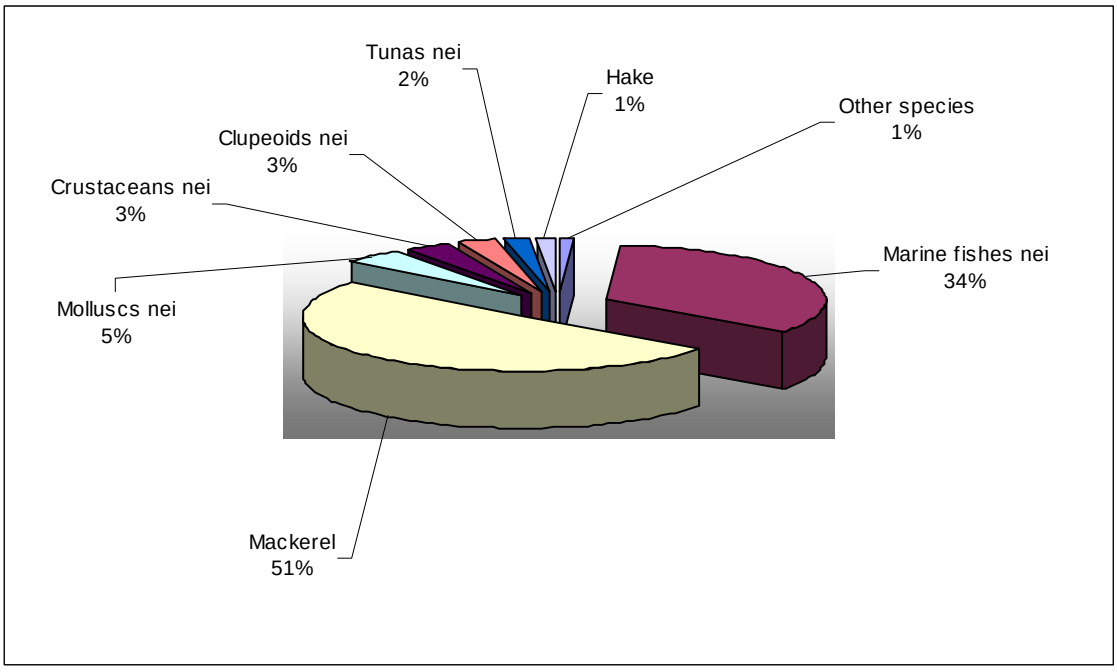

Figure 107: Bulgaria - Main species consumed in 2030

Non-food use net supply 2005-2030

The situation in the non-food use sector is not expected to change with imports and exports stable at their 1998 level.

Production 2005-2030

Capture and aquaculture

Bulgarian aquaculture production will rise to nearly 9 000 tonnes by 2030. Freshwater aquaculture will be responsible for the largest increase in production with more than 4 000 additional t. The traditional farming of common and Chinese carp is expected to be diversified (partly replaced or expanded) with commercial cultivation of more valuable fish species with better market demand, such as sturgeon, catfish, pike and perch (FAO, 2002). Mariculture will also double its Mediterranean mussel production.

Table 564: Bulgaria - Aquaculture by FAO group of species 2005-2030 (t live weight)

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Freshwater fish	4286	4185	4710	5348	6124	7067	8216
Diadromous fish	645	550	550	550	550	550	550
Molluscs	93	106	117	129	142	157	173
Total	5024	4841	5377	6027	6816	7774	8940

Source: database

Table 565: Bulgaria - Total production by FAO group of species 2005-2030 (t live weight)

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Freshwater fish	5593	5492	6018	6655	7431	8374	9524
Diadromous fish	834	739	739	739	739	739	739
Marine fish, pelagic, tunas	25	25	25	25	25	25	25
Marine fish, pelagic, small	3226	3226	3226	3226	3226	3226	3226
Marine fish, demersal	518	518	518	518	518	518	518
Marine fish, others	57	57	57	57	57	57	57
Molluscs	3846	3858	3869	3881	3895	3909	3926
Total	14098	13915	14451	15101	15890	16848	18014

Source: database

Commodities

No major changes in commodities production will be experienced in Bulgaria during the period considered. National plants will continue to produce seafood commodities at their 1998 level of around 19 000 tonnes. The main challenge for the Bulgarian production sector in view of the EU accession is the compliance of its industries with the “acquis communautaire” in the area of marketing standards (FAO, 2002).

Trade 2005-2030

Imports

Bulgarian imports increase by more than 100 percent to reach 46 000 tonnes in 2030. The biggest increase in volume is attributed to fresh and frozen fish imports that represent around 90 percent of Bulgarian imports. Crustaceans remain the second largest Bulgarian import with nearly 3 000 tonnes. Still the biggest relative increase is to be found among prepared/preserved products (canned fish) that rise by 300%, reflecting the overall increasing consumption trend for convenience food and the increased diversification in consumer demand.

Table 566: Bulgaria - FU Commodities Imports by OECD group of products 2005-2030 (t live weight)

Gp of commodities	Av. 94-98	2005	2010	2015	2020	2025	2030
Cephalopods	68	53	54	55	56	57	57
Crus., mol. & other aquatic inv., prepared	13	3	3	3	3	3	3
Crustaceans	2324	2270	2376	2487	2603	2725	2853
Fish, cured	120	23	23	23	23	23	23
Fish, fillets	276	206	209	212	215	218	222
Fish, fresh/chilled and frozen	8236	22127	25050	28359	32106	36348	41151
Molluscs	196	50	50	50	50	50	50

Gp of commodities	Av. 94-98	2005	2010	2015	2020	2025	2030
Prepared/preserved fish	509	537	672	841	1052	1317	1648
Total FU Imports	11741	25269	28437	32030	36109	40741	46007

Source: database

Mackerel represents the bulk of Bulgarian imports, as it is the main species to be found under the frozen fish and prepared/preserved group of commodities. Tuna forms the rest of prepared/preserved imports.

Table 567: Bulgaria - FU Commodities Imports by FAO group of species 2005-2030 (t live weight)

Gp Species	Av. 94-98	2005	2010	2015	2020	2025	2030
Diadromous fish	143	153	173	196	221	251	284
Marine fish, pelagic, tunas	230	575	668	777	906	1059	1241
Marine fish, pelagic, small	6096	17308	19614	22230	25198	28566	32390
Marine fish, demersal	492	550	622	705	797	903	1022
Marine fish, others	2180	4307	4877	5528	6273	7128	8107
Crustaceans	2324	2270	2376	2487	2603	2725	2853
Molluscs	208	53	53	53	53	53	53
Cephalopods	68	53	54	55	56	57	57
Total FU Imports	11741	25269	28437	32030	36109	40741	46007

Source: database

Exports

Exports will remain stable at their 1998 level of 4000 tonnes.

LATVIA

Latvia has a population of approximately 2.5 million and possesses a strong tradition and deep historical links with fishing. Its geographical location makes Latvia one of the key fishing countries in the Baltic Sea region. Its exclusive economic zone is one of the richest areas in the Baltic Sea and the Riga Gulf is one of the most abundant fishing areas in the Northern Hemisphere (Afanasjeva, 1997).
The socio-economic and infrastructure development of the region continues to depend on the fishing sector and fishing related industry provides a crucial economic function (Dixon and Godmanis, 1999). After gaining independence in 1990, Latvia inherited a large but rather old fishing sector, which initially suffered from the new economic environment. In the early years of independence fuel prices were high and the costs of production and raw materials constrained activity within the fishing industry. Between 1991-1993, the country underwent a period of privatisation, which began to benefit the catching and processing sector from 1994.

Since then general conditions for the fishery sector have improved and the situation has stabilised (Afanasjeva, 1997). Latvia's fishing industry is now becoming better aligned to world markets and demand (FAO, 1998d). The number of countries supplied by Latvia's exports of canned products, for instance, doubled to about 40 between 1995 and 2000.

Production: captures, aquaculture and commodities 1989-1998

In 1998, total production was 100 000 tonnes, representing a fourfold decline since 1990. Aquaculture is negligible and represented less than 1 percent of the total production in 1998.

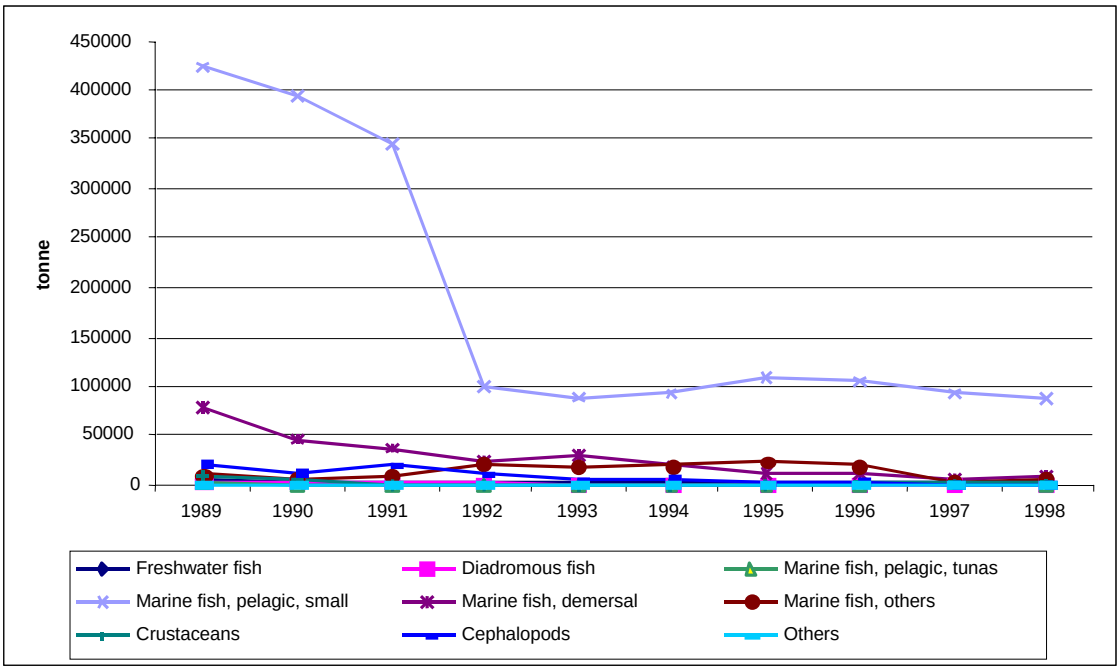

Figure 108: Latvia - Capture and aquaculture production 1989-1998

Captures

The Latvia fishery sector is comprised of four sub-sectors: the distant-water fleet, the Baltic fleet, the coastal fleet and the freshwater fishery. The dramatic decline in total production is mainly due to a fall in productivity of the distant-water fleet. Before independence, the distant-water fleet landed about 500 000 tonnes annually (European Parliament, 1998) while in 1996 landings had decreased to 70 000 tonnes. The Baltic and coastal fleet are nowadays the most important sectors of the fishing industry with 72 000 tonnes produced in 1996 (Afanasjeva, 1997).

Table 568: Latvia - Captures by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Freshwater fish	472	235	641	623	647	541	610	623	612	573	558
Diadromous fish	976	1015	1102	904	707	305	630	713	620	456	743
Marine fish, pelagic, tunas	1164	452	512	58	16	3	74	452	1110	415	426
Marine fish, pelagic, small	423857	394945	344757	99261	88189	91622	109336	105573	92353	86789	183668
Marine fish, demersal	78904	46225	37304	24172	30193	19717	13086	10874	6871	8387	27573
Marine fish, others	10512	4999	9187	20756	17530	19304	23058	19198	3118	4519	13218
Crustaceans	8484	5235	650	0	0	395	679	1253	997	1191	1888
Cephalopods	20688	11778	19421	10994	4608	6280	1717	3956	0	0	7944
Others	161	139	59	10	1	0	0	0	0	0	37
Total gp of species	545218	465023	413633	156778	141891	138167	149190	142642	105681	102330	236055

Source: database

The deep-sea fleet targets sardine, mackerel and horse mackerel mostly in Mauritanian waters, whilst the coastal fleet in the Baltic Sea targets mainly herring, sprat and cod. During the 1990s, inland fisheries produced nearly 600 tonnes per annum, including bream, roach, pike, pike-perch, eel and river lamprey (Afanasjeva, 1997).

Aquaculture

The volume of aquaculture production has fallen significantly since 1990, dropping from 2 200 tonnes to about 350 tonnes in 1997. This is mainly due to the high costs of pond maintenance and severe weather conditions affecting the industry during this period. Common carp is the traditional species, but interest in rainbow trout is on the increase. It is hoped that a new market for crayfish might be supplied by aquaculture in the future.

Table 569: Latvia - Aquaculture by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Freshwater fish	6288	2235	2300	619	334	550	520	379	342	412	1398
Diadromous fish	0	0	385	22	5	10	5	1	3	0	43
Total gp of species	6288	2235	2685	641	339	560	525	380	345	412	1441

Source: database

Commodities production

In 1995, the total fish production for human consumption was around 30 percent of its 1990 level. However, in 1994 production started to increase again, the crisis of the early nineties having been overcome (Afanasjeva, 1997). The free-market necessitated the restructuring of fish production in accordance with world market demands. Previously, production had been oriented towards canned and frozen fish, but nowadays production is much more diversified (Afanasjeva, 1997). The range of processed fish products is large, including a wide range of chilled, frozen, salted, smoked and canned fish, delicatessen fish products and preserves (Eurofish, 2003).

The sector is, however, one of the most important contributors to Latvia's food exports and industrial fish production represented about 3.4 percent of GDP in 1996. The industry already employs about 12 000 people and it is believed that it has the potential to expand further (FAO, 1998e).

Food use commodities production

Prepared/preserved fish, mostly canned products, is the main Latvian commodity. Frozen fish production has decreased by 70 percent since 1992. Fresh fish production is on the increase, while cured fish production follows quite an erratic pattern (Anon., 2001j).

Table 570: Latvia - FU Commodities Production by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Cephalopods	na	Na	na	6501	3544	4475	1256	4771	0	0	2935
Crus., mol. & other aquatic inv., prepared	na	Na	na	485	18	7	0	7	34	24	82
Fish, cured	na	Na	na	9884	8963	9224	9183	15403	10088	6657	9915
Fish, fillets	na	Na	na	0	437	651	583	1752	561	941	703
Fish, fresh/chilled	na	Na	na	0	0	1244	4321	6547	5678	6554	3478
Fish, frozen	na	Na	na	97054	92853	81927	86469	62447	25068	25782	67371
Prepared/preserved fish	na	Na	na	34246	32472	36984	46181	97253	129920	102837	68556
Total FU Production	na	Na	na	148169	138287	134513	147994	188181	171349	142795	153041

Source: database

The main species used by the Latvian food use industry are small pelagic species like herring and various clupeoids for canned products, mackerel and herring for frozen fish, while cod and herring are the main species in the fresh fish group.

Table 571: Latvia - FU Commodities Production by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, small	na	na	na	34123	35083	47456	62709	119195	106096	89000	70523
Marine fish, others	na	na	na	107062	99642	82575	84028	64208	65219	53771	79501
Crustaceans	na	na	na	485	18	7	0	7	34	24	82
Cephalopods	na	na	na	6501	3544	4475	1256	4771	0	0	2935
Total FU Production	na	na	na	148169	138287	134513	147994	188181	171349	142795	153041

Source: database

Non-food use commodities production

Non-food use production is mainly directed towards the national market. Latvian production represented around 20 000 tonnes per year between 1992 and 1998.

Table 572: Latvia - NFU Commodities Production by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish/marine mammal, fat, oil	na	na	na	1981	1397	1009	1264	1450	432	187	1103
Flour, meal unfit for human cons.	na	na	na	25768	24853	15209	16700	19662	12630	12341	18166
Total NFU Production	na	na	na	27749	26249	16218	17963	21112	13062	12528	19269

Source: database

Table 573: Latvia - NFU Commodities Production by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, small	na	na	na	25768	24853	15209	16700	19662	12630	12341	18166
Marine fish, others	na	na	na	1981	1397	1009	1264	1450	432	187	1103
Total NFU Production	na	na	na	27749	26249	16218	17963	21112	13062	12528	19269

Source: database

Non-food use: trade and net supply 1989-1998

The industry for non-food use products is mainly supplied by domestic production, from which 15 percent is directed to the non-food use sector. Between 1992 and 1998, the country imported 2 000 tonnes and exported 4 000 tonnes of non-food use products.

Non-food use imports

Imports are limited as Latvia non-food use industry is mostly supplied by its national production.

Table 574: Latvia - NFU Commodities Imports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish/marine mammal, fat, oil	na	na	na	0	234	3	0	63	0	0	43
Flour, meal unfit for human cons.	na	na	na	0	0	5030	6758	1571	529	1272	2166
Total NFU Imports	na	na	na	0	234	5033	6758	1634	529	1272	2209

Source: database

Table 575: Latvia - NFU Commodities Imports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, small	na	na	na	0	0	5030	6758	1571	529	1272	2166
Marine fish, others	na	na	na	0	234	3	0	63	0	0	43
Total NFU Imports	na	na	na	0	234	5033	6758	1634	529	1272	2209

Source: database

Non-food use exports

Non-food use exports are limited, with most production being used on the national market. Latvian non-food use exports level were around 4 000 tonnes per year between 1992 and 1998.

Table 576: Latvia - NFU Commodities Exports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish/marine mammal, fat, oil	na	na	na	0	999	534	161	537	420	162	402
Flour, meal unfit for human cons.	na	na	na	4792	3638	3613	7214	4201	1092	927	3640
Total NFU Exports	na	na	na	4792	4637	4147	7375	4738	1512	1089	4041

Source: database

Table 577: Latvia - NFU Commodities Exports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, small	na	na	na	4792	3638	3196	6149	3715	1087	925	3357
Marine fish, others	na	na	na	0	999	951	1226	1023	425	163	684
Total NFU Export	na	na	na	4792	4637	4147	7375	4738	1512	1089	4041

Source: database

Non-food use net supply

With limited exports and imports, non-food use net supply is equal to the level of the Latvian domestic production of around 12 500 tonnes annually. Aquaculture is not the main consumer of Latvian non-food use commodities as it produces mainly vegetarian species like carp. The main users are in other areas of animal farming such as pig and chicken rearing.

Table 578: Latvia - NFU net supply by OECD group of commodities 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Fish/marine mammal, fat, oil	na	na	na	1981	632	478	1103	976	12	25	744
Flour, meal unfit for human consumption	na	na	na	20976	21214	16627	16244	17032	12067	12686	16692
Total NFU net supply	na	na	na	22958	21846	17104	17346	18008	12079	12711	17436

Source: database

Table 579: Latvia - NFU net supply by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Marine fish, pelagic, small	na	na	na	20976	21214	17044	17309	17518	12072	12688	16974
Marine fish, others	na	na	na	1981	632	61	37	490	7	24	462
NFU net supply	na	na	na	22958	21846	17104	17346	18008	12079	12711	17436

Source: database

Market for human consumption

Trade

Between 1992 and 1998 Latvia imported in average of 37 000 tonnes annually while exports accounted for 85 000 tonnes. In terms of value, Latvian imports represented US$ 26.7 million in 1996 whereas exports amounted to US$ 131 million (FAO, 1998e).

Food use imports

Latvian imported approximately 40 000 tonnes of fish products during the period 1989-98. The majority of imports were made of whole frozen fish, particularly mackerel and herring. These species are imported in order to compensate for the shortfall in national capture production and to meet the

demand from the domestic processing sector and market. Norway accounted for nearly 50 percent of raw fish supply to the Latvian industry in 1996 (Afanasjeva, 1997).

Table 580: Latvia - FU Commodities Imports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Cephalopods	na	na	na	0	25	0	0	33	68	53	26
Crustaceans	na	na	na	0	0	26	74	105	89	152	64
Fish, cured	na	na	na	0	317	751	144	86	26	141	209
Fish, fillets	na	na	na	0	1449	743	974	2276	3451	3465	1765
Fish, fresh/chilled	na	na	na	3192	3365	1302	1685	2260	2218	619	2092
Fish, frozen	na	na	na	4152	7061	32592	34205	47477	61205	38153	32121
Prepared/preserved fish	na	na	na	0	351	451	500	730	1602	1929	795
Total FU Imports	na	na	na	7344	12568	35865	37582	52966	68658	44511	37071

Source: database

Table 581: Latvia - FU Commodities Imports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Freshwater fish	na	na	na	0	0	81	106	78	108	127	71
Diadromous fish	na	na	na	0	1487	309	143	288	588	946	537
Marine fish, pelagic, tunas	na	na	na	0	229	38	34	9	49	18	54
Marine fish, pelagic, small	na	na	na	0	7329	22908	30761	43755	57275	33506	27933
Marine fish, demersal	na	na	na	0	1503	3960	760	1153	610	424	1202
Marine fish, others	na	na	na	7344	1994	8544	5704	7545	9872	9286	7184
Crustaceans	na	na	na	0	0	26	74	105	89	152	64
Cephalopods	na	na	na	0	25	0	0	33	68	53	26
Total FU Imports	na	na	na	7344	12568	35865	37582	52966	68658	44511	37071

Source: database

Food use exports

Nearly 90 percent of Latvian food use commodities production is destined for export. Between 1989 and 1998, Latvia exported around 80 000 tonnes of fish commodities per year on average, comprising mainly canned herring, sprat, and cod products. The main importers of Latvian products are Russia, the Ukraine, Belarus, Kazakhstan and several central European countries. Unfortunately, Latvian exports have been severely hampered by the prevailing economic conditions in these countries and by the limited purchasing power of overseas customers. Several processors are diversifying their activities and expanding into fishmeal production as a result (Anon., 1999h).

Table 582: Latvia - FU Commodities Exports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Cephalopods	na	na	na	0	0	53	24	15	1	1	14
Fish, cured	na	na	na	0	2809	3844	4522	8484	9056	4189	4701
Fish, fillets	na	na	na	0	529	720	641	1347	997	1387	803
Fish, fresh/chilled	na	na	na	0	1106	2118	2369	4225	1279	1417	1788
Fish, frozen	na	na	na	37747	975	18934	28105	21860	14026	8856	18643
Prepared/preserved fish	na	na	na	785	31793	34608	46446	96384	121289	81517	58975
Total FU Exports	na	na	na	38532	37213	60277	82107	132315	146648	97368	84923

Source: database

Herring, other clupeoids (like sprat), and mackerel form the largest part of small pelagic species included in Latvian exports.

Table 583: Latvia - FU Commodities Exports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Freshwater fish	na	na	na	0	0	12	0	0	1	1	2
Diadromous fish	na	na	na	0	832	235	29	113	91	50	193
Marine fish, pelagic, tunas	na	na	na	0	189	10	20	6	9	0	33
Marine fish, pelagic, small	na	na	na	0	23408	36850	54819	97067	117645	79242	58433

Marine fish, demersal	na	na	na	0	321	1645	696	1084	428	346	646
Marine fish, others	na	na	na	38532	12462	21473	26519	34029	28473	17728	25602
Cephalopods	na	na	na	0	0	53	24	15	1	1	14
Total FU Export	na	na	na	38532	37213	60277	82107	132315	146648	97368	84923

Source: database

Distribution

Directly after independence, decentralisation of the existing system of wholesale and distribution resulted in higher prices. There is no auction system in Latvia and fish are sold directly to dealers or processor in the major ports. Fresh or processed products are then distributed to retailers concentrated in the larger cities. Few of these retailers have suitable facilities to store fresh fish.

Still, the overall situation has improved compared to the early 1990s. Fish is now available all year round and diversity is increasing. Only eastern regions of the country, located far from the coast, receive a limited range of fisheries products (Afanasjeva, 1997).

Food use net supply and consumption

Latvia has a strong tradition of fish consumption and between 1992 and 1998, net supply to the country was around 90 000 tonnes annually. The majority of the fish net supply is made of frozen fish (sprat, herring and mackerel) as a raw material for domestic preserved fish production.

Fresh and chilled fish, coming from the Baltic Sea, is favoured by average to low-end consumers and include species like herring, sprat, cod and flounder. Cured fish (smoked herring) and fish fillets are reserved for middle class consumers. (Afanasjeva, 1997).

Table 584: Latvia - FU net supply by OECD group of commodities 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Cephalopods	na	na	na	6501	3570	4422	1232	4789	66	52	2947
Crus., mol. & other aquatic inv., prepared	na	na	na	485	18	7	0	7	34	24	82
Crustaceans	na	na	na	0	0	26	74	105	89	152	64
Fish, cured	na	na	na	9884	6470	6131	4806	7005	1058	2609	5423
Fish, fillets	na	na	na	0	1357	675	916	2681	3015	3018	1666
Fish, fresh/chilled	na	na	na	3192	2259	428	3637	4582	6617	5755	3782
Fish, frozen	na	na	na	63459	98939	95585	92569	88064	72246	55079	80849
Prepared/preserved fish	na	na	na	33461	1030	2827	235	1600	10233	23250	10377
Total FU net supply	na	na	na	116981	113642	110101	103469	108833	93359	89939	105189

Source: database

Table 585: Latvia - FU net supply by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Freshwater fish	na	na	na	0	0	69	106	78	106	125	69
Diadromous fish	na	na	na	0	655	74	114	175	497	896	345
Marine fish, pelagic, tunas	na	na	na	0	40	28	14	3	40	18	20
Marine fish, pelagic, small	na	na	na	34123	19004	33514	38651	65883	45726	43264	40024
Marine fish, demersal	na	na	na	0	1182	2315	65	69	182	78	556
Marine fish, others	na	na	na	75873	89174	69646	63213	37724	46618	45329	61082
Crustaceans	na	na	na	485	18	33	74	112	123	176	146
Cephalopods	na	na	na	6501	3570	4422	1232	4789	66	52	2947
FU net supply	na	na	na	116981	113642	110101	103469	108833	93359	89939	105189

Source: database

Annual consumption per capita decreased in the period following independence from more than 44 kg per capita per year to 37 kg per capita per year in 1998.The two main causes for this decline were increasing prices of fish products and decreasing purchasing power of the Latvian consumer over that period (Afanasjeva, 1997).

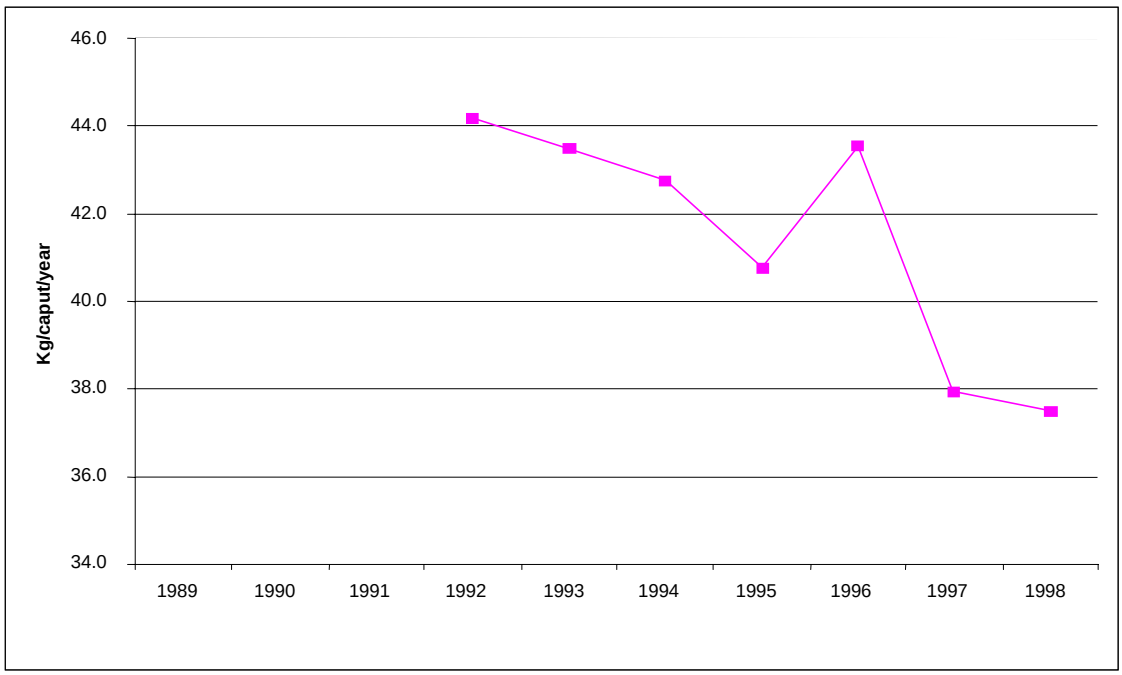

Figure 109: Fish consumption per capita per year in Latvia 1989-1998

Since the privatisation of the sector, consumers now have access to a greater selection of fish products but high prices and low incomes are still major constraints to consumption. Low-income consumers tend to eat fresh and chilled fish from the Baltic Sea and the Riga Gulf, such as herring, sprat or cod, whilst high-income consumers can afford ocean fish products such as smoked and frozen fillets and luxury products.

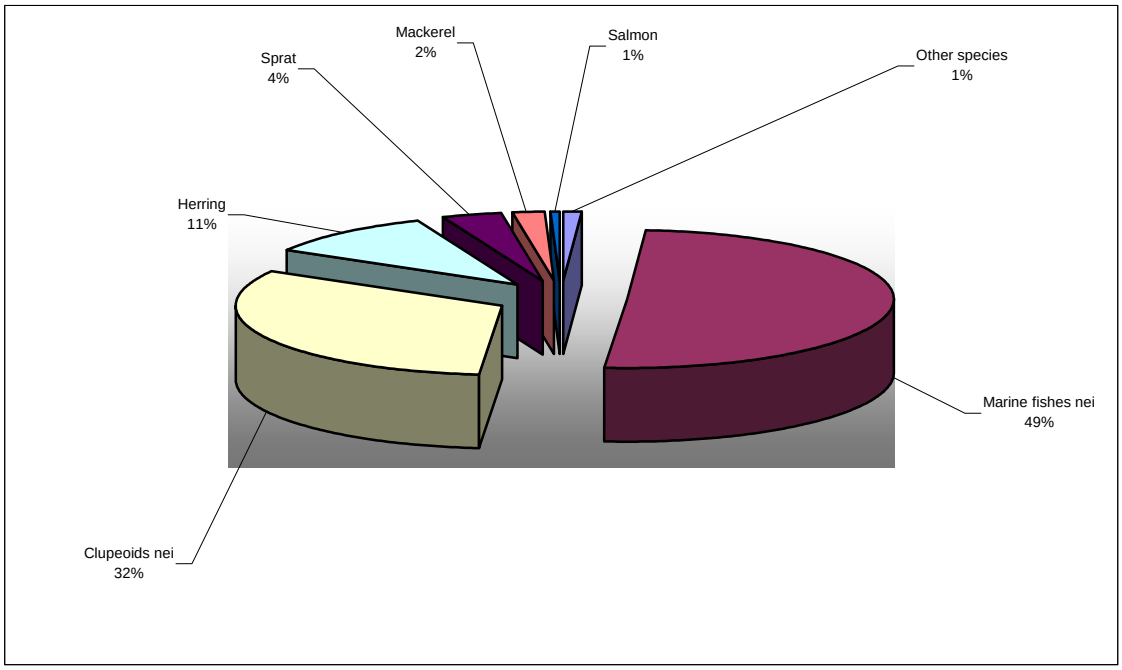

Figure 110: Latvia - Main species consumed in 1998

Assumptions for projection 2005-2030

Consumption trends for the OECD group of products form the basis of the model's assumptions (see methodology in Part 1 of the study). Further assumptions regarding production, imports and exports

and the need for fish in Latvia between 2005 and 2030 take into account and extrapolate previous trends.

In Latvia, the main consumption trends for the period 2005-2030 assume:

- A large increase (200 percent) in the demand for crustaceans, fish fillets and fresh fish.
- A slight decrease (-10 percent) in cephalopods consumption.
- Consumption of the other commodities remain constant.

Economic growth will be the main feature influencing Latvian seafood consumption, as low purchasing power was identified as the main reason for declining fish consumption over the last decade (Afanasjeva, 1997). In 2001, Latvia's growth rate was already reported to be the highest of the Baltic region (Andersone, 2002b), which will help reverse the downward trend in fish consumption of the last decade. Also, the spread of supermarkets will increase fish availability throughout the country, especially in the formerly fish poor Eastern regions.

The large assumed increase in crustaceans, fish fillets and fresh fish consumption reflect the trend towards higher value and new products triggered by the booming tourism industry and growing incomes among young and urban population (Andersone, 2002b).

Table 586: Latvia - Assumptions for projection

OECD group	94-98% annual %	Prod % 30	T 99-30	Imp % 30	T 99-30	Exp % 30	T 99-30	Cons T 99-30	Prod % Annual	Imp % Annual	Exp% Annual	Cons % Annual
Cephalopods	-440%	-88%	0%	-11%		0%	-10%	0.0%	-0.3%			-0.3%
Crus., mol. & other aquatic inv., prepared	143%	29%	0%	0%		0%	0%		0.0%			0.0%
Crustaceans	176%	35%	0%	200%		0%	200%		3.5%			3.5%
Fish, cured	-26%	-5%	0%	0%		0%	0%	0.0%	0.0%	0.0%		0.0%
Fish, fillets	153%	31%	0%	174%		0%	200%	0.0%	3.2%	0.0%		3.5%
Fish, fresh/chilled	184%	37%	0%	448%		0%	200%	0.0%	5.5%	0.0%		1.2%
Fish, frozen	-41%	-8%	0%	0%		0%	0%	0.0%	0.0%	0.0%		0.0%
Molluscs												0.0%
Prepared/preserved fish	-131%	-26%	0%	0%		0%	0%	0.0%	0.0%	0.0%		0.0%
Fish/marine mammal, fat, oil	-401%	-80%	0%	0%		0%		0.0%	0.0%	0.0%		0.0%
Flour, meal unfit for hum. Cons.	-168%	-34%	0%	0%		0%		0.0%	0.0%	0.0%		0.0%

Source: database

Imports of fish products will rise in line with the expected increase in the standard of living of the country. Consumption will be redirected towards higher value products such as crustaceans, fish fillets and fresh fish at the expense of frozen fish. All this will be fuelled by an increase in imports. Exports will not rise, as increased domestic consumption and stable national production will not leave any surplus available.

Table 587: Latvia - Main results for projection

Nature	Average 94-98	2005	2010	2015	2020	2025	2030
Exports FU (t live wt)	103743	97368	97368	97368	97368	97368	97368
Imports FU (t live wt)	47917	45685	46730	47991	49516	51364	53610
Production FU (t live wt)	156966	142795	142795	142795	142795	142795	142795
Fish supply FU (t live wt)	101140	91112	92158	93419	94943	96791	99037
Population (X1000)	2494	2435	2460	2486	2512	2538	2565
Per caput supply (kg/h)	41	37	37	38	38	38	39
Production NFU (t live wt)	16177	12528	12528	12528	12528	12528	12528
Imports NFU (t live wt)	3045	1272	1272	1272	1272	1272	1272
Exports NFU (t live wt)	3772	1089	1089	1089	1089	1089	1089
Net supply NFU (t live wt)	15450	12711	12711	12711	12711	12711	12711
Aquaculture (t live wt)	444	412	412	412	412	412	412

Nature	Average 94-98	2005	2010	2015	2020	2025	2030
Capture (t live wt)	127602	127602	127602	127602	127602	127602	127602
Production total (t live wt)	128046	128014	128014	128014	128014	128014	128014

Source: database

Food use net supply and human consumption 2005-2030

Food use net supply increases as fish consumption increase, thanks to an increase in purchasing power in Latvia. In 2001, Latvia's GDP grew by 7.7 percent, the greatest growth in the Baltic region. Further, the official unemployment rate dropped to 7.7 percent of the total labour force (Andersone, 2002b).
The commodities that will beneficiate the most from consumer demand are the same as those that are imported because national production remains stable and cannot cover domestic needs. Hence net supply will rise for higher value commodities such as crustaceans, fish fillets and fresh fish, while cephalopods are on the decrease.

Table 588: Latvia - FU net supply by OECD group of commodities 2005-2030 (t live weight)

Gp of commodities	Ave. 94-98	2005	2010	2015	2020	2025	2030
Cephalopods	2112	51	50	49	48	47	47
Crus., mol. & other aquatic inv., prepared	15	24	24	24	24	24	24
Crustaceans	89	193	229	272	323	383	455
Fish, cured	4322	2609	2609	2609	2609	2609	2609
Fish, fillets	2061	3873	4610	5472	6482	7664	9047
Fish, fresh/chilled	4204	6034	6307	6664	7129	7735	8527
Fish, frozen	80709	55079	55079	55079	55079	55079	55079
Prepared/preserved fish	7629	23250	23250	23250	23250	23250	23250
Total FU net supply	101140	91112	92158	93419	94943	96791	99037

Source: database

The major species in the net supply will follow the same pattern as imports. Small pelagic species include herring, other clupeoids and mackerels; diadromous fish include trout and salmon. Carp is the most common fresh water fish and crustaceans include shrimps, prawns and crab.

Table 589: Latvia - FU net supply by FAO group of species 2005-2030 (t live weight)

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Freshwater fish	97	183	239	312	407	531	693
Diadromous fish	351	904	912	922	936	953	976
Marine fish, pelagic, tunas	20	18	18	18	18	18	18
Marine fish, pelagic, small	45408	43353	43439	43552	43699	43890	44140
Marine fish, demersal	542	116	153	202	265	348	455
Marine fish, others	52506	46271	47094	48069	49224	50597	52229
Crustaceans	104	217	253	296	347	407	479
Cephalopods	2112	51	50	49	48	47	47
FU net supply	101140	91112	92158	93419	94943	96791	99037

Source: database

Consumption per capita will increase in Latvia, as the net supply growth rate is higher than the population growth rate. So, annual fish consumption per capita will grow from 37 to 39 kg per capita per year, but still not reaching the pre-independance consumption rate of more than 40 kg per capita per year.

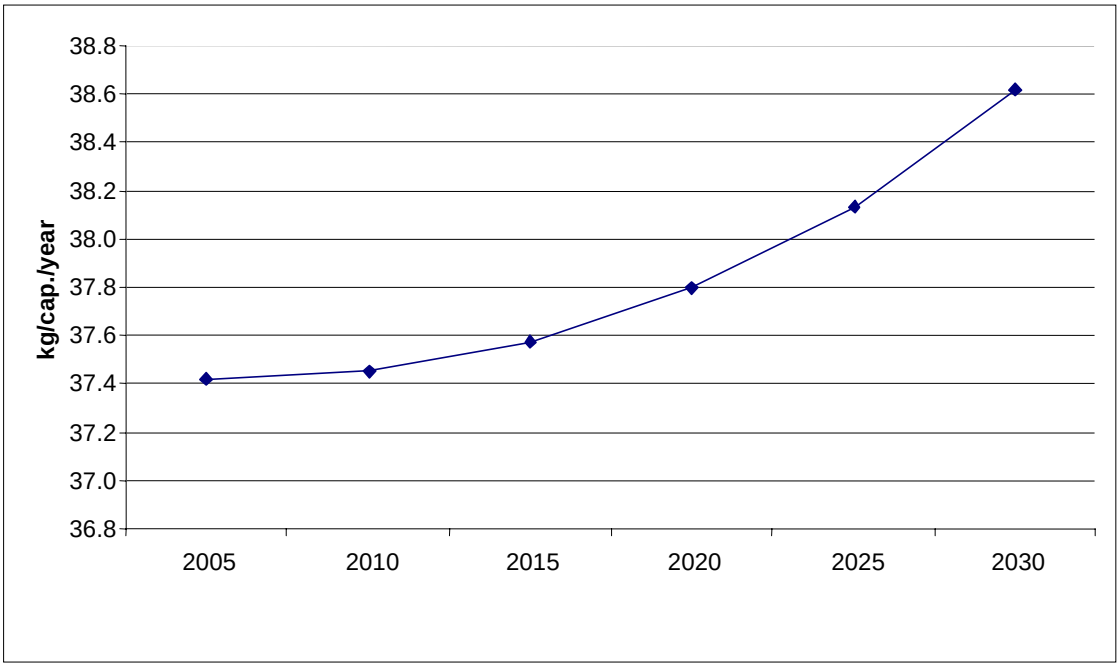

Figure 111: Fish consumption per capita per year in Latvia 2005-2030

While remaining the most important species, clupeoids, herring and sprats all see their market share diminish slightly due to the shift in consumer preferences towards higher value species.

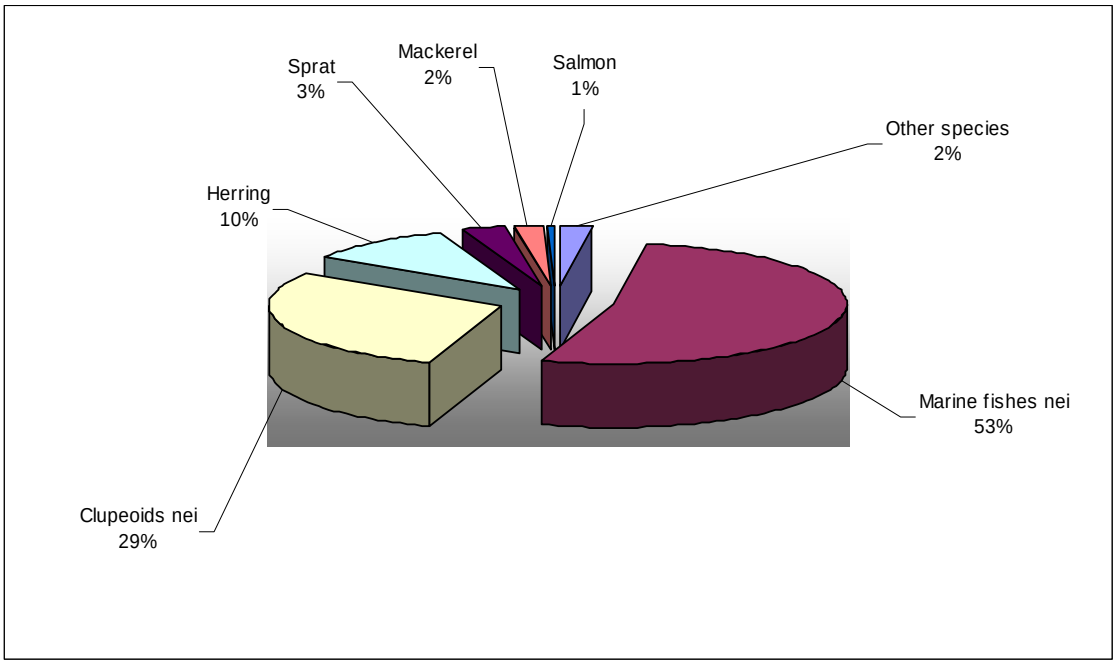

Figure 112: Latvia - Main species consumed in 2030

Non-food use net supply 2005-2030

The non-food use net supply will remain stable as there is little variation in either production or imports and exports.

Production 2005-2030

Capture and aquaculture

Latvian production will remain at its 1998 level (around 130 000 tonnes), as capture production will not rise and the scope for aquaculture expansion is limited due to the short growing seasons (Eurofish, 2003).

Commodities

Commodities production is assumed to remain the same as it was in 1998. Latvian factories will continue to produce around 140 000 tonnes of fish products a year.

Trade 2005-2030

Imports

There are increases in imports of high value commodities such as crustaceans, fish fillets and fresh fish. The increasing variety of Latvian imports for the domestic market include canned tuna, salmon, molluscs, prawns, crab sticks, crab noodles and fish fillets coated in batter or breadcrumb in 2000 (Anon., 2001j).

Frozen fish, the main raw material of the Latvian fish processing industry, remains the largest Latvian import but does not increase as commodities production remain stable.

Table 590: Latvia - FU Commodities Imports by OECD group of products 2005-2030 (t live weight)

Gp of commodities	Av. 94-98	2005	2010	2015	2020	2025	2030
Cephalopods	31	52	51	50	50	49	48
Crustaceans	89	193	229	272	323	383	455
Fish, cured	230	141	141	141	141	141	141
Fish, fillets	2182	4320	5057	5919	6929	8111	9494
Fish, fresh/chilled	1617	897	1171	1527	1992	2599	3390
Fish, frozen	42726	38153	38153	38153	38153	38153	38153
Prepared/preserved fish	1042	1929	1929	1929	1929	1929	1929
Total FU Imports	47917	45685	46730	47991	49516	51364	53610

Source: database

Herring, clupeoids and mackerel (the primary small pelagic species) make the bulk of Latvian fish imports. Fresh fish commodities include some diadromous fish like trout and salmon, some freshwater fish like carp and some marine fish (cod and herring). Shrimps, prawns and crab are the main crustaceans imported into Latvia.

Table 591: Latvia - FU Commodities Imports by FAO group of species 2005-2030 (t live weight)

Gp Species	Av. 94-98	2005	2010	2015	2020	2025	2030
Freshwater fish	100	184	240	313	408	533	695
Diadromous fish	455	954	962	972	985	1003	1025
Marine fish, pelagic, tunas	29	18	18	18	18	18	18
Marine fish, pelagic, small	37641	33594	33681	33793	33940	34132	34382
Marine fish, demersal	1382	462	499	548	611	694	801
Marine fish, others	8190	10228	11051	12025	13181	14553	16185
Crustaceans	89	193	229	272	323	383	455
Cephalopods	31	52	51	50	50	49	48
Total FU Imports	47917	45685	46730	47991	49516	51364	53610

Source: database

Exports

According to the assumptions, exports will remain stable at their 1998 level of around 100 000 tonnes. Still one has to remember that these assumptions consider exports only as a surplus emanating from

the domestic production and therefore do not consider the problem of re-exportation. If re-exports were to be taken into account, it would be realistic to expect exports to grow, as the Latvian industry is mostly geared towards re-exportation. The prospect of the European Union enlargement should also reinforce this trend with the new market opportunities it represents for Latvia.

LITHUANIA

Lithuania has a very short coastline of only about 99 km and, as in many of the former Soviet Union countries, its fishing industry suffered badly during the 1990s transition from a centrally planned economy to a free market economy. However, Lithuania's fishery is probably the richest and most productive in the eastern Baltic and contains abundant stocks of cod, herring and sprats. Despite an unfavourable climate, Lithuania also manages to support a small freshwater aquaculture industry and with improved quality and marketing there are prospects for increased exports. Lithuania has a population of 3.7 million people.

Production: captures, aquaculture and commodities 1989-1998

Lithuania's volume of landings has steadily declined since the 1980s and in 1998 total production was only 22 000 tonnes. This contrasts markedly with the level of catches experienced under the guidance of the former Soviet Union which were reported to reach annual levels of 400 000 tonnes for the distant-water fleet and 18 000 tonnes for the Baltic Sea fleet (Jaskštiene, 1997). Aquaculture represented nearly 6 percent of the total in 1998.

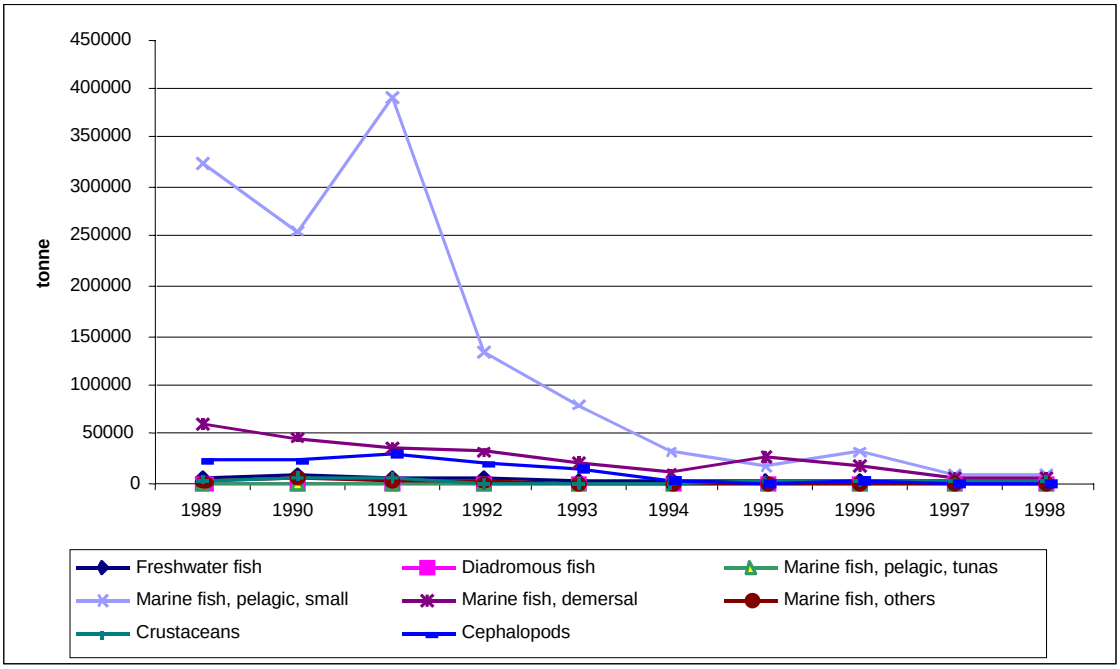

Figure 113: Lithuania - Capture and aquaculture production 1989-1998

Captures

The continued decline in capture production is predominantly due to the huge drop in productivity of the distant-water fleet due to the rise of fuel expenses, which previously were subsidised. Before 1994, the Lithuanian distant-water fleet consisted of 136 vessels. By 1997 the number of vessels had dropped to 57 (Jaskštiene, 1997). The principal species targeted by the distant-water fleet are redfish, mackerel, horse mackerel, sardinella, sea bream, silver hake, blue whiting, squid and shrimp.

The Baltic Sea fleet targets herring, cod, sprats, salmon, sea trout, smolt and flounder. This fleet is a very important component of the Lithuanian fishing industry as it is dedicated to the supply of the local demand and provides products exclusively for local markets.

Since independence, the Baltic Sea fleet has had to face many challenges such as the loss of traditional fishing rights in nearby waters (off the coast of Kaliningrad, Latvia, and Estonia for example) or the decrease in purchasing power that incurred huge increases in running costs (Jaskštiene, 1997).

Table 592: Lithuania - Captures by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Freshwater fish	2902	4763	2289	1189	973	1030	1136	1182	1491	1506	1846
Diadromous fish	482	373	839	353	182	161	125	122	225	366	323
Marine fish, pelagic, tunas	762	249	878	170	73	794	0	0	0	0	293
Marine fish, pelagic, small	323450	256730	391104	133560	79583	32807	18361	31556	9348	9651	128615
Marine fish, demersal	59936	46682	35791	31144	20909	10177	27116	17150	5318	5863	26009
Marine fish, others	2114	5904	3562	1588	107	45	66	188	152	41	1377
Crustaceans	4295	7856	5427	73	0	874	980	1585	1785	3340	2622
Cephalopods	22803	22770	30074	20308	15171	3262	0	3400	0	0	11779
Total gp of species	416744	345327	469964	188385	116998	49150	47784	55183	18319	20767	172862

Source: database

Freshwater catches consist of bream, pike and eels and catches appear to be increasing in relative significance each year. Unfortunately, industrial and agricultural practises and pollution have led to the rapid ecological deterioration of inland waters (GLOBEFISH, 1994a).

Aquaculture

The volume of aquaculture decreased from 4500 tonnes in 1989 to 1500 tonnes in 1998, with live carp comprising 90 percent of production. Small quantities of pike-perch and ornamental goldfish are also being raised (Jaskštiene, 1997). Many ponds and reservoirs are now stocked for carp production and managed on an extensive basis with cheap, corn-based feed.

Table 593: Lithuania - Aquaculture by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Freshwater fish	4526	4611	4750	3899	2907	1874	1714	1537	1516	1516	2885
Total gp of species	4526	4611	4750	3899	2907	1874	1714	1537	1516	1516	2885

Source: database

Commodities production

As with many countries in the region, the processing industry in Lithuania has suffered since the dismantling of the Soviet Union and production decreased by almost 75 percent between 1990 and 1994. With respect to the domestic market, the major processed products include both fresh and frozen fish products, salted round fish, salted fillets, hot smoked fish, marinated products and canned fish.

In 1996, 54 processing companies employed a total of 2050 workers. Better administrative practices are a prerequisite for any development of the sector. Hygiene and environmental standards should also be improved to EU levels (European Parliament, 1998).

Food use commodities production

The main Lithuanian food use commodity is frozen fish despite a dramatic decline in production since 1993 due to the collapse of Lithuanian distant water fleet. Cured and fresh fish production are also declining. The erratic pattern of the prepared/preserved production (canned small pelagic species) could reflect quality problems. Herring, mackerel and clupeoids form the bulk of small pelagic fish.

Table 594: Lithuania - FU Commodities Production by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Crustaceans	na	na	na	0	567	154	403	1998	228	38	484
Fish, cured	na	na	na	0	0	7432	6364	2745	1475	344	2623
Fish, fillets	na	na	na	0	0	385	1414	1920	809	1987	931
Fish, fresh/chilled	na	na	na	0	0	2078	1124	1669	245	51	738
Fish, frozen	na	na	na	183481	109000	29660	43510	47024	16853	24798	64904
Prepared/preserved fish	na	na	na	8803	10905	16901	8742	10353	10305	8773	10683
Total FU Production	na	na	na	192284	120472	56610	61557	65709	29915	35991	80363

Source: database

Table 595: Lithuania - FU Commodities Production by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Diadromous fish	na	na	na	0	0	743	275	31	2	13	152
Marine fish, pelagic, small	na	na	na	0	0	32932	43306	44212	23766	28174	24627
Marine fish, demersal	na	na	na	0	0	2069	1973	2419	886	619	1138
Marine fish, others	na	na	na	192284	119905	20713	15600	17049	5033	7147	53961
Crustaceans	na	na	na	0	567	154	403	1998	228	38	484
Total FU Production	na	na	na	192284	120472	56610	61557	65709	29915	35991	80363

Source: database

Non-food use commodities production

Non-food use commodities production disappeared with the collapse of the distant water fleet. Its 1996 level was around 9000 tonnes.

Table 596: Lithuania - NFU Commodities Production by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Flour, meal unfit for human cons.	na	na	na	0	0	0	0	8645	7054	3699	2771
Total NFU Production	na	na	na	0	0	0	0	8645	7054	3699	2771

Source: database

Table 597: Lithuania - NFU Commodities Production by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, small	na	na	na	0	0	0	0	8645	7054	3699	2771
Total NFU Production	na	na	na	0	0	0	0	8645	7054	3699	2771

Source: database

Non-food use: trade and net supply 1989-1998

Approximately 18 percent of domestic catches were used for non-human consumption products and during the 1994-98 period, the average volume of imports was 13 000 tonnes, while exports amounted to 5 500 tonnes. During the period 1994-1998, 9 000 tonnes of fishmeal a year were imported on average while 4000 tonnes were exported.

Non-food use imports

Table 598: Lithuania - NFU Commodities Imports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish/marine mammal, fat, oil	na	na	na	na	na	284	392	578	1194	2299	678
Flour, meal unfit for human cons.	na	na	na	na	na	10800	12600	10332	11539	12967	8320
Total NFU Imports	na	na	na	na	na	11084	12992	10911	12732	15266	8998

Source: database

Table 599: Lithuania - NFU Commodities Imports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, small	na	na	na	na	na	10800	12600	10202	11485	12934	8289
Marine fish, others	na	na	na	na	na	284	392	578	1194	2299	678
Aquatic animals	na	na	na	na	na	0	0	130	53	34	31
Total NFU Imports	na	na	na	na	na	11084	12992	10911	12732	15266	8998

Source: database

Non-food use exports

Table 600: Lithuania - NFU Commodities Exports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish/marine mammal, fat, oil	na	na	na	na	na	199	0	75	15	13	43
Flour, meal unfit for human cons.	na	na	na	na	na	551	1130	5225	10244	9177	3761
Total NFU Exports	na	na	na	na	na	750	1130	5300	10259	9190	3804

Source: database

Table 601: Lithuania - NFU Commodities Exports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, small	na	na	na	na	na	554	1130	4939	10235	7315	3453
Marine fish, others	na	na	na	na	na	196	0	330	15	1868	344
Aquatic animals	na	na	na	na	na	0	0	31	9	7	7
Total NFU Export	na	na	na	na	na	750	1130	5300	10259	9190	3804

Source: database

Non-food use net supply

Lithuanian non-food use net supply amounted to 8000 tonnes annually on average between 1994 and 1998.

Table 602: Lithuania - NFU net supply by OECD group of commodities 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Fish/marine mammal, fat, oil	na	na	na	na	na	85	392	503	1179	2286	635
Flour, meal unfit for human consumption	na	na	na	na	na	10249	11470	13752	8348	7490	7330
Total NFU net supply	na	na	na	na	na	10334	11861	14255	9527	9775	7965

Source: database

Table 603: Lithuania - NFU net supply by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Marine fish, pelagic, small	na	na	na	na	na	10246	11470	13908	8304	9318	7606
Marine fish, others	na	na	na	na	na	88	392	248	1179	431	334
Aquatic animals	na	na	na	na	na	0	0	99	44	27	24
NFU net supply	na	na	na	na	na	10334	11861	14255	9527	9775	7965

Source: database

Market for human consumption

Trade

Between 1989 and 1998, Lithuania annually imported approximately 60 000 tonnes of products, the majority of which arrived from Norway. Exports accounted for 50 000 tonnes. The main importers were Byelorussia, Russia and the Ukraine. The main products for export included canned fish, fresh cod, frozen cod fillets, salted cod, and live carp (Jaskštiene, 1997). Exports of high value smoked products have decreased since 1990 but it is possible that trade can be increased through improved quality and improved marketing.

Food use imports

Frozen fish imports have been increasing since 1993 to supply the domestic industry with raw material, as the distant water fleet could not fulfil the role anymore, and to be re-exported. Herring, mackerel and hake are the three most important species for making frozen products. Fresh/chilled fish (mostly herring and mackerel) are on the increase. The main suppliers to Lithuania were Norway, Poland, the UK, Latvia and Russia in 1994 (Jakštienė, 1997).

Table 604: Lithuania - FU Commodities Imports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Cephalopods	na	na	na	0	0	6	10	135	19	305	68
Crus., mol. & other aquatic inv., prepared	na	na	na	0	0	6	23	14	89	34	24
Crustaceans	na	na	na	0	28	279	268	2683	904	105	610
Fish, cured	na	na	na	0	0	4803	1827	4233	2225	3048	2305
Fish, fillets	na	na	na	0	0	2902	6721	5795	7106	0	3218
Fish, fresh/chilled	na	na	na	0	0	7355	3739	20117	30983	37231	14204
Fish, frozen	na	na	na	1720	7157	28952	31193	66118	63283	61236	37094
Molluscs	na	na	na	0	0	35	1	16	122	23	28
Prepared/preserved fish	na	na	na	257	550	3987	243	5579	5486	4805	2987
Total FU Imports	na	na	na	1976	7734	48324	44027	104689	110218	106787	60536

Source: database

The bulk of demersal fish is made of hake, while small pelagic species are dominated by herring, mackerel and some clupeoids.

Table 605: Lithuania - FU Commodities Imports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Diadromous fish	na	na	na	0	0	888	263	238	524	871	398
Marine fish, pelagic, tunas	na	na	na	0	0	91	9	32	22	31	26
Marine fish, pelagic, small	na	na	na	0	0	33046	21530	65367	69586	67975	36786
Marine fish, demersal	na	na	na	0	0	1379	1711	5138	5599	9008	3262
Marine fish, others	na	na	na	1976	7707	12595	20211	31067	33353	28433	19335
Crustaceans	na	na	na	0	28	279	268	2683	904	105	610
Molluscs	na	na	na	0	0	41	24	30	211	57	52
Cephalopods	na	na	na	0	0	6	10	135	19	305	68
Total FU Imports	na	na	na	1976	7734	48324	44027	104689	110218	106787	60536

Source: database

Food use exports

Frozen fish exports have been increasing since 1993. The major part of these exports can be characterised as re-exportation as only a small share of the total amount exported can be met by the national production. The main destinations in 1994 for Lithuanian exports were Russia, the Ukraine and Belarus (Jakštienė, 1997). Fish fillets and prepared/preserved fish commodities are also rising. Prepared/preserved products consist mostly of canned pelagic species (mostly herring and other clupeoids) and other fish preparations. Cured and fresh fish exports are decreasing.

Table 606: Lithuania - FU Commodities Exports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Crus., mol. & other aquatic inv., prepared	na	na	na	0	0	1	20	13	88	20	20
Crustaceans	na	na	na	0	498	198	477	2361	725	3	609
Fish, cured	na	na	na	0	0	3370	7569	6387	3346	1512	3169
Fish, fillets	na	na	na	0	0	94	927	1329	1383	1690	775
Fish, fresh/chilled	na	na	na	0	0	5400	4028	8345	12095	1725	4513
Fish, frozen	na	na	na	19667	7334	11167	40203	48929	40790	69597	33955
Prepared/preserved fish	na	na	na	944	734	7248	8050	12735	14450	12905	8152
Total FU Exports	na	na	na	20610	8566	27479	61273	80099	72879	87451	51194

Source: database

Table 607: Lithuania - FU Commodities Exports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Freshwater fish	na	na	na	0	0	0	0	0	0	0	0
Diadromous fish	na	na	na	0	0	829	518	63	111	141	237
Marine fish, pelagic, small	na	na	na	0	0	13309	38861	50530	52158	61178	30862
Marine fish, demersal	na	na	na	0	0	1761	2748	2915	2998	1982	1772
Marine fish, others	na	na	na	20610	8068	11380	18649	24217	16798	24128	17693
Crustaceans	na	na	na	0	498	198	477	2361	725	3	609
Molluscs	na	na	na	0	0	1	20	13	88	20	20
Total FU Export	na	na	na	20610	8566	27479	61273	80099	72879	87451	51194

Source: database

Food use net supply and consumption

Between 1989 and 1998 the annual net supply was around 90 000 tonnes. Frozen fish is still the main component of the net supply on average over the period but its share is declining. In 1998, fresh fish, with 35 000 tonnes, became the leading commodity consumed in Lithuania. That year Lithuania re-exported very large quantities of frozen fish as only 16 000 tonnes went for the domestic market, while 61 000 tonnes had been imported.

Table 608: Lithuania - FU net supply by OECD group of commodities 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Cephalopods	na	na	na	0	0	6	10	135	19	305	68
Crus., mol. & other aquatic inv., prepared	na	na	na	0	0	4	3	1	1	14	3
Crustaceans	na	na	na	0	97	235	195	2319	407	140	485
Fish, cured	na	na	na	0	0	8864	623	591	354	1880	1759
Fish, fillets	na	na	na	0	0	3193	7208	6386	6532	297	3374
Fish, fresh/chilled	na	na	na	0	0	4033	836	13441	19133	35558	10429
Fish, frozen	na	na	na	165534	108822	47446	34500	64213	39346	16437	68043
Molluscs	na	na	na	0	0	35	1	16	122	23	28
Prepared/preserved fish	na	na	na	8116	10721	13639	935	3197	1341	673	5517
Total FU net supply	na	na	na	173650	119640	77456	44310	90299	67254	55327	89705

Source : database

Table 609: Lithuania - FU net supply by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Freshwater fish	na	na	na	0	0	0	0	0	0	0	0
Diadromous fish	na	na	na	0	0	802	19	205	414	744	312
Marine fish, pelagic, tunas	na	na	na	0	0	91	9	32	22	31	26
Marine fish, pelagic, small	na	na	na	0	0	52668	25975	59049	41194	34971	30551
Marine fish, demersal	na	na	na	0	0	1687	935	4642	3487	7645	2628
Marine fish, others	na	na	na	173650	119543	21928	17162	23899	21588	11453	55603
Crustaceans	na	na	na	0	97	235	195	2319	407	140	485
Molluscs	na	na	na	0	0	39	5	18	122	37	32
Cephalopods	na	na	na	0	0	6	10	135	19	305	68
FU net supply	na	na	na	173650	119640	77456	44310	90299	67254	55327	89705

Source : database

Consumption per capita per year decreased during the 1990s from nearly 45 kg to 15 kg in 1998. The total share of fish in the quantity of animal protein consumed daily also decreased to a level of 10 percent in 1998. This trend can be attributed to a rate of inflation in the price of fish products, which was twice that of other food products (Jaskštiene, 1997), and is linked to the loss of cheap supply from the distant water fleet.

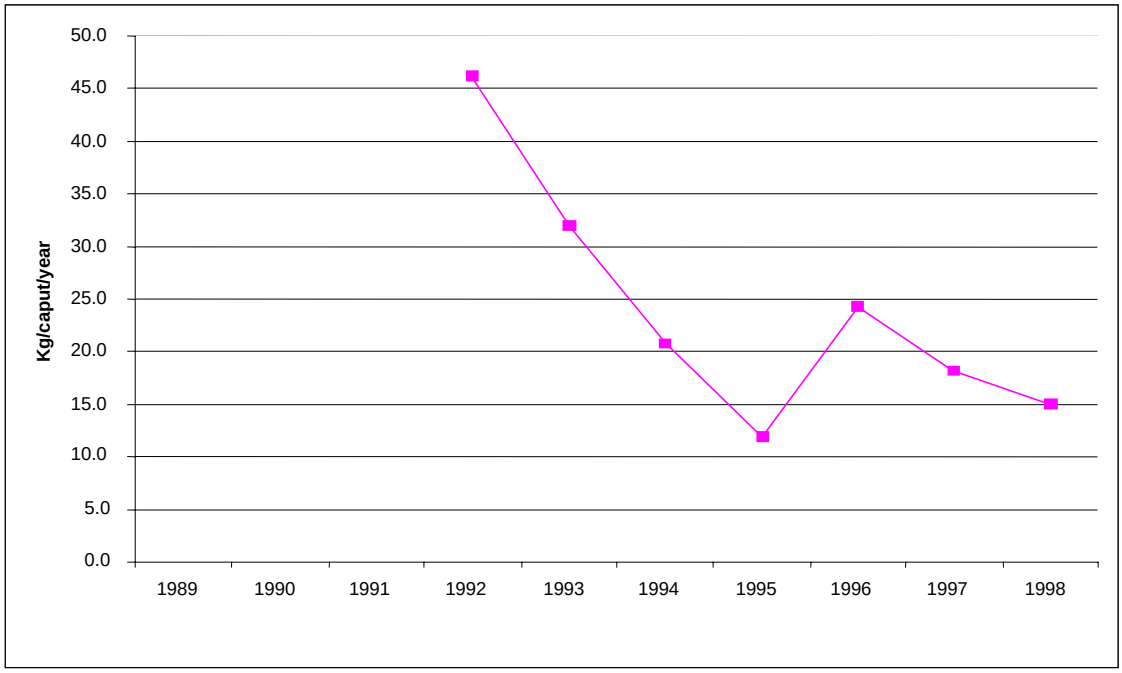

Figure 114: Fish consumption per capita per year in Lithuania 1989-1998

Herring is the main species consumed in Lithuania followed other pelagic species such as mackerel and clupeoids. The leading demersal species of significant importance is hake.

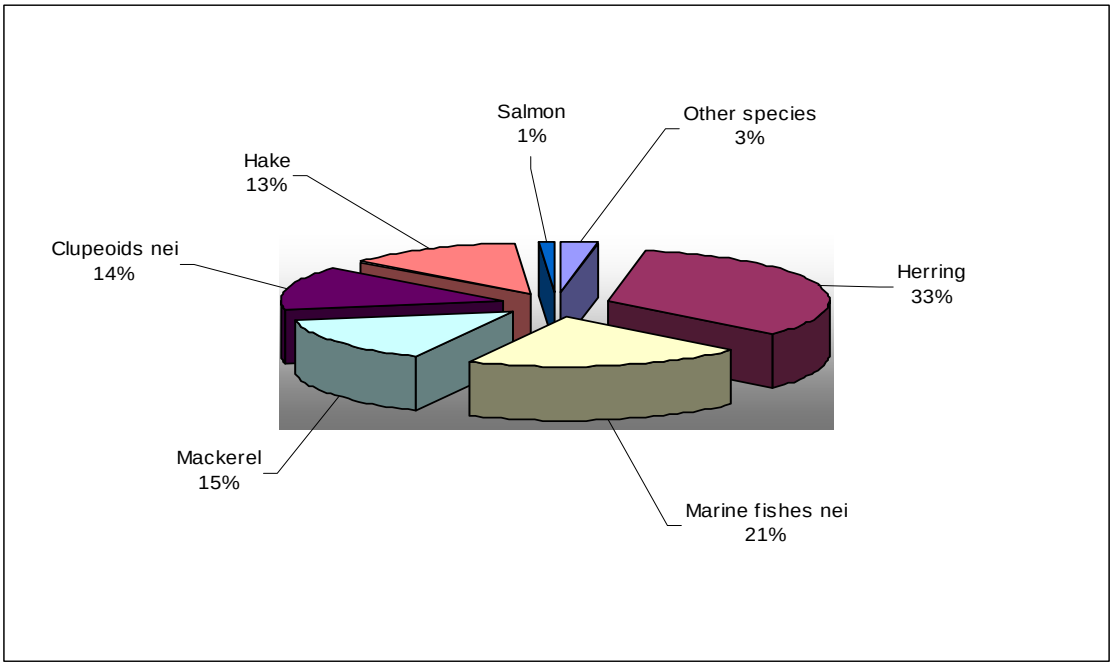

Figure 115: Lithuania - Main species consumed in 1998

Assumptions for projection 2005-2030 and main results

Consumption trends for the OECD group of products form the basis of the model's assumptions (see methodology in Part 1 of the study). Further assumptions regarding production, imports and exports and the need for fish in Lithuania between 2005 and 2030 take into account and extrapolate previous trends.

The following are consumption assumptions for Lithuania for the 2005-2030 forecast:

- A large increase (200 percent) in prepared/preserved fish consumption as well as a 100 percent increase in fresh fish, frozen fish and cephalopods.
- Imports of these products to rise consequently.
- Consumption of other commodities to stagnate.

Economic development of Lithuania will be the main driving force behind the increase in seafood consumption in Lithuania. The Lithuanian economy was reported to have recovered from the Russian crisis in 2000 and prospects for further economic development were positive (Dowling, 2001). So, increase in seafood consumption is linked with the general increase in consumption triggered by economic development.

The Lithuanian fish processing industry has also undergone major changes in the past decade and is now able to offer better quality and a wider range of products to the consumer (Gasiliauskiene, 2003). This increased supply of products adapted to consumer tastes is thus likely to push consumption levels up, especially in processed products, which is here reflected by the large increase in prepared/preserved products.

Table 610: Lithuania - Assumptions for projection

OECD group	94-98%	annual %	Prod % 99-30	T Imp % 99-30	T Exp % 99-30	T Cons 99-30	T Prod Annual	% Imp Annual	% Exp Annual	% Cons Annual
Cephalopods	408%	82%	0%	100%	0%	100%	2.2%			2.2%
Crus., mol. & other aquatic inv., prepared	-110%	-22%	0%	0%	0%	0%	0.0%	0.0%		0.0%

OECD group	94-98% annual %	Prod % 99-30	T Imp % 99-30	T Exp % 99-30	T Cons 99-30	T Prod % Annual	Imp % Annual	Exp% Annual	Cons % Annual
Crustaceans	-48% -10%	0%	0%	0%	0%	0.0%	0.0%	0.0%	0.0%
Fish, cured	-33% -7%	0%	0%	0%	0%	0.0%	0.0%	0.0%	0.0%
Fish, fillets	-137% -27%	0%	0%	0%	0%	0.0%	0.0%	0.0%	0.0%
Fish, fresh/chilled	280% 56%	0%	95%	0%	100%	0.0%	2.1%	0.0%	2.2%
Fish, frozen	87% 17%	0%	27%	0%	100%	0.0%	0.7%	0.0%	2.2%
Molluscs	-29% -6%	0%	0%	0%	0%		0.0%		0.0%
Prepared/preserved fish	27% 5%	0%	28%	0%	200%	0.0%	0.8%	0.0%	3.5%
Fish/marine mammal, fat, oil	320% 64%	0%	0%	0%			0.0%	0.0%	0.0%
Flour, meal unfit for hum. Cons.	17% 3%	0%	0%	0%		0.0%	0.0%	0.0%	0.0%

Source: database

Production will remain stable as the scope for aquaculture expansion is limited and capture fisheries are assumed not to grow. Consequently, no surplus will be available for exports. Imports will increase, especially imports of fresh fish, cephalopods and prepared/preserved products, mostly because of an increase in domestic consumption. Frozen fish imports will also increase but mainly to serve as raw material for the processing industry.

Table 611: Lithuania - Main results for projection

Nature	Average 94-98	2005	2010	2015	2020	2025	2030
Exports FU (t live wt)	65836	87451	87451	87451	87451	87451	87451
Imports FU (t live wt)	82809	116224	123641	131684	140414	149901	160218
Production FU (t live wt)	49956	35991	35991	35991	35991	35991	35991
Fish supply FU (t live wt)	66929	64764	72181	80224	88954	98441	108758
Population (X1000)	3716	3760	3803	3847	3892	3937	3982
Per caput supply (kg/h)	18	17	19	21	23	25	27
Production NFU (t live wt)	3880	3699	3699	3699	3699	3699	3699
Imports NFU (t live wt)	12597	15266	15266	15266	15266	15266	15266
Exports NFU (t live wt)	5326	9190	9190	9190	9190	9190	9190
Net supply NFU (t live wt)	11150	9775	9775	9775	9775	9775	9775
Aquaculture (t live wt)	1631	1516	1516	1516	1516	1516	1516
Capture (t live wt)	38241	38241	38241	38241	38241	38241	38241
Production total (t live wt)	39872	39757	39757	39757	39757	39757	39757

Source: database

Food use net supply and human consumption 2005-2030

The net supply is expected to experience a large increase over the period 1998-2030 as levels of consumption have been particularly low over the prevous decade due to the increases in fish prices and loss of purchasing power. Still, with improvements in the economic situation and the stability gained by the access to the EU, fish consumption is expected to increase, driving the net supply along.

Prepared preserved commodities will experience the biggest rise, followed by fresh and frozen fish and cephalopods. But volumes of prepared preserved commodities still remain low. Net supply of other commodities is to remain constant.

Table 612: Lithuania - FU net supply by OECD group of commodities 2005-2030 (t live weight)

Gp of commodities	Ave. 94-98	2005	2010	2015	2020	2025	2030
Cephalopods	95	355	396	441	491	548	610
Crus., mol. & other aquatic inv., prepared	5	14	14	14	14	14	14
Crustaceans	659	140	140	140	140	140	140
Fish, cured	2462	1880	1880	1880	1880	1880	1880
Fish, fillets	4723	297	297	297	297	297	297
Fish, fresh/chilled	14600	41414	46153	51413	57252	63733	70927
Fish, frozen	40388	19702	22140	24670	27295	30020	32848
Molluscs	40	23	23	23	23	23	23

Gp of commodities	Ave. 94-98	2005	2010	2015	2020	2025	2030
Prepared/preserved fish	3957	940	1139	1346	1562	1786	2018
FU net supply	66929	64764	72181	80224	88954	98441	108758

Source: database

Table 613: Lithuania - FU net supply by FAO group of species 2005-2030 (t live weight)

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Diadromous fish	437	797	837	880	924	972	1022
Marine fish, pelagic, tunas	37	33	34	35	37	38	40
Marine fish, pelagic, small	42772	41450	46558	52113	58159	64745	71927
Marine fish, demersal	3679	8183	8590	9018	9467	9939	10437
Marine fish, others	19206	13770	15589	17560	19699	22021	24545
Crustaceans	659	140	140	140	140	140	140
Molluscs	44	37	37	37	37	37	37
Cephalopods	95	355	396	441	491	548	610
FU net supply	66929	64764	72181	80224	88954	98441	108758

Source: database

Consumption per capita per year will increase in Lithuania over the next 30 years, as the population growth rate (8 percent) is lower than the growth rate of the net supply (97 percent). It will rise from 17 to 27 kg per capita per year.

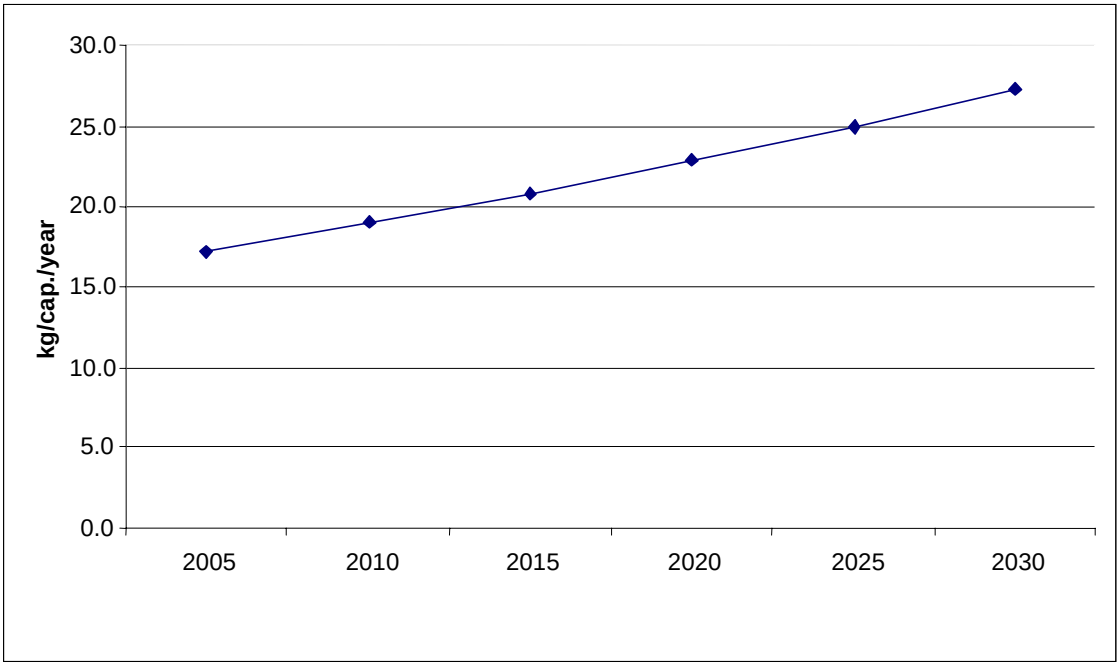

Figure 116: Fish consumption per capita per year in Lithuania 2005-2030

Herring, mackerel and clupeoids are the most important species consumed in Lithuania in 2030. Small pelagic species are on the increase and represent altogether 66 percent of fish consumed nationally, compared with 62 percent in 1998. Hake is the leading species among the demersal fish with a market share of 8 percent but it has declined from its 1998 level of 13%.

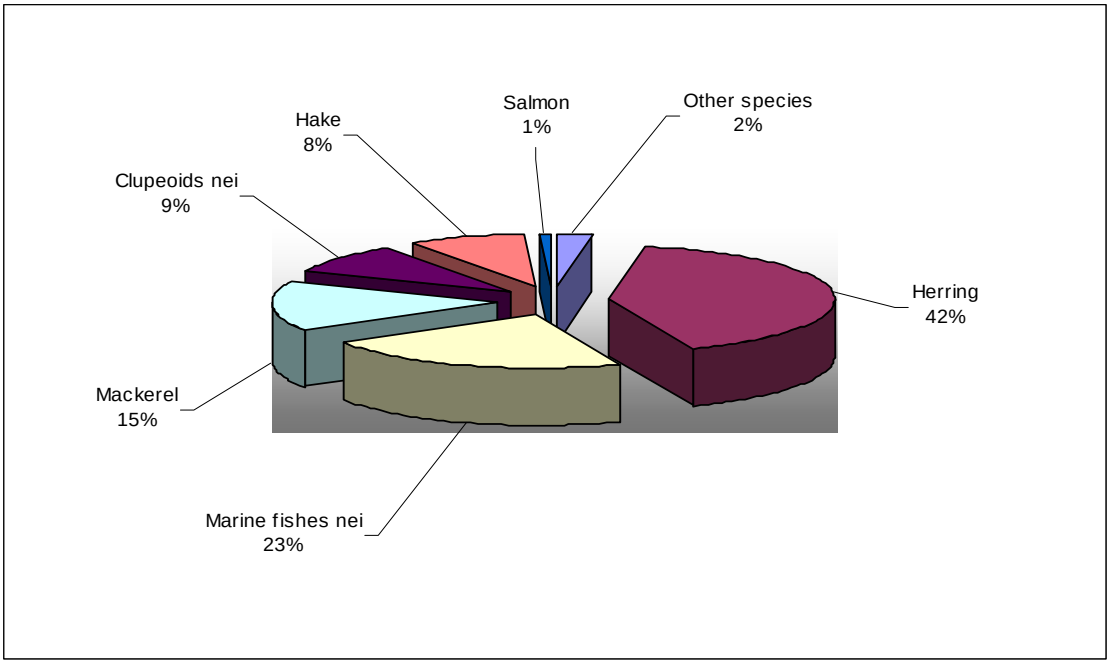

Figure 117: Lithuania - Main species consumed in 2030

Non-Food use net supply 2005-2030

The non-food use net supply will not change significantly over the period considered. Production will remain stable at a level of around 4 000 tonnes, not resulting in any surplus for the export sector. Hence exports will not be able to increase. Imports will not rise as domestic consumption is expected to remain constant due to the limited scope for expansion of the Lithuanian aquaculture sector.

Production 2005-2030

Capture and aquaculture

Capture production will remain stable. There will no expansion of the aquaculture sector, as it is mainly focused on production of carp, a species whose market is declining.

Commodities

The introduction of more rigid production control and quality requirements, and the increase of competition have cut down the number of companies in the past few years. Eleven Lithuanian fish processing companies have been EU certified and several other companies are modernizing their production technologies and seeking to get the same certification. The Lithuanian fish processing industry can now offer the consumer better quality and a wider range of fisheries products than it could in the past. Apart from the traditional salted, smoked and tinned fish products, companies have introduced products that are now common on the Lithuanian market, such as fish preserves with various sauces, fruits, vegetables and nuts. Crab sticks, fish fingers, crayfish tails and other seafood delicacies are also being produced in larger quantities, most of it for export markets (Gasiliauskiene, 2003).

Trade 2005-2030

Imports

Lithuanian imports of fish products are increasing. Cephalopods and fresh fish will experience the largest increase of around 100% between 2005 and 2030. Prepared/preserved fish (canned pelagic) and frozen fish will also increase but only by around 30%.

Table 614: Lithuania - FU Commodities Imports by OECD group of products 2005-2030 (t live weight)

Gp of commodities	Av. 94-98	2005	2010	2015	2020	2025	2030
Cephalopods	95	355	396	441	491	548	610
Crus., mol. & other aquatic inv., prepared	33	34	34	34	34	34	34
Crustaceans	848	105	105	105	105	105	105
Fish, cured	3227	3048	3048	3048	3048	3048	3048
Fish, fillets	4505	0	0	0	0	0	0
Fish, fresh/chilled	19885	43087	47826	53087	58926	65407	72601
Fish, frozen	50157	64501	66938	69468	72094	74819	77647
Molluscs	40	23	23	23	23	23	23
Prepared/preserved fish	4020	5071	5271	5478	5694	5917	6150
Total FU Imports	82809	116224	123641	131684	140414	149901	160218

Source: database

The main species involved include clupeoids, herring and mackerel for the small pelagic species. These species form the bulk of Lithuanian imports as are they imported fresh, prepared preserved and frozen. Hake and plaice are the two most important demersal species imported into Lithuania.

Table 615: Lithuania - FU Commodities Imports by FAO group of species 2005-2030 (t live weight)

Gp Species	Av. 94-98	2005	2010	2015	2020	2025	2030
Diadromous fish	557	924	965	1007	1052	1100	1150
Marine fish, pelagic, tunas	37	33	34	35	37	38	40
Marine fish, pelagic, small	51501	74454	79562	85117	91163	97749	104931
Marine fish, demersal	4567	9546	9953	10381	10830	11303	11800
Marine fish, others	25132	30750	32569	34540	36679	39001	41525
Crustaceans	848	105	105	105	105	105	105
Molluscs	73	57	57	57	57	57	57
Cephalopods	95	355	396	441	491	548	610
Total FU Imports	82809	116224	123641	131684	140414	149901	160218

Source: database

Exports

There will be no significant change in the pattern of exports in the next 30 years in Lithuania. Exports will remain stable at their level of 1998 of around 90 000 tonnes.

MALTA

The Mediterranean island of Malta has a population of 400 000. The national fishing industry is relatively small but at a local level, fishing provides a significant socio-economic function that might augment its contribution to the national economy. Local fisheries have traditionally played an important role in providing employment and food in remote rural communities. In 1998, the total registered fishing population was around 2000 fishermen out of which nearly 400 were full-time. The total number of licensed fishing vessels was around 2000 units, with nearly 50 considered as industrial (de Leiva *et al*., 1998).

Production: captures, aquaculture and commodities 1989-1998

Malta's total production increased from 900 tonnes in 1989 to 2900 tonnes in 1998, largely as a result of the expansion in aquaculture. Aquaculture represented approximately 66 percent of total production in 1998.

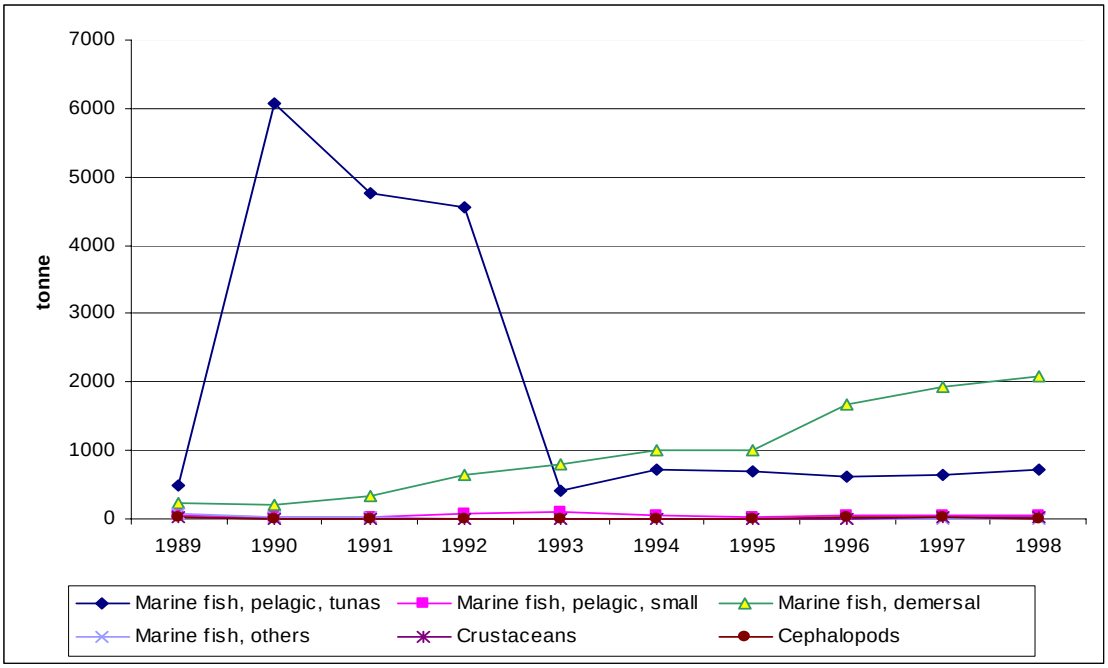

Figure 118: Malta - Capture and aquaculture production 1989-1998

Captures

Malta has experienced a strong decline in catches over the last decade and in 1998 production went back to its 1989 level of approximately 900 tonnes. A significant increase in catches of large pelagic species, mostly yellowfin and skipjack tunas, was observed between 1989 and 1993. Still this does not appear in more recent datasets of Fishstat and could be due to a reporting error.

The Maltese fishery mostly targets pelagic stocks and, because of their high commercial value, the most sought after species are common dolphinfish, northern bluefin tuna, stone bass and wreckfish. Other demersal catches include shrimp, hake, mullet and octopus (FAO, 2001a).

Table 616: Malta - Captures by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Marine fish, pelagic, tunas	496	6079	4758	4555	419	729	687	611	636	729	1970
Marine fish, pelagic, small	61	33	37	69	96	52	38	44	43	61	53
Marine fish, demersal	244	201	138	132	142	101	105	126	140	125	145
Marine fish, others	81	28	22	0	2	2	0	0	0	12	15
Crustaceans	18	10	6	4	6	4	5	9	16	18	10

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Cephalopods	16	6	4	3	4	5	6	16	14	12	9
Total gp of species	916	6357	4965	4763	669	893	841	806	849	957	2202

Source: database

Aquaculture

In 1998, the total volume of aquaculture production in Malta was around 2 000 tonnes. Aquaculture in Malta is essentially based on large-scale commercial offshore units using modern technology and, as a consequence, the cost of farming fish is relatively high. There are four sea-based farms occupying seven different sites around the Maltese islands. These farms are responsible for 98 percent of the production and concentrate on fattening sea bass and sea bream (Malta High Commission, 2001). The development of the aquaculture sub-sector has occurred in accordance with the National Aquaculture Plan, which stipulates strict constraints on activities for the purpose of environmental protection. As much as 95 percent of total aquaculture production is exported (FAO, 2001a), mainly to Italy.

Table 617: Malta - Aquaculture by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Marine fish, demersal	na	na	200	500	650	900	900	1552	1800	1950	1057
Total gp of species	na	na	200	500	650	900	900	1552	1800	1950	1057

Source : database

Commodities production

Food use commodities production

There is no transformation processing taking place in Malta, thus commodities production is limited to the sale of fresh/chilled fish. Production is picking up since 1995 and reached 3000 tonnes in 1998.

Table 618: Malta - FU Commodities Production by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish, fresh/chilled	916	6357	5165	5263	1319	1793	1741	2358	2649	2907	3047
Total FU Production	916	6357	5165	5263	1319	1793	1741	2358	2649	2907	3047

Source: database

Gilthead seabream is the most important species with 2000 tonnes produced in 1998. Other important species are common dolphin fish, bluefin tuna, swordfish and seabass.

Table 619: Malta - FU Commodities Production by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, tunas	916	6357	3650	2178	503	797	752	664	687	789	1729
Marine fish, demersal	0	0	1515	3085	816	996	989	1694	1962	2118	1317
Total FU Production	916	6357	5165	5263	1319	1793	1741	2358	2649	2907	3047

Source: database

Non-food use commodities production

Malta does not produce any non-food use commodities.

Non-food use: trade and net supply 1989-1998

Domestic production is used exclusively for human consumption and non-food products are mainly supplied by imports. From 1994 to 1998, the average volume of imports was 3 800 tonnes.
Non-food use imports

Even if aquaculture production has increased in the recent years, non-food use imports do not follow the same trend and have been decreasing. This is due to improved food conversion ration in the aquaculture industry and the gradual shift away from fish based meal. On average, Malta has imported 3000 tonnes per year between 1989 and 1998.

Table 620: Malta - NFU Commodities Imports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish/marine mammal, fat, oil	0	1406	1385	1368	1060	1584	2373	1391	888	394	1185
Flour, meal unfit for human cons.	0	1448	1962	2550	2477	2514	2400	2563	2633	2346	2089
Total NFU Imports	0	2855	3347	3918	3536	4098	4773	3954	3521	2740	3274

Source: database

Table 621: Malta - NFU Commodities Imports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, small	0	1448	1962	2550	2477	2514	2400	2563	2633	2346	2089
Marine fish, others	0	886	576	60	9	161	203	30	11	19	195
Aquatic mammals	0	521	809	1308	1051	1423	2170	1361	877	375	990
Total NFU Imports	0	2855	3347	3918	3536	4098	4773	3954	3521	2740	3274

Source: database

Non-food use exports

As Malta does not produce any non-food use commodities, exports are nonexistent.

Non-food use net supply

Net supply corresponds to the level of imports are there is no domestic production and no exports. Everything consumed in Malta is imported, and everything imported is consumed in Malta.

Table 622: Malta - NFU net supply by OECD group of commodities 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Fish/marine mammal, fat, oil	0	1406	1385	1368	1060	1584	2373	1391	888	394	1185
Flour, meal unfit for human consumption	0	1448	1962	2550	2477	2514	2400	2563	2633	2346	2089
Total NFU net supply	0	2855	3347	3918	3536	4098	4773	3954	3521	2740	3274

Source: database

Table 623: Malta - NFU net supply by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Marine fish, pelagic, small	0	1448	1962	2550	2477	2514	2400	2563	2633	2346	2089
Marine fish, others	0	886	576	60	9	161	203	30	11	19	195
Aquatic mammals	0	521	809	1308	1051	1423	2170	1361	877	375	990
NFU net supply	0	2855	3347	3918	3536	4098	4773	3954	3521	2740	3274

Source: database

Market for human consumption

Trade

According to fisheries regulations all fish caught by local fishermen has to be sold through the Wholesale Fishmarket. Catches are sold by public auction through middlemen to retailers. However some have assumed that at least 25 percent of all catches go unrecorded (de Leiva *et al*., 1998).

Due to the low level of domestic production the market largely depends on imports to supply demand. Between 1994 and 1998, the country imported 9000 tonnes annually and exported 1 200 tonnes of fishery products.

Food use imports

Prepared/preserved commodities (mostly canned tuna and mackerel) represented more than 50 percent of Maltese fish imports on average between 1989 and 1998, and these commodities have been increasing constantly since 1993. Frozen fish is the second largest product imported into Malta, 1 000 tonnes per year on average. Molluscs, cured fish, fresh fish and fish fillets are all increasing.

Table 624: Malta - FU Commodities Imports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Cephalopods	0	210	455	248	550	619	1441	788	1050	745	610
Crus., mol. & other aquatic inv., prepared	0	84	173	447	351	422	409	343	466	354	305
Crustaceans	0	292	363	635	721	610	983	689	739	696	573

Fish, cured	0	70	175	77	39	127	133	136	124	177	106
Fish, fillets	0	180	193	401	227	302	423	502	379	657	326
Fish, fresh/chilled	0	32	16	84	227	260	20	201	155	444	144
Fish, frozen	2722	583	796	759	940	526	313	1269	2084	1651	1164
Molluscs	0	52	73	80	0	6	59	197	236	356	106
Prepared/preserved fish	4491	2897	4131	5061	3223	4634	4792	4866	5211	5247	4455
Total FU Imports	7213	4400	6375	7791	6279	7504	8575	8991	10444	10326	7790

Source: database

The main species imported are large and small pelagic species, namely tuna and mackerel. Cuttlefish is the main species among the cephalopods, salmon among the diadromous fish.

Table 625: Malta - FU Commodities Imports by FAO group of species 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Diadromous fish	0	188	334	310	252	293	190	504	370	953	339
Marine fish, pelagic, tunas	0	1699	2780	3330	1405	2634	2658	2474	2951	3513	2344
Marine fish, pelagic, small	0	1043	1086	1115	1167	1199	1053	1722	2388	1075	1185
Marine fish, demersal	0	78	14	13	41	32	96	130	474	332	121
Marine fish, others	7213	755	1096	1613	1791	1689	1685	2143	1771	2302	2206
Crustaceans	0	292	363	635	721	610	983	689	739	696	573
Molluscs	0	136	246	527	351	429	468	540	702	710	411
Cephalopods	0	210	455	248	550	619	1441	788	1050	745	610
Total FU Import	7213	4400	6375	7791	6279	7504	8575	8991	10444	10326	7790

Source: database

Food use exports

Food use export commodities are made up of fresh fish only because there is no transformation taking place on the island. Exports are mostly fuelled by the aquaculture sector, as capture production is very limited. Italy is the main destination of Maltese products.

Table 626: Malta - FU Commodities Exports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish, fresh/chilled	83	924	615	434	1274	1014	643	1398	1594	1599	958
Total FU Exports	83	924	615	434	1274	1014	643	1398	1594	1599	958

Source: database

The main species exported are farmed species such as gilthead seabream and seabass. Some tuna is also exported.

Table 627: Malta - FU Commodities Exports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, tunas	0	268	136	69	118	456	40	120	109	39	136
Marine fish, others	83	656	479	366	1156	558	602	1278	1485	1559	822
Total FU Export	83	924	615	434	1274	1014	643	1398	1594	1599	958

Source: database

Food use net supply and consumption

Malta has a strong tradition of fish consumption. Between 1994 and 1998, the net supply was 10 000 tonnes. As national capture production is fairly low and aquaculture production is directed towards the export market, most of the fish consumed in Malta has to be imported.

With 5 000 tonnes in 1998, prepared/preserved products are the main item of the food use net supply, followed by fresh fish with 1 800 tonnes and frozen fish with 1 700 tonnes.

Table 628: Malta - FU net supply by OECD group of commodities 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Cephalopods	0	210	455	248	550	619	1441	788	1050	745	610
Crus., mol. & other aquatic inv., prepared	0	84	173	447	351	422	409	343	466	354	305
Crustaceans	0	292	363	635	721	610	983	689	739	696	573
Fish, cured	0	70	175	77	39	127	133	136	124	177	106
Fish, fillets	0	180	193	401	227	302	423	502	379	657	326
Fish, fresh/chilled	833	5465	4566	4913	272	1039	1119	1161	1211	1753	2233
Fish, frozen	2722	583	796	759	940	526	313	1269	2084	1651	1164
Molluscs	0	52	73	80	0	6	59	197	236	356	106
Prepared/preserved fish	4491	2897	4131	5061	3223	4634	4792	4866	5211	5247	4455
Total FU net supply	8046	9834	10924	12620	6323	8284	9673	9950	11499	11634	9879

Source: database

The main species in the net supply are tuna (fresh and canned) for large pelagic species, mackerel (fresh, canned and frozen) for small pelagic species, shrimp (frozen and canned) for crustaceans and mussels (frozen) for molluscs. Cuttlefish and octopus (fresh and frozen) make the bulk of the cephalopod supply.

Table 629: Malta - FU net supply by FAO group of species 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Diadromous fish	0	188	334	310	252	293	190	504	370	953	339
Marine fish, pelagic, tunas	916	7788	6294	5439	1790	2975	3370	3018	3529	4263	3938
Marine fish, pelagic, small	0	1043	1086	1115	1167	1199	1053	1722	2388	1075	1185
Marine fish, demersal	0	78	1529	3098	857	1028	1085	1824	2436	2450	1438
Marine fish, others	7130	99	617	1247	635	1131	1082	865	286	743	1384
Crustaceans	0	292	363	635	721	610	983	689	739	696	573
Molluscs	0	136	246	527	351	429	468	540	702	710	411
Cephalopods	0	210	455	248	550	619	1441	788	1050	745	610
FU net supply	8046	9834	10924	12620	6323	8284	9673	9950	11499	11634	9879

Source: database

The annual consumption rate per capita was 27 kg per year. In 1997, fish represented 13 percent of all animal protein consumed (FAO, 1999b).

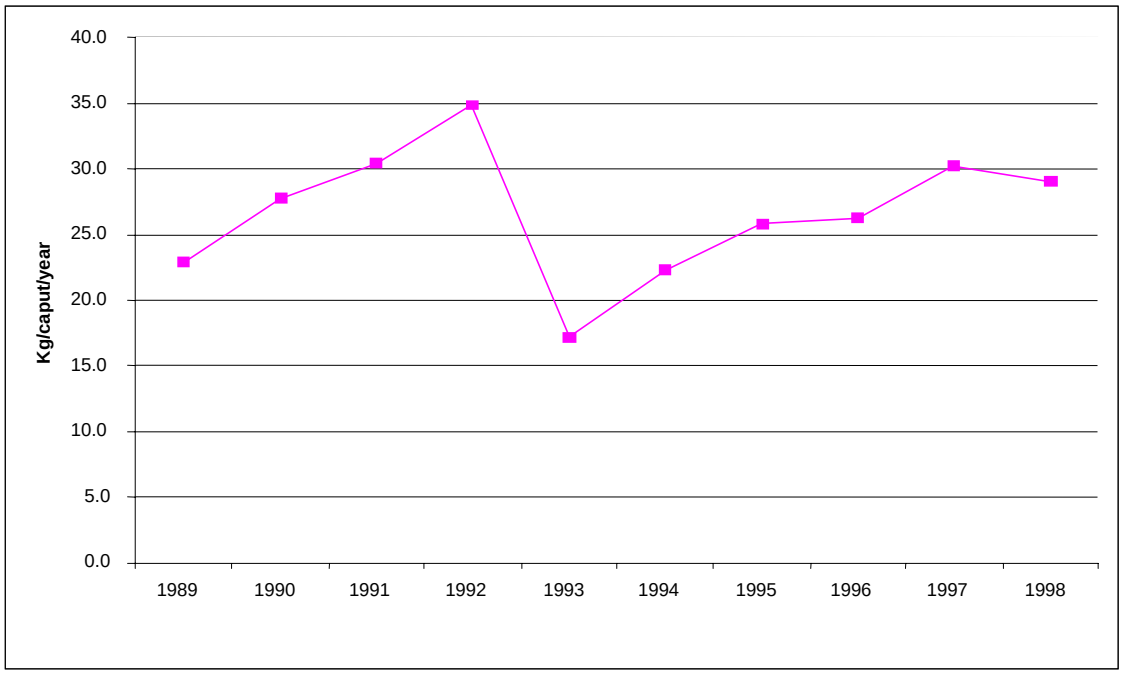

Figure 119: Fish consumption per capita per year in Malta 1989-1998

Tuna is by far the leading consumed species with a market share of above 30%. Seabream comes in second place with 13%, while the rest of the market is made of a wide variety of species.

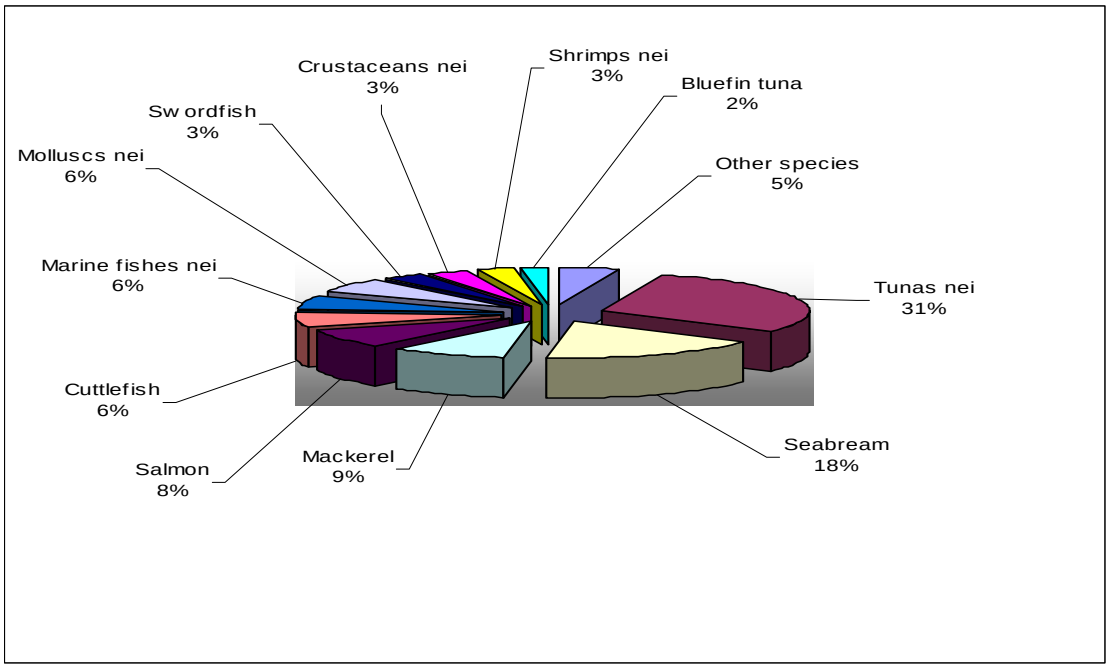

Figure 120: Malta - Main species consumed in 1998

Assumptions for projection 2005-2030 and main results

Consumption trends for the OECD group of products form the basis of the model's assumptions (see methodology in Part 1 of the study). Further assumptions regarding production, imports and exports and the need for fish in Malta between 2005 and 2030 take into account and extrapolate previous trends.

In Malta, the main consumption trends for the period 2005-2030 assume:

- A 50 percent rise in consumption of cured fish, fish fillets, frozen fish, molluscs and prepared/preserved products. A lesser increase in fresh fish (25 percent) and cephalopods (10 percent).
- A small decrease (10 percent) in raw crustaceans and in prepared crustaceans and molluscs.
- A stagnation of all other commodities.
- Large increases in imports of fresh fish, frozen and cured fish, fish fillets, molluscs and prepared/preserved commodities.

Table 630: Malta - Assumptions for projection

OECD group	94-98% annual %	Prod T % 99-30	Imp T % 99-30	Exp T % 99-30	Cons T 99-30	Prod % Annual	Imp % Annual	Exp% Annual	Cons % Annual
Cephalopods	25% 5%	0%	10%	0%	10%		0.3%		0.3%
Crus., mol. & other aquatic inv., prepared	-11% -2%	0%	-11%	0%	-10%		-0.3%		-0.3%
Crustaceans	-13% -3%	0%	-11%	0%	-10%		-0.3%		-0.3%
Fish, cured	56% 11%	0%	50%	0%	50%		1.3%		1.3%
Fish, fillets	85% 17%	0%	50%	0%	50%		1.3%		1.3%
Fish, fresh/chilled	58% 12%	0%	100%	0%	25%	0.0%	2.2%	0.0%	0.7%
Fish, frozen	109% 22%	0%	50%	0%	50%		1.3%		1.3%
Molluscs	402% 80%	0%	50%	0%	50%		1.3%		1.3%
Prepared/preserved fish	19% 4%	0%	50%	0%	50%		1.3%		1.3%

OECD group	94-98% annual %	Prod T % 99-30	Imp T % 99-30	Exp T % 99-30	Cons T % 99-30	Prod % Annual	Imp % Annual	Exp% Annual	Cons % Annual
Fish/marine mammal, fat, oil	-139% -28%	0%	0%	0%			0.0%		0.0%
Flour, meal unfit for hum. Cons.	-7% -1%	0%	0%	0%			0.0%		0.0%

Source: database

Aquaculture production increases by 100 percent between 1999 and 2030. Still this will not be enough to produce any surplus for the export market, as fish consumption also increases. Hence, exports will remain constant at their 1998 level of around 1 600 tonnes. Imports will rise to compensate for the deficit of domestic production to reach 15 000 tonnes by 2030.

Table 631: Malta - Main results for projection

Nature	Average 94-98	2005	2010	2015	2020	2025	2030
Exports FU (t live wt)	1249	1599	1599	1599	1599	1599	1599
Imports FU (t live wt)	9168	11141	11773	12449	13175	13951	14784
Production FU (t live wt)	2290	2907	2907	2907	2907	2907	2907
Fish supply FU (t live wt)	10208	12449	13081	13758	14483	15260	16092
Population (X1000)	381	411	419	427	436	445	453
Per caput supply (kg/h)	27	30	31	32	33	34	36
Production NFU (t live wt)							
Imports NFU (t live wt)	3817	2740	2740	2740	2740	2740	2740
Exports NFU (t live wt)							
Net supply NFU (t live wt)	3817	2740	2740	2740	2740	2740	2740
Aquaculture (t live wt)	1420	2240	2473	2730	3015	3328	3675
Capture (t live wt)	869	869	869	869	869	869	869
Production total (t live wt)	2290	3109	3342	3600	3884	4198	4544

Source: database

Food use net supply and human consumption 2005-2030

The pattern of the net supply will be very similar to the pattern of imports as domestic production is low and the majority of fish demand continues to be met through imports. Prepared/preserved fish (canned pelagic species) is the main commodity consumed in Malta, followed by frozen fish. The only commodities with a decreasing consumption trend are crustaceans.

Table 632: Malta - FU net supply by OECD group of commodities 2005-2030 (t live weight)

Gp of commodities	Ave. 94-98	2005	2010	2015	2020	2025	2030
Cephalopods	929	761	772	784	795	807	820
Crus., mol. & other aquatic inv., prepared	399	346	340	335	329	324	319
Crustaceans	744	680	669	658	648	637	627
Fish, cured	139	193	206	219	234	249	265
Fish, fillets	453	717	764	814	868	924	985
Fish, fresh/chilled	1256	1825	1885	1950	2024	2106	2197
Fish, frozen	1168	1804	1922	2048	2182	2325	2477
Molluscs	171	389	414	441	470	501	534
Prepared/preserved fish	4950	5733	6108	6508	6933	7387	7870
Total FU net supply	10208	12449	13081	13758	14483	15260	16092

Source: database

The main species consumed are tuna, dolphin fish and swordfish for the large pelagic species, mackerel for the small pelagic species, salmon for diadromous fish and cuttlefish for cephalopods.

Table 633: Malta - FU net supply by FAO group of species 2005-2030 (t live weight)

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Diadromous fish	462	1069	1162	1262	1372	1493	1625
Marine fish, pelagic, tunas	3431	4589	4840	5107	5392	5696	6019
Marine fish, pelagic, small	1487	1175	1252	1334	1421	1514	1613
Marine fish, demersal	1764	2481	2504	2530	2557	2585	2616

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Marine fish, others	821	960	1128	1307	1498	1703	1921
Crustaceans	744	680	669	658	648	637	627
Molluscs	570	735	754	776	799	825	852
Cephalopods	929	761	772	784	795	807	820
FU net supply	10208	12449	13081	13758	14483	15260	16092

Source: database

As the net supply growth rate (38 percent) is higher than the population growth rate (13 percent) over the period 1998-2030, apparent consumption per capita will be increasing over the next 30 years to reach 36 kg/per capita/year by 2030.

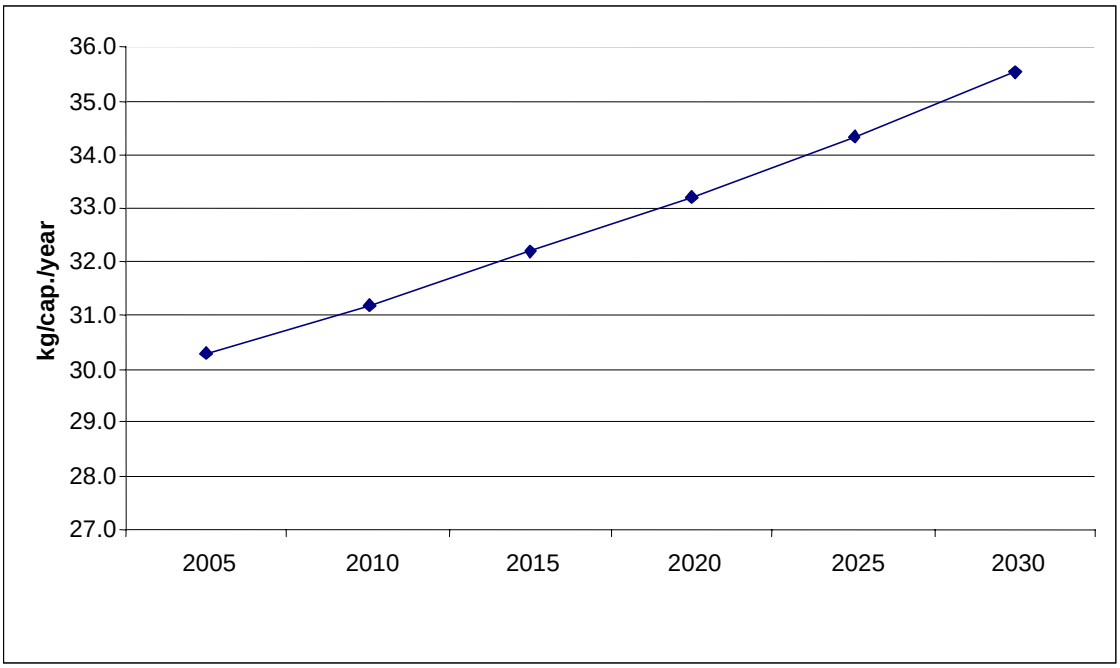

Figure 121: Fish consumption per capita per year in Malta 2005-2030

The major species consumed in Malta in 2030 remain the same as they were in 1998. Tunas and seabream are still the two most important species, with seabream losing some of its market share, as it reaches 13 percent compared with 18 percent in 1998.

Non-food use net supply 2005-2030

There will be no change in the non-food use net supply, as future aquaculture development will not be based on fishmeal.

Production 2005-2030

Capture and aquaculture

Improvement in sea bass and sea bream production technologies and the introduction of new species are the development prospects for the Maltese aquaculture sector (Malta High Commission, 2001). Aquaculture production will increase between 1998 and 2030 to reach 3 600 tonnes by the end of the period. Seabream and seabass will still account for the major part of the production.

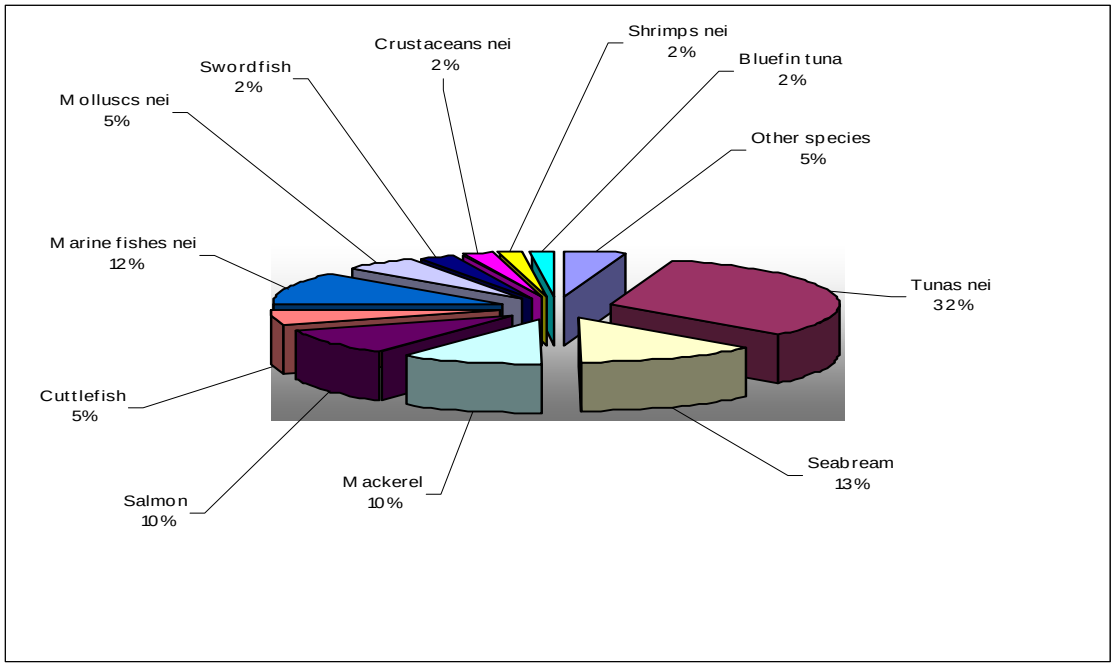

Figure 122: Malta - Main species consumed in 2030

Table 634: Malta - Aquaculture by FAO group of species 2005-2030 (t live weight)

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Marine fish, demersal	1420	2240	2473	2730	3015	3328	3675
Total	1420	2240	2473	2730	3015	3328	3675

Source: database

Table 635: Malta - Total production by FAO group of species 2005-2030 (t live weight)

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Marine fish, pelagic, tunas	678	678	678	678	678	678	678
Marine fish, pelagic, small	48	48	48	48	48	48	48
Marine fish, demersal	1540	2359	2592	2850	3134	3448	3794
Marine fish, others	3	3	3	3	3	3	3
Crustaceans	10	10	10	10	10	10	10
Cephalopods	11	11	11	11	11	11	11
Total	2290	3109	3342	3600	3884	4198	4544

Source: database

Commodities

There is no fish commodities production in Malta.

Trade 2005-2030

Imports

All fish commodities imports in Malta will be increasing except for crustaceans. Malta will be importing a total of 15 000 tonnes annually by 2030. Prepared/preserved products (canned pelagic species) are rising and remain the main imported fish commodity with 8 000 tonnes, followed by frozen fish with 2 500 tonnes.

Table 636: Malta - FU Commodities Imports by OECD group of products 2005-2030 (t live weight)

Gp of commodities	Av. 94-98	2005	2010	2015	2020	2025	2030
Cephalopods	929	761	772	784	795	807	820
Crus., mol. & other aquatic inv., prepared	399	346	340	335	329	324	319
Crustaceans	744	680	669	658	648	637	627

Gp of commodities	Av. 94-98	2005	2010	2015	2020	2025	2030
Fish, cured	139	193	206	219	234	249	265
Fish, fillets	453	717	764	814	868	924	985
Fish, fresh/chilled	216	517	576	642	715	797	889
Fish, frozen	1168	1804	1922	2048	2182	2325	2477
Molluscs	171	389	414	441	470	501	534
Prepared/preserved fish	4950	5733	6108	6508	6933	7387	7870
Total FU Imports	9168	11141	11773	12449	13175	13951	14784

Source: database

The main species will be tuna and mackerel for pelagic species, salmon for diadromous species, cuttlefish for cephalopods and shrimp for crustaceans.

Table 637: Malta - FU Commodities Imports by FAO group of species 2005-2030 (t live weight)

Gp Species	Av. 94-98	2005	2010	2015	2020	2025	2030
Diadromous fish	462	1069	1162	1262	1372	1493	1625
Marine fish, pelagic, tunas	2846	3839	4090	4357	4642	4946	5269
Marine fish, pelagic, small	1487	1175	1252	1334	1421	1514	1613
Marine fish, demersal	213	363	387	412	439	468	498
Marine fish, others	1918	2519	2687	2866	3058	3262	3480
Crustaceans	744	680	669	658	648	637	627
Molluscs	570	735	754	776	799	825	852
Cephalopods	929	761	772	784	795	807	820
Total FU Imports	9168	11141	11773	12449	13175	13951	14784

Source: database

Exports

Exports will remain at their level of 1998 of around 1 600 tonnes, as domestic production will not be able to produce any surplus.

NORWAY

Norway has a population of 4.5 million and powerful traditional links with the sea and its exploitation. The long Norwegian coastline and its very rich fishing grounds have enabled this country to become one of the principal fishing nations in Europe and the second largest exporter of seafood in the world after Thailand. The fisheries sector in Norway provides an extensive range of raw and processed products and the national industry is strongly export-orientated. In terms of value, exports of seafood products are second only to oil and gas products and, despite predictions of a slowdown of the industry, they continue to increase each year (Ryvolt, 2000). The fishery sector in Norway is also an important source of employment in coastal areas.

The Norwegian aquaculture industry has grown into the largest in Europe and one of the most successful in the world. Efficiency within the aquaculture industry and in the processing sector has risen as controls preventing conglomeration have been relaxed. In addition, a clear national policy for responsible management and the control of fishing effort should ensure that the national industry remains viable and successful into the future.

Production: captures, aquaculture and commodities 1989-1998

Norwegian fisheries and aquaculture production increased from 2 Mt in 1989, to 3 million in 1998. Aquaculture accounted for 12 percent of the volume at the end of the decade. Freshwater commercial operations are negligible although the country's rivers support a good recreational angling.

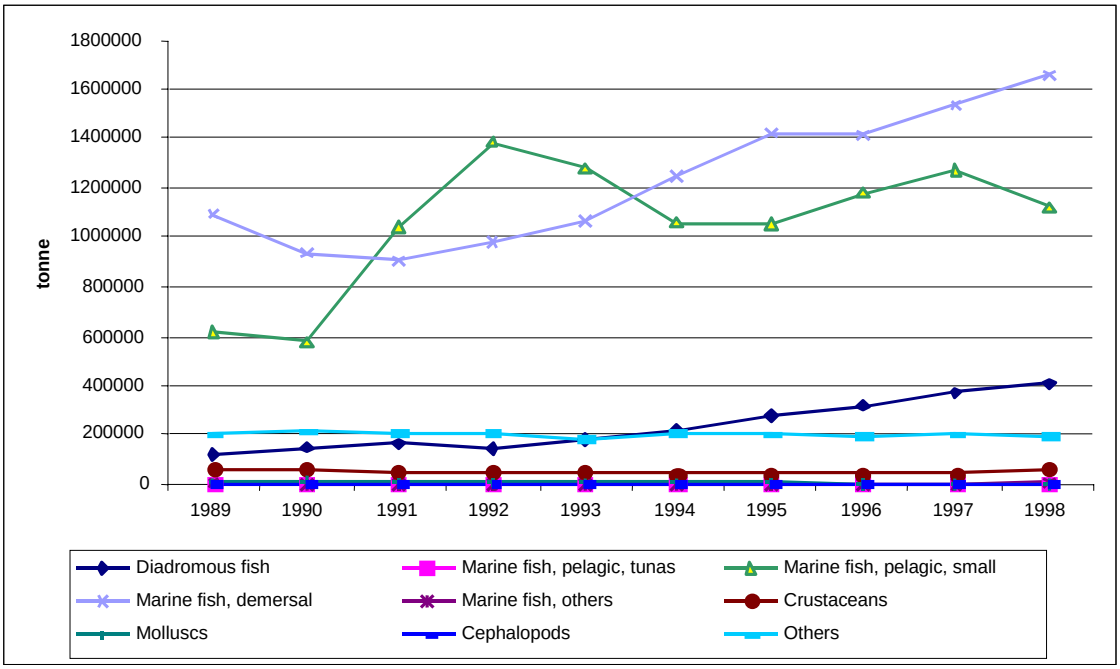

Figure 123: Norway - Capture and aquaculture production 1989-1998

Captures

Norwegian waters are very productive, allowing the country to achieve the highest landings in Europe. Average catch over the 1989-1998 period was 2.5 Mt and have been increasing steadily. This increase can be attributed to growth in the landings of industrial species, both pelagic species (herring essentially) and demersal (blue withing and sandeels) (Hempel, 1998).

Table 638: Norway - Captures by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Diadromous fish	6884	1236	1271	1473	1359	1569	1403	1237	1270	1254	1896
Marine fish, pelagic, tunas	1787	1790	0	0	0	0	0	0	0	0	358
Marine fish, pelagic, small	620586	578044	1043728	1385408	1281888	1061861	1053755	1180034	1271591	1126580	1060348
Marine fish, demersal	1098039	941646	903280	984698	1068474	1253232	1419542	1413573	1538180	1659918	1228058
Marine fish, others	3735	2269	2356	1759	2290	1047	336	158	322	2788	1706
Crustaceans	57639	64294	50793	50672	50838	40245	41289	43478	44307	59579	50313
Molluscs	6132	13669	10586	6805	10278	8076	7423	83	99	250	6340
Cephalopods	5	0	0	0	0	0	352	0	190	2	55
Others	196768	212446	205295	203465	182494	203448	201232	190285	202281	189408	198712
Total gp of species	1991575	1815394	2217309	2634280	2597621	2569478	2725332	2828848	3058240	3039779	2547786

Source: database

In fact, industrial species now account for the greatest share of the total at about 1.3 Mt in 1998. Landings of demersal species accounted for approximately 800 000 tonnes in 1998 with cod, saithe and haddock representing the main species caught. Cod catches remain mostly stable around 300 000 tonnes while landings of herring increased from 200 000 tonnes in 1989 to reach 800 000 tonnes in 1998. Sandeels and blue whiting also go up between 1989 and 1998 with the blue whiting experiencing a growth of around 300 000 tonnes.

Aquaculture

The production of farmed fish has been rising steadily since the establishment of the industry at the beginning of the 1970s. Expansion was particularly marked during the 1990s when the volume of production increased from 110 000 tonnes in 1989 to 400 000 tonnes by 1998. Norway's natural environment and geographical features, with deep sheltered fjords, constitute ideal conditions for the industry.

Norway has imposed a series of controls on salmon farming including volume restrictions on farm production, the use of chemicals and medicines and strict feed quotas. Although these constraints initially impacted the industry, it is widely agreed that it also encouraged the development of a more efficient and competitive sub-sector (Tilseth *et al*., 1991). The feed quotas in force since 1996, for instance, have ultimately encouraged innovation and development of more efficient use of the limited feed (Hempel, 2001a). Recently, aquaculture companies have been allowed to expand and merge so that in 1998, the ten largest salmon farming companies controlled about 34 percent of total production. This figure rose to 42 percent in the year 2000 (Hempel, 2001b).

The principal cultivated species are salmon and rainbow trout with about 360 000 and 50 000 tonnes annual production respectively. Norway currently produces half of the world production of Atlantic salmon (Anon., 1998g).

There is still potential to extend aquaculture production with the cultivation of new species. Trials with cod, halibut and wolfish cultivation, for example, have all proved successful and commercial viability is likely in the near future (Anon., 2001b). Similar success has been achieved with mussel production where some increases appear achievable (Anon., 2000a).

Table 639: Norway - Aquaculture by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Diadromous fish	113719	149947	160705	137387	173130	217073	276515	320723	366219	407612	232303
Marine fish, demersal	0	0	0	232	367	569	289	198	307	148	211
Marine fish, others	0	0	0	0	0	287	444	437	270	835	227
Molluscs	43	77	0	0	0	542	388	184	502	267	200
Total gp of species	113762	150024	160705	137619	173497	218471	277636	321542	367298	408862	232942

Source: database

Commodities production

Food use commodities production

Food use commodities production has nearly doubled since 1989 to reach a total of 1.7 Mt in 1998. In 1995, 65 percent of the catch was used for human consumption (OECD, 1997) and in 1997 there were around 600 land-based plants approved for the processing of the fish (FAO, 2001b).

Frozen fish is the main commodity produced in volume with 500 000 tonnes average, followed by fresh fish (300 000 tonnes), fish fillets and cured fish. The most common frozen products are herring, mackerel, salmon, trout and cod. Salmon dominates the fresh fish production, while cod in brine, dried cod (stockfish), dried and salted cod (klipfish), smoked or salted herring are the main commodities found in the cured fish category. Frozen or fresh cod and herring fillets form the bulk of Norwegian fillet production.

Table 640: Norway - FU Commodities Production by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Cephalopods	1793	591	0	0	0	0	517	1354	122	2128	650
Crus., mol. & other aquatic inv., prepared	21903	20098	18186	20089	20353	20706	16988	16166	20139	23782	19841
Crustaceans	22317	39531	35211	30488	36978	39344	25199	27181	24547	24699	30550
Fish, cured	170897	134225	170352	170366	182202	239200	238026	228701	220818	216159	197095
Fish, fillets	128942	96470	88317	137183	184567	266314	276808	299783	309855	356653	214489
Fish, fresh/chilled	275039	266413	233856	242370	250914	269405	290152	285004	346451	359970	281957
Fish, frozen	243221	312710	423071	381537	438978	552824	618730	719896	830685	580397	510205
Molluscs	3546	4528	2392	2935	2552	2908	3699	2859	4910	5108	3544
Prepared/preserved fish	90781	88727	94727	104006	112792	95271	89631	87072	88891	88991	94089
Total FU Production	958439	963294	1066111	1088974	1229338	1485972	1559749	1668015	1846418	1657886	1352419

Source: database

The main species involved in the food use commodities production include Atlantic salmon and rainbow trout for diadromous fish, Atlantic herring and mackerel for small pelagic species, Atlantic cod, saithe, haddock and Greenland halibut for demersal species, and shrimp and prawn for crustaceans.

Table 641: Norway - FU Commodities Production by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Diadromous fish	166931	196499	195792	189824	197985	225125	265842	322682	382161	414648	255749
Marine fish, pelagic, small	243676	254425	350930	373057	429468	578600	617362	719836	796949	580288	494459
Marine fish, demersal	261674	209073	260203	276570	326113	377236	373783	420161	416590	399832	332124
Marine fish, others	236599	238548	203397	196011	215888	242052	256359	157777	201000	207402	215503
Crustaceans	44220	59630	53397	50576	57332	60050	42186	43346	44686	48481	50391
Molluscs	3546	4528	2392	2935	2552	2908	3699	2859	4910	5108	3544
Cephalopods	1793	591	0	0	0	0	517	1354	122	2128	650
Total FU Production	958439	963294	1066111	1088974	1229338	1485972	1559749	1668015	1846418	1657886	1352419

Source: database

Non-food use commodities production

Non-food use commodities production is very important for this major aquaculture producer. In 1998, there were 11 plants involved in fish reduction employing a total of around 500 workers and most of the production was used as feed in the salmon industry (FAO, 2001). Production has been steadily increasing since 1989 to reach 13 Mt in 1998. The share of the catch used for the production of meal and oil was reported to be around 35 percent in 1995 (OECD, 1997).

Table 642: Norway - NFU Commodities Production by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish/marine mammal, fat, oil	54271	201064	356341	459452	436469	342795	252434	255901	302193	300952	296187
Flour, meal unfit for human cons.	764888	648396	823083	1008937	990159	584952	693376	673545	827276	1011587	802620
Total NFU Production	819159	849460	1179424	1468389	1426628	927747	945810	929447	1129469	1312539	1098807

Source: database

In the data below, demersal species used for industrial production were included under the group small pelagic. The main species involved in the non-food use production are pout, sandeel and blue whiting for demersal species, while capelin, herring and sprat are the most common pelagic fish. Seal oil formed the bulk of aquatic mammals products. Around 50 percent of the volume of pelagic landings is used for non-food production (FAO, 2001b).

Table 643: Norway - NFU Commodities Production by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, small	750371	639739	809367	999208	983786	580307	680966	667447	820798	1004558	793655
Marine fish, demersal	21412	13703	23148	17902	12410	10453	18560	14136	12837	12819	15738
Marine fish, others	45978	194639	345730	450151	429738	335753	245039	247115	295835	295162	288514
Aquatic mammals	1398	1378	1179	1129	694	1234	1245	748	0	0	901
Total NFU Production	819159	849460	1179424	1468389	1426628	927747	945810	929447	1129469	1312539	1098807

Source: database

Non-food use: trade and net supply 1989-1998

Non-food use imports

Levels of non-food use imports were around 500 000 tonnes annually over the period 1989-1998 and represented mainly raw material for the important Norwegian fishmeal industry. Part of these imports consists of direct landings from foreign vessels for processing in Norwegian plants (Myrstad, 2000).

Table 644: Norway - NFU Commodities Imports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish/marine mammal, fat, oil	328265	225526	224381	216194	338922	416197	523469	527121	604842	471306	387622
Flour, meal unfit for human cons.	45614	25910	48614	62286	51862	72958	315931	274626	334073	259502	149138
Total NFU Imports	373879	251437	272995	278480	390784	489155	839400	801747	938915	730808	536760

Source: database

As major Norwegian non-food use imports are made of fish oil, species are often not clearly distinguished. Cod (trimmings), shark and small pelagic seem to be the favourite species for oil imports. Myrstad (2000) identifies cod, mackerel and herring as the main species involved.

Table 645: Norway - NFU Commodities Imports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, small	45614	25910	48614	62286	51862	72904	0	0	0	0	30719
Marine fish, demersal	1377	1283	1455	639	613	1284	3691	2640	1535	617	1513
Marine fish, others	326888	222647	220955	215350	338254	414683	835124	798673	937269	730047	503989
Aquatic animals	0	0	0	0	0	55	582	425	111	144	132
Aquatic mammals	0	1597	1972	205	56	229	3	9	0	0	407
Total NFU Imports	373879	251437	272995	278480	390784	489155	839400	801747	938915	730808	536760

Source: database

Non-food use exports

Norwegian non-food use exports are mostly made up of fishmeal. The average for the 1989-1998 period is around 200 000 tonnes per year, but levels have been steadily increasing from 50 000 tonnes in 1989 to 600 000 tonnes in 1998.

Table 646: Norway - NFU Commodities Exports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish/marine mammal, fat, oil	127714	136541	186905	170798	195269	204042	124835	104110	87034	69217	140647
Flour, meal unfit for human cons.	54144	54414	132624	167624	167062	171752	291513	387114	352935	560978	234016
Total NFU Exports	181858	190955	319529	338423	362330	375794	416348	491224	439969	630195	374663

Source: database

Table 647: Norway - NFU Commodities Exports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, small	54144	54414	132624	167624	167062	85656	110479	87623	67025	49098	97575
Marine fish, demersal	2073	2423	3315	3260	3006	5176	4622	5460	6259	5629	4122
Marine fish, others	125638	134118	183590	167532	192257	284962	300500	398135	366674	575454	272886
Aquatic animals	0	0	0	0	0	0	0	0	11	14	3
Aquatic mammals	3	0	0	6	6	0	747	6	0	0	77
Total NFU Export	181858	190955	319529	338423	362330	375794	416348	491224	439969	630195	374663

Source: database

Non-food use net supply

From 1989 to 1998, the net supply of non-food production was approximately 1.3 Mt, most of which was directed for salmon production (FAO, 2001b). The high level of the fish oil net supply reflects the importance of the non-food use Norwegian industry. Its production is important enough to supply the domestic market while providing a surplus to be exported.

Table 648: Norway - NFU net supply by OECD group of commodities 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Fish/marine mammal, fat, oil	254822	290049	393818	504847	580123	554950	651068	678912	820001	703041	543163
Flour, meal unfit for human consumption	756359	619892	739073	903599	874959	486159	717795	561058	808414	710111	717742
Total NFU net supply	1011180	909941	1132891	1408446	1455082	1041108	1368862	1239970	1628415	1413152	1260905

Source: database

Table 649: Norway - NFU net supply by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Marine fish, pelagic, small	741841	611236	725357	893870	868586	567554	570487	579825	753773	955459	726799
Marine fish, demersal	20716	12563	21288	15281	10017	6562	17629	11316	8113	7806	13129
Marine fish, others	247228	283168	383095	497969	575735	465474	779663	647653	866430	449756	519617
Aquatic animals	0	0	0	0	0	55	582	425	100	130	129
Aquatic mammals	1395	2975	3151	1327	744	1463	501	751	0	0	1231
NFU net supply	1011180	909941	1132891	1408446	1455082	1041108	1368862	1239970	1628415	1413152	1260905

Source: database

Market for human consumption

Trade

Norway is a major exporter of fishery products and between 1994 and 1998 it exported 1.7 Mt while it imported 300 000 tonnes. In terms of value, Norwegian imports amounted to NOK 33.3 billion, while exports represented NOK 23.7 billion (OECD, 2000). It is a general objective for the Norwegian industry to increase the degree of processing for all fish products exported from Norway (Hempel, 1998a). Aquaculture is playing an increasingly important role in Norwegian seafood exports and farmed fish accounted for some 32 percent of total exports value in 1998 (Hempel, 2001a).

The EU is by far the largest market for Norwegian seafood and in 1997 it accounted for 48 percent by volume and 59 percent by value of total seafood exports from Norway. This represents an important change from earlier years, however. Previously, the EU had accounted for a much larger share of Norwegian seafood exports at about 70 percent by value but Norwegian companies have since decided to actively seek additional markets to reduce their vulnerability to policy changes and import restrictions imposed by EU. Over the last two years, for instance, the EU attempted to curb imports of

Norwegian salmon when Scottish fish farmers accused Norwegian exporters of distorting prices by dumping salmon on the EU market.

The Norwegian Seafood Exports Council has recognised this vulnerability and over-reliance on the EU market and has been proactive in seeking additional markets such as Japan and China (Hempel, 1998b and Anon. 1997b). As a result, exports to China of basic and luxury products (like salmon) increased by more than 133 percent in 1996. Russia, Poland and other Eastern European countries have also emerged as new and significant customers for Norwegian products, particularly regarding pelagic species, salmon and shrimp (Hempel, 1997).

Food use imports

The main food use commodities imports were made of fresh fish, which represents more than 60 percent on average between 1989 and 1998. Fresh fish is mostly re-exported. Frozen fish commodities are second in volume, followed by crustaceans.

Table 650: Norway - FU Commodities Imports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Cephalopods	6628	3812	6106	6056	4420	1482	235	370	538	7591	3724
Crus., mol. & other aquatic inv., prepared	436	1230	1198	1706	1567	1892	1629	2149	2116	2588	1651
Crustaceans	13738	11391	15988	23892	33329	14806	22108	21986	16211	15858	18931
Fish, cured	5680	7710	5474	2230	3689	1689	3913	4438	5799	6915	4754
Fish, fillets	2172	4053	4997	3454	3419	2970	3961	7012	6954	8250	4724
Fish, fresh/chilled	27603	43327	116077	125856	149436	149391	192112	228315	233229	235028	150037
Fish, frozen	22320	31990	32783	32760	36077	29916	28098	40893	52376	70221	37743
Molluscs	455	507	77	125	163	2079	6813	7001	4873	3737	2583
Prepared/preserved fish	9074	9804	7790	10306	11570	10279	12200	13558	16295	17006	11788
Total FU Imports	88106	113824	190492	206386	243671	214504	271070	325723	338390	367196	235936

Source: database

Imported species are mainly comprised of cod, mackerel and herring to supply Norwegian processors and to be re-exported to established foreign markets. Cod is mainly supplied by Russia, which exported more than 50 percent of all its cod catch to Norway in 1998 (Hempel, 2001).

Table 651: Norway - FU Commodities Imports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Freshwater fish	1	4	62	0	0	0	0	0	96	221	38
Diadromous fish	12213	8838	3534	1966	10149	1137	2444	1238	1619	1570	4471
Marine fish, pelagic, tunas	929	981	1010	1073	1275	1410	1259	1653	1403	2128	1312
Marine fish, pelagic, small	10534	26233	92598	71820	76263	80845	96395	142677	158688	193283	94934
Marine fish, demersal	37086	53636	62672	89942	105517	101847	128796	133220	136322	115716	96475
Marine fish, others	6086	7192	7246	9805	10986	9006	11391	15427	16524	24503	11817
Crustaceans	14174	12621	17187	25598	34896	16699	23738	24136	18327	18447	20582
Molluscs	455	507	77	125	163	2079	6813	7001	4873	3737	2583

Cephalopods	6628	3812	6106	6056	4420	1482	235	370	538	7591	3724
Total FU Imports	88106	113824	190492	206386	243671	214504	271070	325723	338390	367196	235936

Source: database

Food use exports

Fresh and chilled fish represent the most important export although dried, salted, smoked fish, frozen fish and frozen fillets are all traded in significant volumes. Pelagic fish represent the major exported species group. About 900 000 tonnes were exported in 1997. Norway also exports considerable quantities of fresh salmon and trout. Around 300 000 tonnes of salmon are exported annually. The majority of salmon exports are directed to the European markets while the major customer of Norwegian trout is Japan (Anon., 2002c).

Table 652: Norway - FU Commodities Exports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Cephalopods	1431	370	2398	767	1095	252	399	1083	115	1663	957
Crus., mol. & other aquatic inv., prepared	21042	18106	16866	20215	19996	20744	14032	16626	19937	23975	19154
Crustaceans	11311	13102	12265	9656	10965	13320	8522	10346	12557	14636	11668
Fish, cured	125262	108663	129477	140935	171237	224782	222213	226313	209956	217824	177666
Fish, fillets	123639	81397	86415	132970	181810	257203	277286	303255	309325	293179	204648
Fish, fresh/chilled	268648	305026	326233	344564	374686	386859	440650	492696	565680	589164	409421
Fish, frozen	259947	319125	444375	403520	467936	544133	615287	699423	812474	631879	519810
Molluscs	2286	2479	1729	1429	1972	2569	2909	2306	3870	387	2194
Prepared/preserved fish	42127	37781	42983	42951	43061	49011	43590	42803	47310	49253	44087
Total FU Exports	855692	886050	1062742	1097007	1272758	1498873	1624889	1794852	1981224	1821960	1389605

Source: database

The most important export species are salmon and trout for diadromous fish; herring and mackerel for pelagic species; cod, saithe, haddock and Atlantic redfish for demersal species; and shrimp and prawns for crustaceans (Anon., 2000i).

Table 653: Norway - FU Commodities Exports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Freshwater fish	1	1	12	0	0	0	0	0	30	69	11
Diadromous fish	138860	161818	171736	179376	191845	220549	264320	322007	362348	403509	241637
Marine fish, pelagic, tunas	679	331	174	5	253	313	138	641	185	1133	385
Marine fish, pelagic, small	250324	279670	435858	433400	505348	650459	706304	829496	946580	755507	579295
Marine fish, demersal	295524	253577	283470	348623	430525	478441	495708	523515	541241	419776	407040
Marine fish, others	134235	156596	138234	103537	110759	112226	132557	88832	94361	201306	127264
Crustaceans	32353	31208	29131	29871	30961	34064	22554	26972	32494	38611	30822
Molluscs	2286	2479	1729	1429	1972	2569	2909	2306	3870	387	2194
Cephalopods	1431	370	2398	767	1095	252	399	1083	115	1663	957
Total FU Export	855692	886050	1062742	1097007	1272758	1498873	1624889	1794852	1981224	1821960	1389605

Source: database

Distribution

The domestic market is seen as an important and profitable market for the fishing industry. Supermarkets dominate the distribution of fish products in Norway. They accounted for 67 percent of final sales in 1997, while fishmongers represented only 12 percent of sales that year (Papageorgiou, Girard 2000). Sales from grocery shops are characterised both by a low share of fresh fish and fillets and by a relatively high share of processed products (Bjørndal *et al*., 2000).

Food use net supply and consumption

Norway is one of the greatest fish consumers in Europe. The net supply of fishery products over the period 1989-1998 was around 200 000 tonnes. Prepared/preserved fish is usually the main commodity

in the net-supply with around 60 000 tonnes annually, followed by crustaceans, frozen, cured and fresh fish. The share of crustaceans has been decreasing in the past few years, as well as the one of fresh and frozen fish.

Table 654: Norway - FU net supply by OECD group of commodities 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Cephalopods	6990	4033	3708	5289	3325	1230	353	642	545	8057	3417
Crus., mol. & other aquatic inv., prepared	1297	3223	2519	1580	1924	1854	4585	1689	2318	2395	2338
Crustaceans	24744	37820	38934	44724	59342	40830	38786	38821	28201	25922	37812
Fish, cured	51316	33271	46349	31661	14654	16106	19726	6826	16661	5251	24182
Fish, fillets	7475	19126	6899	7667	6175	12080	3482	3539	7485	71724	14565
Fish, fresh/chilled	33994	4714	23700	23662	25664	31937	41613	20622	14000	5834	22574
Fish, frozen	5594	25575	11478	10777	7119	38607	31541	61365	70587	18739	28138
Molluscs	1715	2556	740	1631	744	2418	7603	7554	5913	8457	3933
Prepared/preserved fish	57728	60750	59533	71362	81301	56539	58241	57827	57875	56743	61790
Total FU net supply	190853	191068	193862	198352	200251	201603	205930	198886	203585	203121	198751

Source: database

Table 655: Norway - FU net supply by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Freshwater fish	0	3	50	0	0	0	0	0	65	152	27
Diadromous fish	40284	43519	27591	12414	16289	5713	3966	1912	21432	12710	18583
Marine fish, pelagic, tunas	251	650	836	1068	1022	1097	1121	1012	1218	994	927
Marine fish, pelagic, small	3886	988	7669	11477	383	8985	7452	33017	9058	18064	10098
Marine fish, demersal	3236	9132	39405	17889	1105	642	6871	29867	11672	95772	21559
Marine fish, others	108451	89144	72410	102279	116115	138832	135193	84371	123163	30598	100056
Crustaceans	26041	41043	41453	46304	61267	42684	43370	40510	30519	28317	40151
Molluscs	1715	2556	740	1631	744	2418	7603	7554	5913	8457	3933
Cephalopods	6990	4033	3708	5289	3325	1230	353	642	545	8057	3417
FU net supply	190853	191068	193862	198352	200251	201603	205930	198886	203585	203121	198751

Source: database

Annual consumption per capita was 48 kg per annum, representing nearly 25 percent of animal proteins consumed in 1997 (FAO, 1999b). There are several reasons why there appears to have been increasing demand from the consumer in recent years. Firstly, there is a wider public perception that seafood is both good to eat and good for health (Anon., 2001d). Increased health awareness may explain the trend of increased demand for fresh fish and markedly decreased demand for canned fish between 1977 and 1994. In addition, increased demand might relate to increased choice, as new forms of products are made available and there are increased opportunities for sales through retailers such as take-away restaurants, additional supermarkets and seafood markets (Myrland *et al*., 2000).

The share of salmon in sales of fresh fish has increased over the last twenty years. Salmon appears to have substituted for other fresh fish, in particular the cheaper mackerel and herring (Floaaten *et al*., 1997).

There are also variations in consumer preferences that reflect regional and demographic differences such as the age of households. In the Oslo area, for instance, households buy less fish than most other parts of Norway, whilst households with young housewives buy less fish than households with older housewives (Bjørndal *et al*., 2000).

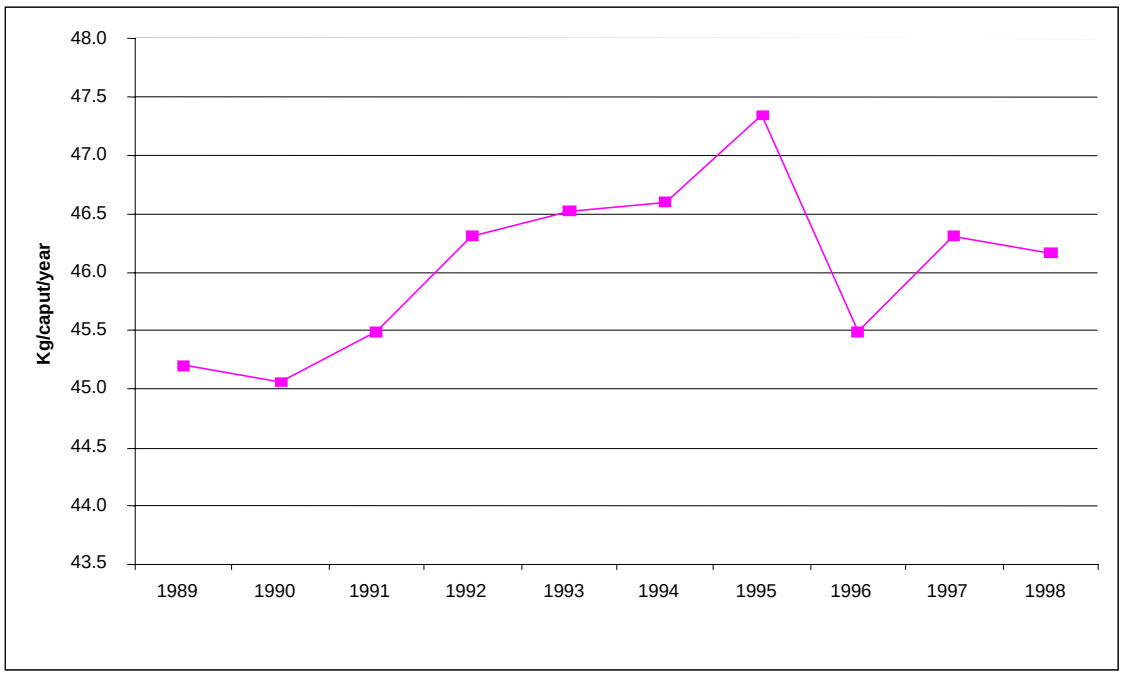

Figure 124: Fish consumption per capita per year in Norway 1989-1998

The main species consumed were cod and mackerel. Together they accounted for more than 70 percent of the market. Saithe, salmon and haddock were chosen to a lesser degree.

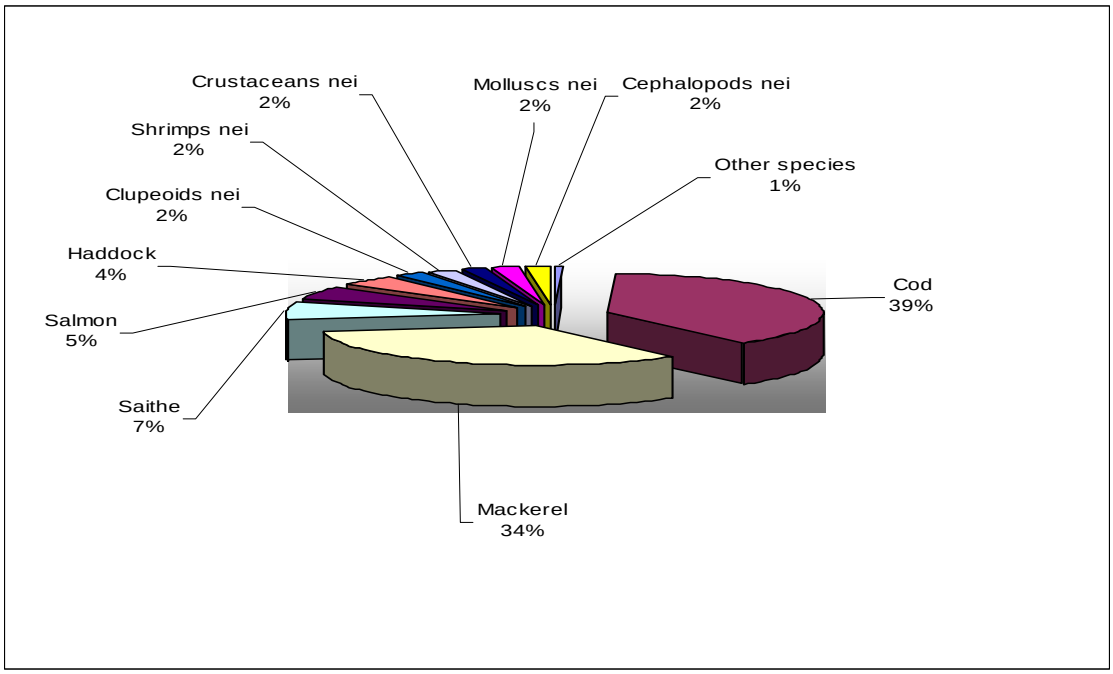

Figure 125: Norway - Main species consumed in 1998

Assumptions for projection 2005-2030

Consumption trends for the OECD group of products form the basis of the model's assumptions (see methodology in Part 1 of the study). Further assumptions regarding production, imports and exports and the need for fish in Norway between 2005 and 2030 take into account and extrapolate previous trends.

The main consumption trends during the period 2005-2030 for Norway assume:

- A 50 percent rise in consumption of molluscs and a lesser increase (20 percent) in fresh/chilled fish and prepared/preserved fish. A small rise (10 percent) in fish fillets consumption
- A stagnation of all other commodities.
- Large increases in molluscs and fish fillet imports.

Apparent consumption will increase thanks to the wide public perception that seafood is both good to eat and good for health (Myland *et al.*, 2000). Increased choice and availability, positively influenced by the increasing share of large retailers within the Norwegian seafood distribution, is also likely to push apparent consumption up (Johansen, 2002).

However, consumption per capita per year will decrease between 1998 and 2030 from 46 kg per capita per year to reach 45 kg per capita per year as the growth rate of the net supply will be lower than the growth rate of the population. This can be explained by the fact that younger generations consume less and less fish (OECD, 2003) with households with young housewives reported to buy less fish than households with older housewives (Bjørndal *et al.*, 2000). A shift in consumption pattern among younger generations is also observed with an increase in convenience products (prepared/preserved), while more traditional products (cured fish) stagnate.

Table 656: Norway - Assumptions for projection

OECD group	94-98% annual %	Prod % 99-30	T Imp T % 99-30	Exp T % 99-30	Cons T 99-30	Prod % Annual	Imp % Annual	Exp% Annual	Cons % Annual
Cephalopods	172%	34%	0%	0%	0%	0%	0.0%	0.0%	0.0%	0.0%
Crus., mol. & other aquatic inv., prepared	13%	3%	0%	0%	0%	0%	0.0%	0.0%	0.0%	0.0%
Crustaceans	-44%	-9%	0%	0%	0%	0%	0.0%	0.0%	0.0%	0.0%
Fish, cured	20%	4%	10%	8%	10%	0%	0.3%	0.2%	0.3%	0.0%
Fish, fillets	72%	14%	0%	72%	0%	10%	0.0%	1.7%	0.0%	0.3%
Fish, fresh/chilled	-53%	-11%	20%	0%	12%	20%	0.6%	0.0%	0.4%	0.6%
Fish, frozen	-112%	-22%	0%	0%	0%	0%	0.0%	0.0%	0.0%	0.0%
Molluscs	136%	27%	0%	114%	0%	50%	0.0%	2.4%	0.0%	1.3%
Prepared/preserved fish	-18%	-4%	10%	16%	0%	20%	0.3%	0.5%	0.0%	0.6%
Fish/marine mammal, fat, oil	9%	2%	0%	20%	0%		0.0%	0.6%	0.0%	0.0%
Flour, meal unfit for hum. Cons.	13%	3%	0%	20%	0%		0.0%	0.6%	0.0%	0.0%

Source: database

Production will rise thanks to the further development of the aquaculture sector. This will provide a surplus that will enable Norwegian exports to rise to nearly 2 Mt. Imports will rise thanks to increased consumption of fish fillets and molluscs, as well as prepared and preserved products.

Imports of fish oil and fishmeal will rise in order to cope with the increased production of the aquaculture sector.

Table 657: Norway - Main results for projection

Nature	Average 94-98	2005	2010	2015	2020	2025	2030
Exports FU (t live wt)	1744360	1841286	1855374	1869703	1884278	1899102	1914180
Imports FU (t live wt)	303377	369583	371454	373478	375671	378051	380636
Production FU (t live wt)	1643608	1678962	1694462	1710345	1726621	1743301	1760395
Fish supply FU (t live wt)	202625	207259	210542	214120	218015	222250	226851
Population (X1000)	4369	4551	4663	4756	4851	4948	5046
Per caput supply (kg/h)	46	46	45	45	45	45	45
Production NFU (t live wt)	1049002	1312539	1312539	1312539	1312539	1312539	1312539
Imports NFU (t live wt)	760005	772943	805224	839534	876077	915088	956828
Exports NFU (t live wt)	470706	630195	630195	630195	630195	630195	630195
Net supply NFU (t live wt)	1338302	1455286	1487568	1521877	1558421	1597432	1639172
Aquaculture (t live wt)	318762	466065	511905	562381	617967	679189	746624

Capture (t live wt)	2844335	2844335	2844335	2844335	2844335	2844335	2844335
Production total (t live wt)	3163097	3310400	3356241	3406716	3462303	3523524	3590959

Source: database

Food use net supply and human consumption 2005-2030

Consumption of seafood is reportedly increasing in urban areas. Grocery retail chains account for 85 percent of total fish sales in Norway, and the trend is toward even higher market shares in the future. The larger grocery retailers are expanding the availability of fresh fish in their stores to attract health-conscious consumers (Johansen, 2002).

The Norwegian Seafood Export Council is also increasing its effort to promote fish in the domestic market. In 2001, it spent about NOK 18.5 million (US$ 2 million) out of total budget of NOK 340 million (US$ 38 million) to increase fish awareness through distribution of brochures, participation in smaller fairs and festivals, and support of TV commercials. Several fish promotion programs were also launched to target the young generation by supporting the use of fish in school meals and cooking lessons (Johansen, 2002).

Fish fillets remain the main commodity consumed in Norway with its net supply increasing to 78 000 t. Prepared/preserved fish and crustaceans follow with 70 000 tonnes and 26 000 tonnes respectively. These products reflect the growing importance of more sophisticated products in the Norwegian market. Interest for traditional cured products like klipfish and stockfish seem to diminish as consumption increases only slightly. As a whole, the Norwegian net supply will grow by 10 percent from 200 000 tonnes to 220 000 tonnes in 2030.

Table 658: Norway - FU net supply by OECD group of commodities 2005-2030 (t live weight)

Gp of commodities	Ave. 94-98	2005	2010	2015	2020	2025	2030
Cephalopods	2165	8057	8057	8057	8057	8057	8057
Crus., mol. & other aquatic inv., prepared	2568	2395	2395	2395	2395	2395	2395
Crustaceans	34512	25922	25922	25922	25922	25922	25922
Fish, cured	12914	5259	5265	5269	5272	5275	5276
Fish, fillets	19662	72763	73584	74478	75451	76511	77664
Fish, fresh/chilled	22801	5811	5934	6181	6556	7067	7718
Fish, frozen	44168	18739	18739	18739	18739	18739	18739
Molluscs	6389	9134	9691	10319	11025	11821	12717
Prepared/preserved fish	57445	59180	60955	62761	64597	66464	68364
Total FU net supply	202625	207259	210542	214120	218015	222250	226851

Source: database

Table 659: Norway - FU net supply by FAO group of species 2005-2030 (t live weight)

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Freshwater fish	44	178	199	222	247	274	303
Diadromous fish	9147	17236	20656	24237	27985	31907	36009
Marine fish, pelagic, tunas	1089	1033	1061	1090	1120	1151	1182
Marine fish, pelagic, small	15315	14829	12478	10095	7679	5232	2753
Marine fish, demersal	28965	92755	90565	88347	86100	83826	81524
Marine fish, others	102432	35720	39518	43437	47485	51667	55989
Crustaceans	37080	28317	28317	28317	28317	28317	28317
Molluscs	6389	9134	9691	10319	11025	11821	12717
Cephalopods	2165	8057	8057	8057	8057	8057	8057
FU net supply	202625	207259	210542	214120	218015	222250	226851

Source: database

As the Norwegian population growth rate on the period (15 percent) will be higher than the net supply growth rate (12 percent between 1998 and 2030), consumption per capita per year will decrease from 46 to 45 kg per capita per yearr. The increase in fish consumption in Norway is mostly supported by particular age groups between 30 and 50 years old, while younger and older generations seem to have a lower consumption rate (OECD, 2003).

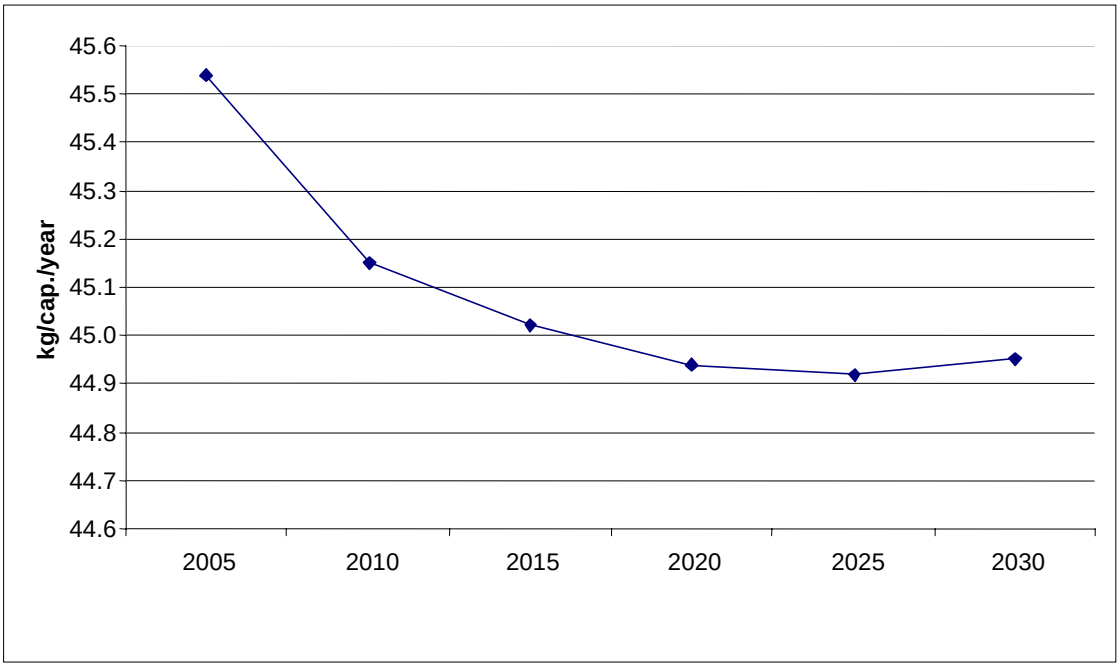

Figure 126: Fish consumption per capita per year in Norway 2005-2030

The share of cod and mackerel diminish, but they remain the leading species consumed in Norway. Saithe, crustaceans and mollusc are consumed more than in the past.

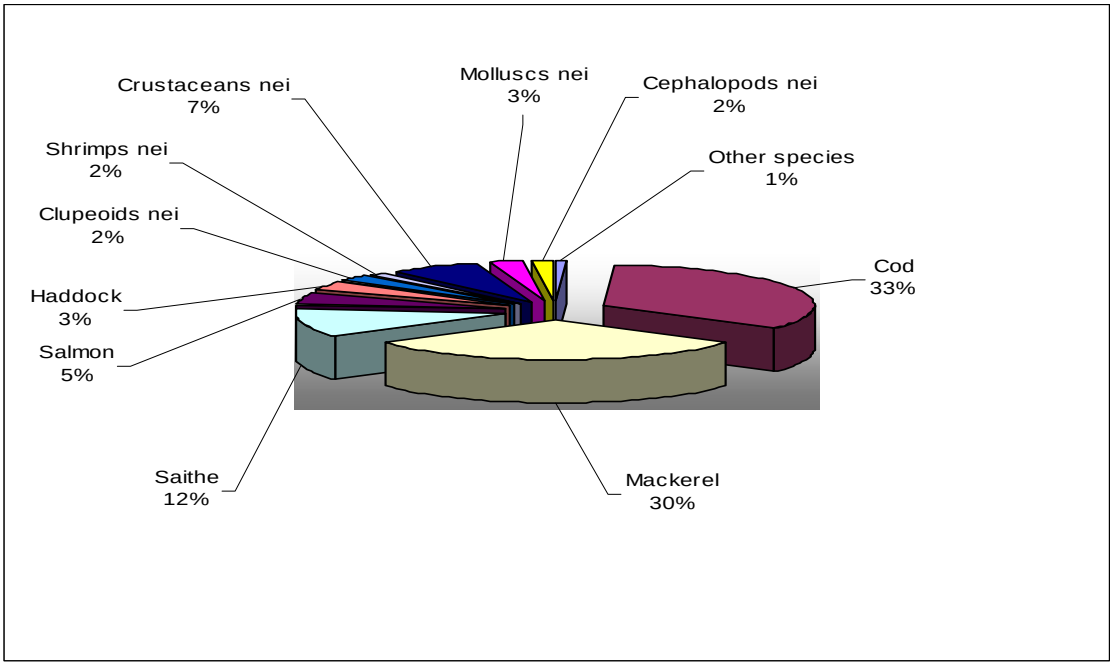

Figure 127: Norway - Main species consumed in 2030

Non-Food use net supply 2005-2030

Non-food use imports (both fish oil and fish meal) increase in order to supply the domestic aquaculture sector that increases its production. The main species affected by this rise in imports will be mostly small pelagic species.

Table 660: Norway - NFU Commodities Imports by OECD group of products 2005-2030 (t live weight)

Gp of commodities	Av. 94-98	2005	2010	2015	2020	2025	2030
Fish/marine mammal, fat, oil	508587	500459	523073	547371	573549	601825	632450

Gp of commodities	Av. 94-98	2005	2010	2015	2020	2025	2030
Flour, meal unfit for human cons.	251418	272483	282151	292162	302529	313263	324378
Total NFU Imports	760005	772943	805224	839534	876077	915088	956828

Source: database

Table 661: Norway - NFU Commodities Imports by FAO group of species 2005-2030 (t live weight)

Gp Species	Av. 94-98	2005	2010	2015	2020	2025	2030
Marine fish, demersal	1953	653	680	709	738	769	802
Marine fish, others	743159	772138	804387	838663	875171	914144	955846
Aquatic animals	263	152	157	162	168	174	180
Total NFU Imports	760005	772943	805224	839534	876077	915088	956828

Source: database

The net supply of fish oil is increasing, as is fishmeal, reflecting the increase in production of the aquaculture sector that leads to increased consumption of feed.

Table 662: Norway - NFU net supply by OECD group of commodities 2005-2030 (t live weight)

Gp of commodities	Ave. 94-98	2005	2010	2015	2020	2025	2030
Fish/marine mammal, fat, oil	681594	732194	754808	779106	805283	833560	864185
Flour, meal unfit for human consumption	656707	723091	732758	742768	753133	763866	774979
Total NFU net supply	1338302	1455285	1487566	1521874	1558416	1597426	1639164

Source: database

Species influenced by the rise in the net supply will be the same as the one influenced by the rise in imports as non-food use domestic production and exports remain stable.

Table 663: Norway - NFU net supply by FAO group of species 2005-2030 (t live weight)

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Marine fish, pelagic, small	685419	955459	955459	955459	955459	955459	955459
Marine fish, demersal	10285	7843	7870	7899	7928	7959	7991
Marine fish, others	641795	491847	524096	558371	594879	633853	675555
Aquatic animals	258	136	141	145	150	154	159
Aquatic mammals	543	0	0	0	0	0	0
NFU net supply	1338302	1455285	1487566	1521874	1558416	1597426	1639164

Source: database

Production 2005-2030

Capture and aquaculture

As OECD (2003) reported, there is still room for an expansion of the aquaculture industry along the Norwegian coastline and new licenses for salmon and trout production were distributed in 2002, which had not happened for some years. Productivity has increased and production costs have been reduced in the past few years and they are expected to decrease further, as the integration process by the industry continues and the efficiency in production methods increases (OECD, 2003).

Aquaculture production will therefore continue its progression to reach 750 000 tonnes in 2030, with salmon and trout benefiting the most from the expansion. Mussels and cod farming are developing but remain fairly small-scale industries. Lack of nutrients in the fjords and toxic blooms of algae are a real problem for mussel producers, while farming of cod and halibut has proven much more difficult than expected, with important mortality at the early stage of the lifecycle of these species (Anon., 2002b). Another limiting factor are the high production costs for these species, which result in prices that the market is not willing to pay (Bjørndal and Tveterås, 2000). Norwegian capture will remain stable at their 1998 level of around 3 M tonnes.

Table 664: Norway - Aquaculture by FAO group of species 2005-2030 (t live weight)

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Diadromous fish	317628	464629	510320	560631	616035	677055	744268
Marine fish, demersal	302	170	188	207	229	253	279

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Marine fish, others	455	959	1059	1169	1291	1425	1574
Molluscs	377	307	339	374	413	456	503
Total	318762	466065	511905	562381	617967	679189	746624

Source: database

The only species to increase are the farmed species. Otherwise the range of species remains the same as in the past because capture production does not expand. Salmon and trout are responsible for the increase in production for the diadromous fish, mussels for the molluscs and cod for the demersal species.

Table 665: Norway - Total production by FAO group of species 2005-2030 (t live weight)

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Diadromous fish	318975	465976	511667	561977	617381	678402	745615
Marine fish, pelagic, tunas	0	0	0	0	0	0	0
Marine fish, pelagic, small	1138764	1138764	1138764	1138764	1138764	1138764	1138764
Marine fish, demersal	1457191	1457059	1457077	1457096	1457118	1457142	1457168
Marine fish, others	1385	1889	1989	2099	2221	2355	2504
Crustaceans	45780	45780	45780	45780	45780	45780	45780
Molluscs	3563	3493	3525	3560	3599	3642	3689
Cephalopods	109	109	109	109	109	109	109
Others	197331	197331	197331	197331	197331	197331	197331
Total	3163097	3310400	3356241	3406716	3462303	3523524	3590959

Source: database

Commodities

Norwegian food use commodities production will increase to reach 1.8 Mt in 2030, following the increase in production experienced in the 1990s due to positive developments in quotas for a number of stocks, imported raw materials, the contribution of fish farming and investment in the production sector (Guillotreau and Le Grel, 2001).

Frozen fish will remain the main commodity produced in Norway even though its production does not increase. However, the share of fresh fish will increase, as will production of cured fish and prepared/preserved fish. Frozen herring and mackerel will form the bulk of the frozen commodities, followed by frozen salmon and trout. Salmon will be the main fresh product, while cod and herring will be the two most common commodities filleted, both fresh and frozen. Salted Atlantic herring, cod in brine, stockfish (dried cod) and klipfish (salted and dried cod) remain the major cured fish products. Canned pelagic and various fish preparations, such as fish meat, balls and cake will account for the increase in production of the prepared/preserved commodities.

Table 666: Norway - FU Commodities Production by OECD group of products 2005-2030 (t live weight)

Gp of commodities	Av. 94-98	2005	2010	2015	2020	2025	2030
Cephalopods	824	2128	2128	2128	2128	2128	2128
Crus., mol. & other aquatic inv., prepared	19556	23782	23782	23782	23782	23782	23782
Crustaceans	28194	24699	24699	24699	24699	24699	24699
Fish, cured	228581	220713	224025	227386	230797	234260	237775
Fish, fillets	301883	356653	356653	356653	356653	356653	356653
Fish, fresh/chilled	310196	374617	385442	396580	408041	419832	431964
Fish, frozen	660506	580397	580397	580397	580397	580397	580397
Molluscs	3897	5108	5108	5108	5108	5108	5108
Prepared/preserved fish	89971	90866	92229	93613	95017	96443	97890
Total FU Production	1643608	1678962	1694462	1710345	1726621	1743301	1760395

Source: database

The main species used for the food use commodities production are salmon for the diadromous fish, herring and mackerel for the pelagic species, and cod, saithe and haddock for the demersal species.

Table 667: Norway - FU Commodities Production by FAO group of species 2005-2030 (t live weight)

Gp Species	Av. 94-98	2005	2010	2015	2020	2025	2030
Diadromous fish	322092	426744	435682	444877	454337	464069	474081
Marine fish, pelagic, small	658607	581364	582147	582942	583749	584567	585398
Marine fish, demersal	397521	403383	405965	408586	411246	413946	416686
Marine fish, others	212918	211755	214952	218224	221574	225003	228513
Crustaceans	47750	48481	48481	48481	48481	48481	48481
Molluscs	3897	5108	5108	5108	5108	5108	5108
Cephalopods	824	2128	2128	2128	2128	2128	2128
Total FU Production	1643608	1678962	1694462	1710345	1726621	1743301	1760395

Source: database

Trade 2005-2030

Imports

Fresh fish remains the main imported food use commodity in Norway even though quantities do not increase. Frozen fish imports do not increase either but remain the second imported product in terms of volume. Imports of prepared/preserved fish, fish cured, fish fillets and molluscs all increase, which reflects an interest for higher value and more sophisticated products.

Table 668: Norway - FU Commodities Imports by OECD group of products 2005-2030 (t live weight)

Gp of commodities	Av. 94-98	2005	2010	2015	2020	2025	2030
Cephalopods	2043	7591	7591	7591	7591	7591	7591
Crus., mol. & other aquatic inv., prepared	2075	2588	2588	2588	2588	2588	2588
Crustaceans	18194	15858	15858	15858	15858	15858	15858
Fish, cured	4551	7026	7106	7186	7268	7351	7434
Fish, fillets	5829	9289	10111	11005	11978	13037	14190
Fish, fresh/chilled	207615	235028	235028	235028	235028	235028	235028
Fish, frozen	44301	70221	70221	70221	70221	70221	70221
Molluscs	4901	4414	4971	5598	6305	7101	7997
Prepared/preserved fish	13868	17567	17979	18401	18833	19275	19727
Total FU Imports	303377	369583	371454	373478	375671	378051	380636

Source: database

Imports will have an impact on large pelagic species like tuna, small pelagic species like herring, demersal species like cod, Greenland halibut and Atlantic redfish and molluscs like mussels.

Table 669: Norway - FU Commodities Imports by FAO group of species 2005-2030 (t live weight)

Gp Species	Av. 94-98	2005	2010	2015	2020	2025	2030
Freshwater fish	63	249	271	295	320	349	379
Diadromous fish	1602	1615	1650	1688	1728	1772	1819
Marine fish, pelagic, tunas	1570	2180	2218	2257	2297	2338	2380
Marine fish, pelagic, small	134378	193522	193708	193908	194123	194354	194603
Marine fish, demersal	123180	116073	116344	116629	116930	117247	117582
Marine fish, others	15370	25493	26255	27066	27930	28852	29837
Crustaceans	20269	18447	18447	18447	18447	18447	18447
Molluscs	4901	4414	4971	5598	6305	7101	7997
Cephalopods	2043	7591	7591	7591	7591	7591	7591
Total FU Imports	303377	369583	371454	373478	375671	378051	380636

Source: database

Exports

Fresh and cured fish are the only Norwegian exports that will increase during the period considered. The other commodities remain stable at their level of 1998. Fresh fish remain the main Norwegian export with 660 000 tonnes.

Table 670: Norway - FU Commodities Exports by OECD group of products 2005-2030 (t live weight)

Gp of commodities	Av. 94-98	2005	2010	2015	2020	2025	2030
Cephalopods	702	1663	1663	1663	1663	1663	1663
Crus., mol. & other aquatic inv., prepared	19063	23975	23975	23975	23975	23975	23975
Crustaceans	11876	14636	14636	14636	14636	14636	14636
Fish, cured	220218	222479	225865	229303	232793	236336	239933
Fish, fillets	288050	293179	293179	293179	293179	293179	293179
Fish, fresh/chilled	495010	603834	614536	625428	636512	647793	659274
Fish, frozen	660639	631879	631879	631879	631879	631879	631879
Molluscs	2408	387	387	387	387	387	387
Prepared/preserved fish	46394	49253	49253	49253	49253	49253	49253
Total FU Exports	1744360	1841286	1855374	1869703	1884278	1899102	1914180

Source: database

The species impacted by a rise in the exports of food use commodities are mainly salmon for the anadromous fish; herring and mackerel for the pelagic species; cod, ling, Atlantic redfish, saithe and haddock for the demersal species.

Table 671: Norway - FU Commodities Exports by FAO group of species 2005-2030 (t live weight)

Gp Species	Av. 94-98	2005	2010	2015	2020	2025	2030
Freshwater fish	20	70	72	73	74	75	76
Diadromous fish	314547	411122	416676	422328	428080	433934	439892
Marine fish, pelagic, tunas	482	1147	1157	1167	1177	1187	1198
Marine fish, pelagic, small	777669	760058	763377	766755	770192	773689	777248
Marine fish, demersal	491736	426701	431743	436868	442075	447367	452744
Marine fish, others	125856	201527	201689	201853	202019	202188	202361
Crustaceans	30939	38611	38611	38611	38611	38611	38611
Molluscs	2408	387	387	387	387	387	387
Cephalopods	702	1663	1663	1663	1663	1663	1663
Total FU Export	1744360	1841286	1855374	1869703	1884278	1899102	1914180

Source: database

ROMANIA

Romania has a population of 23 million inhabitants and a coastline of about 245 km. The Romanian fisheries sector suffered from an extended period of decline during the 1990s when production fell to nearly a sixteenth of its original level. It is acknowledged in Romania that the national priority in the next five years is to match the capacity of the fleet with the available fisheries resources, develop aquaculture, stabilise markets and improve the quality of products (Slay, 2000).

Production: captures, aquaculture and commodities 1989-1998

Total fisheries production has been consistently falling over the last decade in Romania. This represents a decline from 225 000 tonnes in 1989 to about 18 000 tonnes in 1998. This marked drop is predominantly due to the decrease in the volume of national landings (see below). Although the volume of aquaculture production decreased in the 1990s, the relative contribution from this sub-sector to the overall production increased, from 20 percent of the total national production in 1989 to almost 50 percent in 1998.

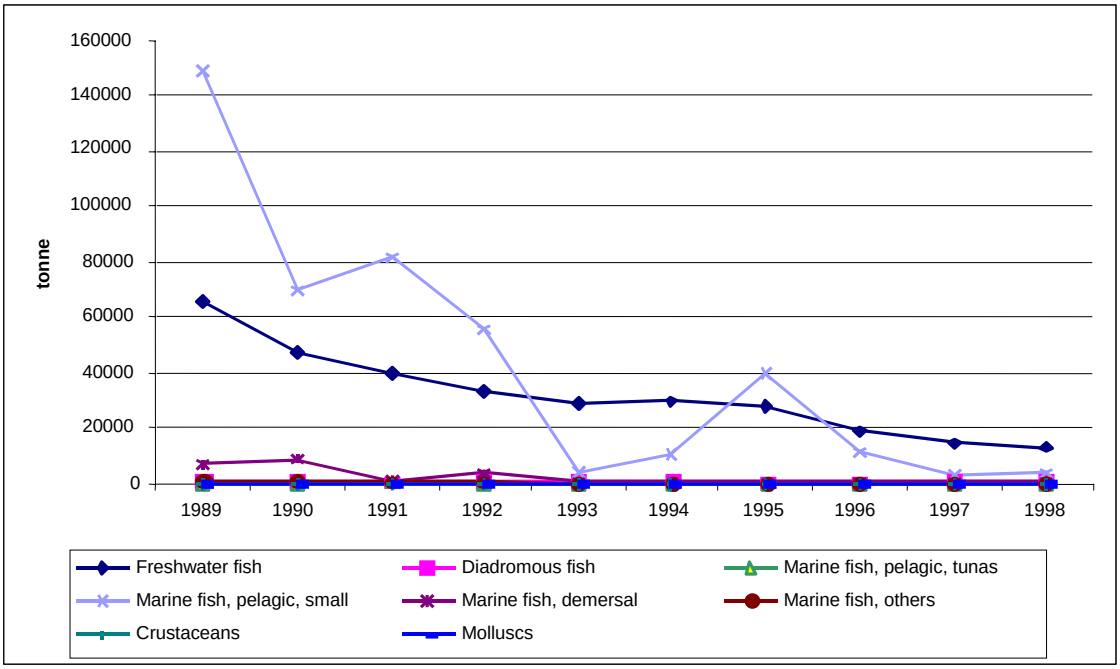

Figure 128: Romania - Capture and aquaculture production 1989-1998

Captures

Capture fisheries can be divided in two sub sectors: the high-seas fleet and the Black Sea fisheries. Since 1989, catches from the high seas fleet have been declining due to the poor condition of fishing vessels, lack of fishing licenses and inadequate management (GLOBEFISH, 1993). Harvests from the Black sea also decreased mainly because of pollution problems affecting this enclosed water body. As a consequence, between 1989 and 1998, the overall volume of catches decreased dramatically from 177 000 tonnes to only 9 000 tonnes. Fishing operations in the Black Sea target mainly sprat and whiting but catches also consist of horse mackerel, anchovy, shads, dogfish and turbot (Maxim, 2001). Horse mackerel, sardinellas and chub were the main species targeted by the high-seas fleet (GLOBEFISH, 1993).

Table 672: Romania - Captures by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Freshwater fish	19311	12976	10688	9024	8136	9878	8669	5709	3791	4069	9225
Diadromous fish	537	435	572	991	632	865	532	551	540	641	630
Marine fish, pelagic, tunas	195	150	561	157	0	0	0	0	0	0	106

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Marine fish, pelagic, small	148822	69355	81636	55908	4139	10909	39629	11589	3374	3539	42890
Marine fish, demersal	7229	8580	1180	3870	614	468	357	387	447	649	2378
Marine fish, others	1281	1168	661	699	253	95	88	23	2	2	427
Crustaceans	0	0	0	0	0	0	0	0	0	65	7
Molluscs	0	75	70	110	45	0	0	0	0	0	30
Total gp of species	177375	92739	95368	70759	13819	22215	49275	18259	8154	8965	55693

Source: database

Romania has an extensive network of productive rivers and harvests from Romania's inland waters may provide as much as 80 percent of the country's total production (Rudiger, 1998). Species include cultured carp (see below), trout, bream, pike-perch and perch.

Aquaculture

Romanian aquaculture is mostly carried out on a semi-intensive and extensive basis. Aquaculture production has fallen significantly from 47 000 tonnes in 1989 to 9 000 tonnes in 1998. This fall in production is mainly due to the difficulties experienced in the transition from a centrally planned economy to a free-market economy. The sector has experienced decreased rates of return due to high maintenance costs for hydro-technical works, water works, feed and nurseries (GLOBEFISH, 1993). In addition, this has combined with a fall in purchasing power of consumers, which led to a stagnant market.

Still, carp cultivation and consumption remain important in inland areas, with Chinese carp representing 70 percent of farmed fish production. Other species include common carp, Prussian carp, pike-perch, bream, pike and wells. Trout production is rather small at about 400 tonnes per year (Rudiger, 1998).

Table 673: Romania - Aquaculture by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Freshwater fish	46610	34400	29170	24360	20740	19990	19440	13520	10694	8898	22782
Diadromous fish	650	550	360	260	360	410	390	380	454	565	438
Total gp of species	47260	34950	29530	24620	21100	20400	19830	13900	11148	9463	23220

Source: database

Commodities production

Food use commodities production

Romanian food use commodities production is fairly low at around 18 000 tonnes and has declined dramatically from its 1990 level of 200 000 tonnes. This fall in production is mostly due to reduced production of prepared/preserved and frozen fish commodities, which were principally fuelled by harvests from the high-seas fisheries. The fall in cured fish commodities is most likely to have been triggered by the productivity decline of the aquaculture sector during the same period (Anon., 1998k).

Table 674: Romania - FU Commodities Production by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish, cured	55802	26229	5715	3866	5343	9116	9958	7328	14479	4342	14218
Fish, frozen	138263	70467	95713	69712	2701	24095	58292	23399	788	11904	49533
Prepared/preserved fish	16485	24791	18577	15102	26664	9248	773	1317	3928	2139	11902
Total FU Production	210550	121487	120005	88680	34708	42458	69023	32045	19194	18385	75654

Source: database

Distinction between the respective shares of freshwater and marine fish does not appear in the data. Still, most important species will include varieties of carp for freshwater fish, while the bulk of marine fish will be made up of horse mackerel and sprat.

Table 675: Romania - FU Commodities Production by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine and	210550	121487	120005	88680	34708	42458	69023	32045	19194	18385	75654

freshwater fish, others											
Total FU Production	210550	121487	120005	88680	34708	42458	69023	32045	19194	18385	75654

Source: database

Non-food use commodities production

Romania used to produce some fishmeal while its high-seas fisheries fleet was still operational. Since 1993, production has been very much limited.

Table 676: Romania -NFU Commodities Production by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish/marine mammal, fat, oil	360	168	160	137	0	0	0	0	0	0	82
Flour, meal unfit for human cons.	13725	6034	4734	6562	211	157	82	114	108	43	3177
Total NFU Production	14085	6202	4893	6699	211	157	82	114	108	43	3259

Source: database

Table 677: Romania - NFU Commodities Production by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, small	13725	6034	4734	6562	211	157	82	114	108	43	3177
Marine fish, others	360	168	160	137	0	0	0	0	0	0	82
Total NFU Production	14085	6202	4893	6699	211	157	82	114	108	43	3259

Source: database

Non-food use: trade and net supply 1989-1998

Domestic production is used exclusively for human consumption and raw material for the non-food use industry is mainly imported. From 1989 to 1998, the average volume of imports was 22 000 tonnes and the volume of exports was negligible at 12 tonnes.

Non-food use imports

Romania imports 22 000 tonnes per year on average to compensate for its low domestic production.

Table 678: Romania - NFU Commodities Imports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, small	11724	70564	13770	6704	21052	15450	16048	27331	15390	21611	21964
Marine fish, others	0	0	0	0	375	354	0	1008	330	90	216
Aquatic animals	0	0	0	0	0	0	0	96	0	112	21
Total NFU Imports	11724	70564	13770	6704	21427	15804	16048	28435	15720	21813	22201

Source: database

Table 679: Romania - NFU Commodities Imports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, small	11724	70564	13770	6704	21052	15450	16048	27331	15390	21611	21964
Marine fish, others	0	0	0	0	375	354	0	1008	330	90	216
Aquatic animals	0	0	0	0	0	0	0	96	0	112	21
Total NFU Imports	11724	70564	13770	6704	21427	15804	16048	28435	15720	21813	22201

Source: database

Non-food use exports

As domestic production of non-food use commodities is almost nonexistent, there is no surplus available for exports, which are consequently very limited.

Table 680: Romania - NFU Commodities Exports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Flour, meal unfit for human cons.	0	0	0	0	0	0	0	11	0	109	12
Total NFU Exports	0	0	0	0	0	0	0	11	0	109	12

Source: database

Table 681: Romania - NFU Commodities Exports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Aquatic animals	0	0	0	0	0	0	0	11	0	109	12
Total NFU Export	0	0	0	0	0	0	0	11	0	109	12

Source: database

Non-food use net supply

Romanian non-food use net supply was around 25 000 tonnes a year over the period 1989/1998, and its pattern is very similar the pattern of non-food use imports, as domestic production is almost nonexistent and exports are negligible.

Table 682: Romania - NFU net supply by OECD group of commodities 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Fish/marine mammal, fat, oil	360	168	160	137	375	201	0	1008	330	90	283
Flour, meal unfit for human consumption	25449	76598	18504	13267	21262	15760	16129	27531	15498	21657	25165
Total NFU net supply	25809	76765	18663	13403	21637	15961	16129	28539	15828	21747	25448

Source: database

Table 683: Romania - NFU net supply by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Marine fish, pelagic, small	25449	76598	18504	13267	21262	15607	16129	27445	15498	21654	25141
Marine fish, others	360	168	160	137	375	354	0	1008	330	90	298
Aquatic animals	0	0	0	0	0	0	0	85	0	3	9
NFU net supply	25809	76765	18663	13403	21637	15961	16129	28539	15828	21747	25448

Source: database

Market for human consumption

Trade

Between 1994 and 1998, Romania imported 28 000 tonnes annually and exported approximately 500 tonnes of fishery products. Today, the whole processing sector is operated by private companies. Most of the imported raw materials are mackerel and herring, for which there is very high demand on the Romanian market. Other imports, purchased from Norway, Ireland, Netherlands, the United Kingdom and Poland, include frozen mackerel, herring, sprat, Alaska pollock, hake, sardines and anchovy (Maxim, 2001).

Food use imports

Frozen fish commodities have been increasing throughout the last decade to compensate for the demise of the high-seas fisheries and represent the main Romanian import with 15 000 tonnes. Prepared/preserved fish imports (canned pelagic species) have experienced a strong rise in the past few years and so have crustaceans and fish fillets imports.

Table 684: Romania - FU Commodities Imports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Cephalopods	0	0	0	0	0	4	27	37	29	172	27
Crus., mol. & other aquatic inv., prepared	571	0	2	13	0	0	22	39	123	36	81
Crustaceans	0	1437	0	3	0	4	14	59	926	2055	450
Fish, cured	0	0	0	69	167	333	2	12	130	518	123
Fish, fillets	0	0	0	0	34	110	6	219	234	821	142
Fish, fresh/chilled	0	0	142	117	1195	525	238	2492	940	1188	684
Fish, frozen	7496	21970	677	562	6771	21256	8999	22233	16646	38553	14516
Molluscs	0	0	23	43	32	425	23	145	1	45	74
Prepared/preserved fish	3916	4153	997	930	365	878	1299	3315	4389	10848	3109
Total FU Imports	11983	27560	1840	1737	8564	23536	10630	28551	23420	54237	19206

Source: database

The major imported species in Romania are mackerel, herring and other clupeoids for small pelagic species; tuna for large pelagic species; and hake, cod and saithe for demersal species.

Table 685: Romania - FU Commodities Imports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Freshwater fish	0	0	0	50	0	0	0	0	3	128	18
Diadromous fish	256	58	142	92	122	1600	10	42	31	117	247
Marine fish, pelagic, tunas	0	0	5	244	230	477	1188	1012	690	1261	511
Marine fish, pelagic, small	0	0	55	655	5312	15267	3057	15329	17300	39600	9658
Marine fish, demersal	0	0	0	21	92	2892	668	2299	1417	3375	1076
Marine fish, others	11156	26064	1614	616	2775	2866	5622	9589	2901	7448	7065
Crustaceans	0	1437	0	3	0	4	14	59	926	2055	450
Molluscs	571	0	25	56	32	425	45	184	124	81	154
Cephalopods	0	0	0	0	0	4	27	37	29	172	27
Total FU Imports	11983	27560	1840	1737	8564	23536	10630	28551	23420	54237	19206

Source: database

Food use exports

Romanian exports are fairly small because domestic production is not sufficient to provide for any surplus. Some prepared/preserved products, and recently some crustaceans, have been exported but in very limited quantities.

Table 686: Romania - FU Commodities Exports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Cephalopods	0	0	0	0	0	0	0	0	0	138	14
Crus., mol. & other aquatic inv., prepared	0	0	0	0	0	0	0	20	88	0	11
Crustaceans	0	0	0	0	0	0	0	0	312	608	92
Fish, fillets	0	0	0	0	0	0	0	83	33	39	15
Fish, fresh/chilled	0	0	0	12	0	0	0	0	72	14	10
Fish, frozen	9327	0	12	0	0	177	5	0	0	177	970
Molluscs	0	0	1	25	14	0	0	117	0	40	20
Prepared/preserved fish	328	54	228	365	14	5	1	57	133	343	153
Total FU Exports	9655	54	241	402	29	182	6	278	638	1359	1284

Source: database

Exported crustaceans are made up of shrimps, while exports of small pelagic species include herring among others.

Table 687: Romania - FU Commodities Exports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Freshwater and marine fish	9655	54	240	287	7	2	6	123	194	347	1092
Marine fish, pelagic, tunas	0	0	0	0	0	0	0	0	12	49	6
Marine fish, pelagic, small	0	0	0	90	7	181	0	17	32	177	50
Crustaceans	0	0	0	0	0	0	0	0	312	608	92
Molluscs	0	0	1	25	14	0	0	137	88	40	31
Cephalopods	0	0	0	0	0	0	0	0	0	138	14
Total FU Export	9655	54	241	402	29	182	6	278	638	1359	1284

Source: database

Food use net supply and consumption

The Romanian net supply had been declining during the first part of the decade but seems to be recovering during the second part. Romania has been suffering from supply problems, as domestic production has been far too small to cope with the national demand, especially since the fall in productivity of the early nineties.

Fish is sold on the Romanian consumer market as live fish; whole fish (fresh, refrigerated or frozen); primary processed fish (eviscerated, headless, filleted, portioned); half canned (marinated, fish paste, fish roe, salted, smoked); and canned fish (in oil, in tomato sauce, other forms) (Eurofish, 2003). On average, the main commodity in the net supply is fresh and frozen fish followed by cured and prepared/preserved fish.

Table 688: Romania - FU net supply by OECD group of commodities 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Cephalopods	0	0	0	0	0	4	27	37	29	33	13
Crus., mol. & other aquatic inv., prepared	571	0	2	13	0	0	22	19	35	36	70
Crustaceans	0	1437	0	3	0	4	14	59	615	1447	358
Fish, cured	55802	26229	5715	3935	5510	9448	9961	7340	14610	4860	14341
Fish, fillets	0	0	0	0	34	110	6	136	201	783	127
Fish, fresh/chilled, and frozen	136432	92437	96519	70379	10667	45699	67523	48124	18302	51454	63754
Molluscs	0	0	22	18	18	425	23	28	1	5	54
Prepared/preserved fish	20073	28890	19346	15668	27015	10121	2071	4575	8184	12644	14859
Total FU net supply	212879	148993	121604	90015	43243	65812	79647	60318	41977	71262	93575

Source: database

The major species in the net supply of Romania are mackerel, sprats and herring for small pelagic species; tuna for large pelagic species; and hake, cod and saithe for demersal species.

Table 689: Romania - FU net supply by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Freshwater and marine fish, others	212051	147498	121379	89059	37476	45322	74638	41510	21904	25614	81646
Diadromous fish	256	58	142	92	122	1600	10	42	31	117	247
Marine fish, pelagic, tunas	0	0	5	244	230	477	1188	1012	677	1212	505
Marine fish, pelagic, small	0	0	55	565	5305	15087	3057	15312	17268	39423	9607
Marine fish, demersal	0	0	0	21	92	2892	668	2299	1417	3375	1076
Crustaceans	0	1437	0	3	0	4	14	59	615	1447	358
Molluscs	571	0	24	30	18	425	45	47	37	41	124
Cephalopods	0	0	0	0	0	4	27	37	29	33	13
FU net supply	212879	148993	121604	90015	43243	65812	79647	60318	41977	71262	93575

Source: database

Annual consumption per capita has decreased over the last decade. During the 1980s, consumption rates were approximately 8 kg per capita per year but fell to about 2 kg per capita per year in 1997 (FAO, 1999b). The share of fish in the total animal protein consumed also decreased from about 8 percent to 1.5 percent over the same period.

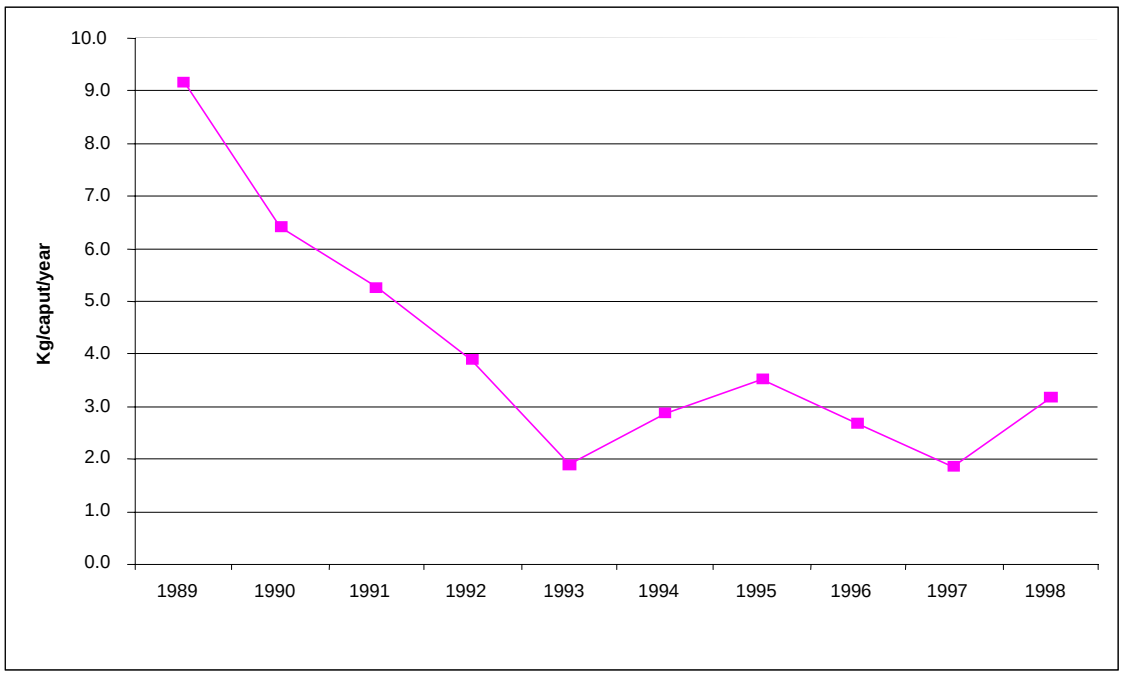

Figure 129: Fish consumption per capita per year in Romania 1989-1998

Mackerel, herring and clupeoids, like sprat, are the main species consumed in Romania. Sprat is used exclusively for human consumption and is sold on the domestic market as fresh (25 percent), salted (68 percent), smoked, marinated or paste products (Maxim, 2001).

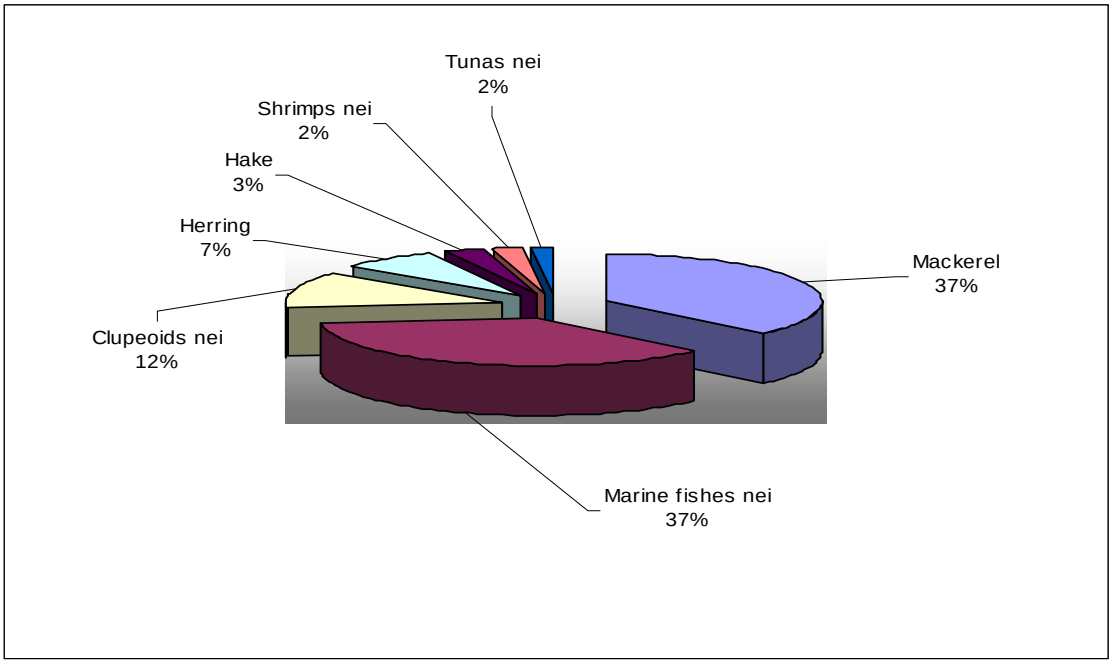

Figure 130: Romania - Main species consumed in 1998

Assumptions for projection 2005-2030 and main results

Consumption trends for the OECD group of products form the basis of the model's assumptions (see methodology in Part 1 of the study). Further assumptions regarding production, imports and exports and the need for fish in Romania between 2005 and 2030 take into account and extrapolate previous trends.

In Romania, the main consumption trends for the period 2005-2030 assume:

- A large increase of the demand for crustaceans, fish fillets and prepared/preserved products (200 percent) as well as a 100 percent rise in fresh fish. A lesser increase in frozen fish (50 percent) and cured products (10 percent).
- A stagnation of all other commodities.
- Large increases in imports of prepared preserved products, fish fillets crustaceans, and fresh and cured fish.

The main feature in the development of seafood consumption in Romania will be the development of efficient distribution channels (Anon., 2003b). Expansion of supermarkets chains throughout the country will undoubtedly help in that regard.

A trend towards new species and products has also been identified, at the expense of fresh water fish, which made the bulk of the demand up to 1998 (Anon., 2003b). This is reflected in these assumptions through the increase in consumption of crustaceans, fish fillets and prepared preserved fish products.
The restaurant and catering sector will also positively influence seafood consumption, as menus have evolved from offering a few species of domestic fish to a richly varied menu of fish comparable to good restaurants anywhere in the world (Anon., 2003b).

Table 690: Romania - Assumptions for projection

OECD group	94-98% annual %	Prod T % 99-30	Imp T % 99-30	Exp T % 99-30	Cons T 99-30	Prod % Annual	Imp % Annual	Exp% Annual	Cons % Annual
Cephalopods	267% 53%	0%	0%	0%	0%		0.0%	0.0%	0.0%
Crus., mol. & other aquatic inv., prepared	0% 0%	0%	0%	0%	0%		0.0%	0.0%	0.0%
Crustaceans	578% 116%	0%	141%	0%	200%		2.8%	0.0%	3.5%
Fish, cured	7% 1%	0%	95%	0%	10%	0.0%	2.1%		0.3%
Fish, fillets	185% 37%	0%	191%	0%	200%		3.4%	0.0%	3.5%
Fish, fresh/chilled	69% 14%	0%	99%	0%	100%		2.2%	0.0%	2.2%
Fish, frozen	36% 7%	0%	65%	0%	50%	0.0%	1.6%	0.0%	1.3%
Molluscs	-356% -71%	0%	0%	0%	0%		0.0%	0.0%	0.0%
Prepared/preserved fish	91% 18%	0%	233%	0%	200%	0.0%	3.8%	0.0%	3.5%
Fish/marine mammal, fat, oil	-80% -16%	0%	0%	0%		0.0%	0.0%	0.0%	0.0%
Flour, meal unfit for hum. Cons.	33% 7%	0%	0%	0%		0.0%	0.0%	0.0%	0.0%

Source: database

Aquaculture production will slightly increase while capture production will remain stable. This increase in production will not be enough to provide the export market with any surplus, hence exports will stay at their 1998 level of 1 300 tonnes. Imports will increase as domestic consumption increases. The non-food use industry will not experience significant changes.

Table 691: Romania - Main results for projection

Nature	Average 94-98	2005	2010	2015	2020	2025	2030
Exports FU (t live wt)	493	1359	1359	1359	1359	1359	1359
Imports FU (t live wt)	28075	62892	70090	78290	87656	98384	110707
Production FU (t live wt)	36221	18385	18385	18385	18385	18385	18385
Fish supply FU (t live wt)	63803	79918	87115	95315	104681	115410	127732
Population (X1000)	22652	23063	23473	23891	24320	24753	25194
Per caput supply (kg/h)	3	3	4	4	4	5	5
Production NFU (t live wt)	101	43	43	43	43	43	43
Imports NFU (t live wt)	19564	21813	21813	21813	21813	21813	21813
Exports NFU (t live wt)	24	109	109	109	109	109	109
Net supply NFU (t live wt)	19641	21747	21747	21747	21747	21747	21747
Aquaculture (t live wt)	14948	9547	9615	9693	9779	9875	9982

Capture (t live wt)	21374	21374	21374	21374	21374	21374	21374
Production total (t live wt)	36322	30920	30989	31066	31152	31249	31356

Source: database

Food use net supply and human consumption 2005-2030

The food use net supply will increase drastically in Romania during the period considered to reach 130 000 tonnes by 2030. Main reasons for this increase will be the expected increase in the standard of living and the previously low domestic fish consumption. One major inducement to this increase in fish consumption will be the expansion of distribution channels and the creation of clean and attractive retail outlets, which had been lacking until recently in Romania. Aggressive promotion campaigns have already boosted the demand for new species, such as sea bream, sea bass and salmon, that were not available on the market a few years earlier. Up to 1998 demand was primarily for domestic fish like carp, pike and trout (Anon., 2003b).

As, in the meantime, domestic production will increase only slightly, the major part of the consumption increase will be have to be met through imports. Hence the net supply pattern will be very similar to the pattern of the imports. Generally speaking, nearly all food use commodities increase, with frozen fish and prepared/preserved fish remaining the leading consumed commodities in Romania.

Table 692: Romania - FU net supply by OECD group of commodities 2005-2030 (t live weight)

Gp of commodities	Ave. 94-98	2005	2010	2015	2020	2025	2030
Cephalopods	26	33	33	33	33	33	33
Crus., mol. & other aquatic inv., prepared	23	36	36	36	36	36	36
Crustaceans	428	1883	2250	2671	3154	3708	4344
Fish, cured	9244	4941	5007	5080	5161	5252	5352
Fish, fillets	247	999	1187	1410	1673	1984	2351
Fish, fresh/chilled	1060	1368	1524	1699	1893	2110	2351
Fish, frozen	45161	54743	58244	62030	66124	70552	75340
Molluscs	96	5	5	5	5	5	5
Prepared/preserved fish	7519	15909	18828	22350	26601	31730	37920
Total FU net supply	63803	79918	87115	95315	104681	115410	127732

Source: database

The major species in the net supply in Romania are mackerel, sprats and herring for small pelagic species; tuna for large pelagic species; hake, cod and saithe for demersal species; and salmon for diadromous species.

Table 693: Romania - FU net supply by FAO group of species 2005-2030 (t live weight)

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Freshwater fish	23	135	152	170	191	215	240
Diadromous fish	360	133	147	161	178	196	215
Marine fish, pelagic, tunas	913	1591	1930	2339	2833	3428	4147
Marine fish, pelagic, small	18029	45684	50889	56819	63594	71359	80283
Marine fish, demersal	2130	3766	4074	4406	4765	5154	5574
Marine fish, others	41774	26651	27600	28674	29892	31276	32854
Crustaceans	428	1883	2250	2671	3154	3708	4344
Molluscs	119	41	41	41	41	41	41
Cephalopods	26	33	33	33	33	33	33
FU net supply	63803	79918	87115	95315	104681	115410	127732

Source: database

Because the growth rate of the net supply is higher (79 percent) than the population growth rate (12 percent) during 1998 to 2030, apparent consumption per capita will increase in Romania to reach 5 kg per capita per year by the end of the period.

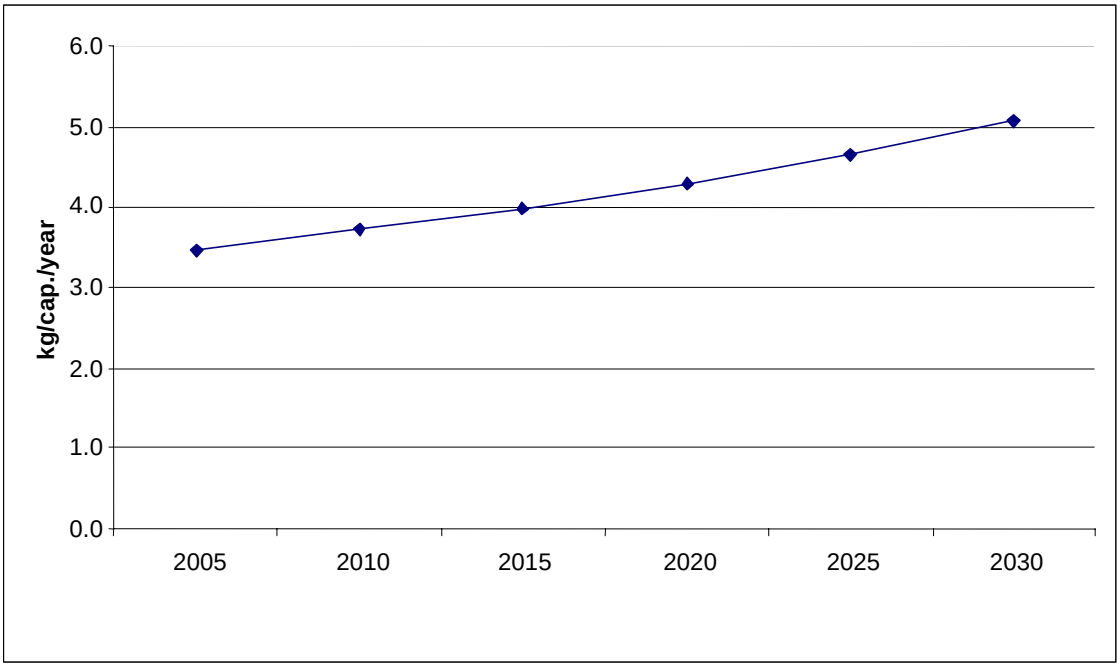

Figure 131: Fish consumption per capita per year in Romania 2005-2030

The main species consumed are mackerel, various clupeoids like sprat and herring, and hake and tuna. Shrimps are also on the menu.

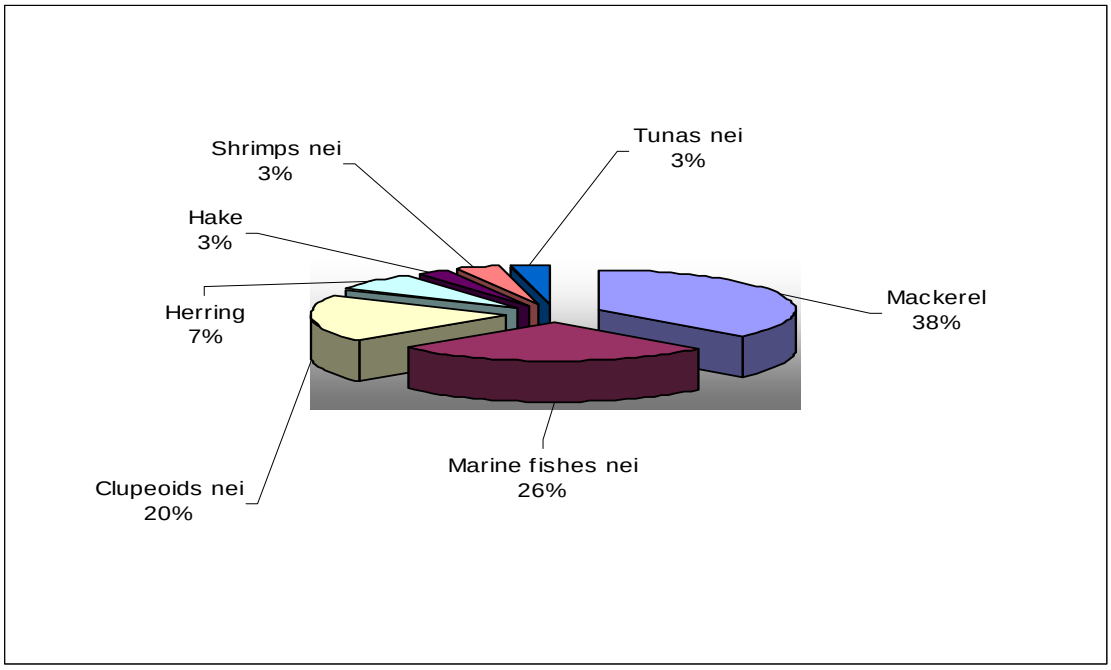

Figure 132: Romania - Main species consumed in 2030

Non-Food use net supply 2005-2030

The non-food use net supply will not experience major changes during the period 2005-2030. Imports and exports will remain at their 1998 levels of 22 000 and 100 tonnes. Non-food use domestic consumption is not expected to increase as aquaculture production is mostly made up of vegetarian fish.

Production 2005-2030

Capture and aquaculture

Romanian fish farms are in the process of modernisation with the help of (among others) the SAPARD programme of the EU. The SAPARD Programme includes projects for fish farm modernisation, improvement of fodder quality and supply, modernisation of aquaculture mechanisation system, environmental quality control and hygiene (Maxim, 2001).

It is therefore expected that both freshwater and diadromous aquaculture will increase to reach a total of around 10 000 tonnes by 2030. The main species for diadromous production include rainbow trout and sea trout, while freshwater fish are composed of various species of carp.

Table 694: Romania - Aquaculture by FAO group of species 2005-2030 (t live weight)

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Freshwater fish	14508	8898	8899	8901	8905	8911	8917
Diadromous fish	440	649	717	791	873	964	1065
Total	14948	9547	9615	9693	9779	9875	9982

Source: database

Total production will rise as a consequence of the increase in the aquaculture sector.

Table 695: Romania - Total production by FAO group of species 2005-2030 (t live weight)

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Freshwater fish	20932	15321	15322	15325	15328	15334	15340
Diadromous fish	1066	1275	1342	1417	1499	1590	1691
Marine fish, pelagic, tunas	0	0	0	0	0	0	0
Marine fish, pelagic, small	13808	13808	13808	13808	13808	13808	13808
Marine fish, demersal	462	462	462	462	462	462	462
Marine fish, others	42	42	42	42	42	42	42
Crustaceans	13	13	13	13	13	13	13
Molluscs	0	0	0	0	0	0	0
Total	36322	30920	30989	31066	31152	31249	31356

Source: database

Commodities

There will be no significant change in commodities production in Romania until 2030.

Trade 2005-2030

Imports

Romanian imports will increase drastically during the period 1998-2030 due to increased fish consumption and development of better supply channels. Major imports are frozen fish purchased from Norway, Ireland, Netherlands, United Kingdom, Poland and recently from Argentina, Peru, Greece and Thailand in this order (Eurofish, 2003). Prepared/preserved fish imports confirm their importance as the number two imported commodities, while the share of crustaceans continues to rise to reach around 5 percent of total imports by 2030.

Table 696: Romania - FU Commodities Imports by OECD group of products 2005-2030 (t live weight)

Gp of commodities	Av. 94-98	2005	2010	2015	2020	2025	2030
Cephalopods	54	172	172	172	172	172	172
Crus., mol. & other aquatic inv., prepared	44	36	36	36	36	36	36
Crustaceans	612	2491	2858	3279	3762	4316	4952
Fish, cured	199	599	665	738	819	910	1010
Fish, fillets	278	1037	1226	1448	1711	2022	2390
Fish, fresh/chilled	1077	1382	1538	1713	1907	2124	2365
Fish, frozen	21538	43017	46518	50304	54398	58825	63613
Molluscs	128	45	45	45	45	45	45

Gp of commodities	Av. 94-98	2005	2010	2015	2020	2025	2030
Prepared/preserved fish	4146	14114	17032	20554	24805	29934	36124
Total FU Imports	28075	62892	70090	78290	87656	98384	110707

Source: database

The major imported species in Romania remain mackerel, sprats and herring for small pelagic species; tuna for large pelagic species; hake, cod and saithe for demersal species; and salmon for diadromous species.

Table 697: Romania - FU Commodities Imports by FAO group of species 2005-2030 (t live weight)

Gp Species	Av. 94-98	2005	2010	2015	2020	2025	2030
Freshwater fish	26	149	166	184	205	229	254
Diadromous fish	360	133	147	161	178	196	215
Marine fish, pelagic, tunas	926	1640	1979	2388	2882	3477	4196
Marine fish, pelagic, small	18111	45861	51066	56996	63771	71536	80460
Marine fish, demersal	2130	3766	4074	4406	4765	5154	5574
Marine fish, others	5685	8599	9548	10622	11840	13225	14802
Crustaceans	612	2491	2858	3279	3762	4316	4952
Molluscs	172	81	81	81	81	81	81
Cephalopods	54	172	172	172	172	172	172
Total FU Import	28075	62892	70090	78290	87656	98384	110707

Source: database

Exports

There will be no significant change in the pattern of Romanian exports during the period. Exports will remain at their 1998 level of around 1 400 tonnes.

SLOVAKIA

Slovakia has a population of approximately 5 million and although the country is very mountainous, fishing is one of the country's oldest and historically significant economic activities. The majority of Slovakia's fishing is concentrated in the free flowing rivers. Aquaculture production may grow in the future but prospects for development of Slovakia's fisheries appear limited.

Production: captures, aquaculture and commodities 1989-1998

Total production was 2000 tonnes in 1998 with aquaculture contributing approximately 30 percent of this volume.

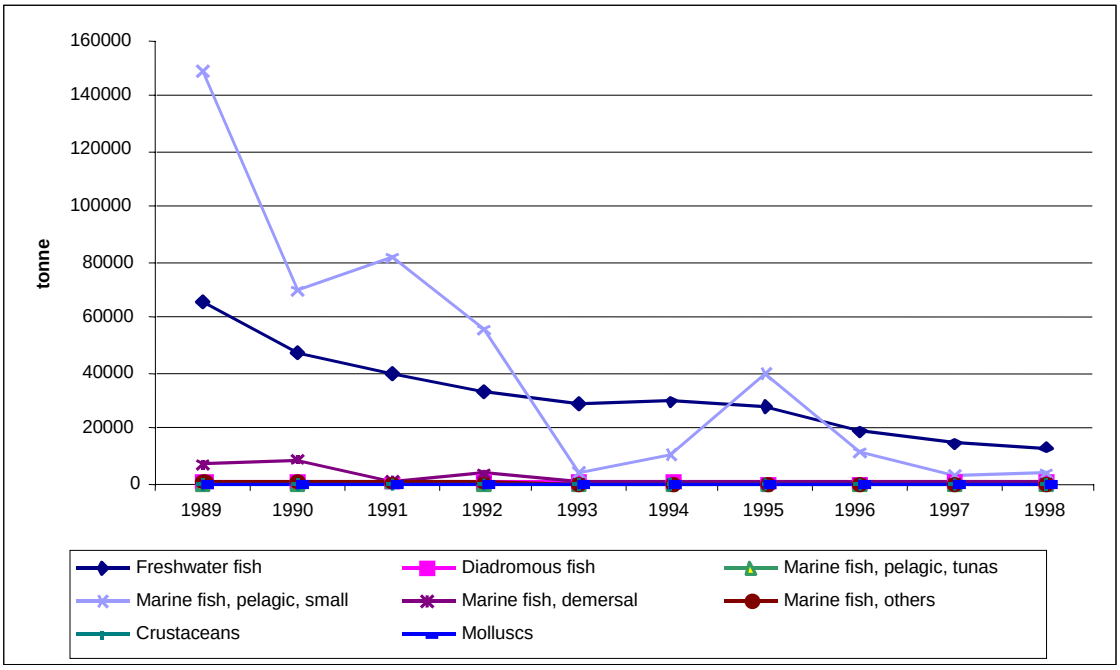

Figure 133: Slovakia - Capture and aquaculture production 1989-1998

Captures

Catches were approximately 1 300 tonnes in 1998 with the main species caught being carp, trout, pike-perch, pike and wells. Unfortunately, since the beginning of the 1970s, natural fish habitats and the aquatic ecosystem have been badly damaged by industrial development and now several species are showing signs of becoming threatened (FAO, 1996d).

Table 698: Slovakia - Captures by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Freshwater fish	na	na	na	na	1112	1543	1837	1332	1289	1266	838
Diadromous fish	na	na	na	na	67	77	99	74	87	82	49
Total gp of species	na	na	na	na	1179	1620	1936	1406	1376	1348	887

Source: database

Aquaculture

In 1998 aquaculture production was 600 tonnes. Since the state-run fishery was disbanded, fish farming activity has gradually been transferred to the private sector where ten companies now operate. In1994, the vast majority of production was comprised of almost equal amounts of carp and rainbow trout, with the remainder represented by pike, brook trout, tench and eel (FAO, 1996d). Since 1995, freshwater fish production (mostly carp) has been decreasing.

Table 699: Slovakia - Aquaculture by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Freshwater fish	na	na	na	na	800	932	801	325	529	98	581
Diadromous fish	na	na	na	na	786	925	813	625	706	538	732
Total gp of species	na	na	na	na	1586	1857	1614	950	1235	636	1313

Source: database

Commodities production

Food use commodities production

The food use commodities industry processes nearly all domestic production and is hence dominated by fresh water and diadromous species, such as carp and trout (Fiche, 2000). The two commodities produced in Slovakia in 1998 are frozen (1 800 tonnes) and cured fish (smoked fish, 150 tonnes).

Table 700: Slovakia - FU Commodities Production by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish, cured	na	na	na	na	171	348	417	183	229	150	250
Fish, fresh/chilled and frozen	na	na	na	na	2594	3129	3133	2173	2382	1834	2541
Total FU Production	na	na	na	na	2765	3477	3550	2356	2611	1984	2791

Source: database

Table 701: Slovakia - FU Commodities Production by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Freshwater and Diadromous fish	na	na	na	na	2765	3477	3550	2356	2611	1984	2791
Total FU Production	na	na	na	na	2765	3477	3550	2356	2611	1984	2791

Source: database

Non-food use commodities production

There is no production of non-food use commodities in Slovakia.

Non-food use: trade and net supply 1989-1998

Domestic production is used exclusively for human consumption, consequently all non-food use commodities are imported. From 1994 to 1998, the average volume of imports was 12 800 tonnes and the volume of exports was negligible with 40 tonnes.

Non-food use imports

Non-food use commodities mainly consisted of ready to use fishmeal, essentially for the trout industry.

Table 702: Slovakia - NFU Commodities Imports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish/marine mammal, fat, oil	na	na	na	na	5	6	0	0	150	102	44
Flour, meal unfit for human cons.	na	na	na	na	13305	14635	13020	11957	12992	11380	12881
Total NFU Imports	na	na	na	na	13310	14641	13020	11957	13142	11482	12925

Source: database

Table 703: Slovakia - NFU Commodities Imports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, small	na	na	na	na	13251	14576	13020	11957	12992	11380	12863
Marine fish, others	na	na	na	na	59	65	0	0	150	102	63
Total NFU Imports	na	na	na	na	13310	14641	13020	11957	13142	11482	12925

Source: database

Non-food use exports

Non-use exports are negligible and consist of re-exportation as there is no domestic production.

Table 704: Slovakia - NFU Commodities Exports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish/marine mammal, fat, oil	na	na	na	na	0	0	0	0	66	51	20
Flour, meal unfit for human cons.	na	na	na	na	24	26	0	0	72	0	20
Total NFU Exports	na	na	na	na	24	26	0	0	138	51	40

Source: database

Table 705: Slovakia - NFU Commodities Exports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Marine fish, pelagic, small	na	na	na	na	24	26	0	0	72	0	20
Marine fish, others	na	na	na	na	0	0	0	0	66	51	20
Total NFU Export	na	na	na	na	24	26	0	0	138	51	40

Source: database

Non-food use net supply

The non-food use net supply has been slowly decreasing, as fish based meals are gradually replaced by vegetal based meals and food conversion ratios improve. Net supply was around 13 000 tonnes per year on average over the period 1989 –1998.

Table 706: Slovakia - NFU net supply by OECD group of commodities 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Fish/marine mammal, fat, oil	na	na	na	na	5	6	0	0	84	51	24
Flour, meal unfit for human consumption	na	na	na	na	13281	14609	13020	11957	12920	11380	12861
Total NFU net supply	na	na	na	na	13286	14615	13020	11957	13004	11431	12885

Source: database

Table 707: Slovakia - NFU net supply by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Marine fish, pelagic, small	na	na	na	na	13227	14550	13020	11957	12920	11380	12842
Marine fish, others	na	na	na	na	59	65	0	0	84	51	43
NFU net supply	na	na	na	na	13286	14615	13020	11957	13004	11431	12885

Source: database

Market for human consumption

Trade

Because domestic fish production cannot meet national demand, large quantities of marine and freshwater fish are imported annually. Between 1989 and 1998 imports accounted for 34 000 tonnes annually while exports represented 600 tonnes. In terms of value, imports amounted to US$ 22.4 million in 1994, whereas exports were valued at US$ 2 million (FAO, 1996d). Half of these imports were made of fish fillets with the remainder distributed between frozen and canned products. Exports consisted mainly of trout and, to a lesser degree, eel and carp.

Food use imports

Because domestic fish production is already stretched, large quantities of marine and freshwater fish are imported annually. The average amount of imported fish and fish products was 33 000 tonnes between 1989 and 1998. Fish fillets represented 40 percent of imports, prepared preserved products (canned pelagic and fishmeat) 30 percent and frozen fish 20%.

Table 708: Slovakia - FU Commodities Imports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Crustaceans	na	na	na	na	0	3	0	24	15	38	13
Fish, cured	na	na	na	na	289	318	233	296	189	108	239
Fish, fillets	na	na	na	na	8660	9526	16948	21077	11801	11120	13189

Fish, fresh/chilled	na	na	na	na	3322	3888	2862	4260	1882	2109	3054
Fish, frozen	na	na	na	na	7398	9185	6475	9274	4949	6432	7285
Prepared/preserved fish	na	na	na	na	11873	13060	8682	11839	7263	7041	9960
Total FU Imports	na	na	na	na	31541	35981	35200	46768	26099	26848	33740

Source: database

Mackerel and herring are the two main pelagic species imported into Slovakia, while hake, cod and pollock account for the bulk of the demersal species.

Table 709: Slovakia - FU Commodities Imports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Freshwater fish	na	na	na	na	2345	2814	2552	3742	1451	1555	2410
Diadromous fish	na	na	na	na	0	100	103	276	200	241	153
Marine fish, pelagic, tunas	na	na	na	na	660	726	571	1143	438	670	701
Marine fish, pelagic, small	na	na	na	na	10647	11712	8389	18133	6149	6521	10258
Marine fish, demersal	na	na	na	na	0	948	51	14469	286	776	2755
Marine fish, others	na	na	na	na	17890	19679	23534	8982	17560	17048	17449
Crustaceans	na	na	na	na	0	3	0	24	15	38	13
Total FU Imports	na	na	na	na	31541	35981	35200	46768	26099	26848	33740

Source: database

Food use exports

Exports are very much limited and mostly consist of re-exportation. Prepared preserved products and fresh fish both represented 30 percent on average of the total exports, while fish fillets reached 25%.

Table 710: Slovakia - FU Commodities Exports by OECD group of products 1989-1998 (t live weight)

Gp of commodities	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Fish, cured	na	na	na	na	49	54	3	88	101	102	66
Fish, fillets	na	na	na	na	33	36	297	152	145	239	150
Fish, fresh/chilled	na	na	na	na	0	180	105	327	231	270	186
Fish, frozen	na	na	na	na	0	15	18	12	20	43	18
Prepared/preserved fish	na	na	na	na	36	40	85	174	390	394	186
Total FU Exports	na	na	na	na	118	325	508	753	887	1047	606

Source: database

Table 711: Slovakia - FU Commodities Exports by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Av. 89-98
Freshwater fish	na	na	na	na	0	105	57	197	97	88	91
Diadromous fish	na	na	na	na	0	90	67	229	154	224	127
Marine fish, pelagic, small	na	na	na	na	36	40	51	0	103	96	54
Marine fish, demersal	na	na	na	na	0	0	0	117	0	0	20
Marine fish, others	na	na	na	na	82	90	334	209	533	639	314
Total FU Export	na	na	na	na	118	325	508	753	887	1047	606

Source: database

Food use net supply and consumption

Between 1994 and 1998, the net supply of fisheries products was 36 000 tonnes. As domestic production and exports are limited, the pattern of the net supply will be very similar to the pattern of imports. The major difference will be in the share of freshwater fish because all domestic production is consumed nationally. On average, fish fillets represent 36 percent of the net supply while frozen fish and prepared/preserved fish both reached 30%.

Table 712: Slovakia - FU net supply by OECD group of commodities 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Crustaceans	na	na	na	na	0	3	0	24	15	38	13
Fish, cured	na	na	na	na	410	611	647	390	318	156	422
Fish, fillets	na	na	na	na	8627	9490	16651	20925	11656	10882	13039

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Fish, fresh/chilled	na	na	na	na	3322	3708	2757	3933	1651	1840	2868
Fish, frozen	na	na	na	na	9992	12300	9590	11435	7311	8224	9809
Prepared/preserved fish	na	na	na	na	11837	13021	8597	11664	6873	6647	9773
Total FU net supply	na	na	na	na	34189	39133	38242	48372	27823	27785	35924

Source: database

Freshwater fish are composed of trout and carp, while small pelagic species include mostly mackerels and herrings. Demersal fish are represented by cod, hake and pollock.

Table 713: Slovakia - FU net supply by FAO group of species 1989-1998 (t live weight)

Gp Species	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Ave. 89-98
Freshwater fish	na	na	na	na	5110	6186	6045	5900	3966	3450	5110
Diadromous fish	na	na	na	na	0	9	36	47	46	17	26
Marine fish, pelagic, tunas	na	na	na	na	660	726	571	1143	438	670	701
Marine fish, pelagic, small	na	na	na	na	10611	11672	8339	18133	6046	6425	10204
Marine fish, demersal	na	na	na	na	0	948	51	14351	286	776	2735
Marine fish, others	na	na	na	na	17808	19589	23201	8773	17027	16410	17135
Crustaceans	na	na	na	na	0	3	0	24	15	38	13
FU net supply	na	na	na	na	34189	39133	38242	48372	27823	27785	35924

Source: database

The net supply of food use product is equivalent to an annual consumption rate per capita of 7 kg per capita per year and represents approximately 3 percent of the total animal protein consumed in 1997.

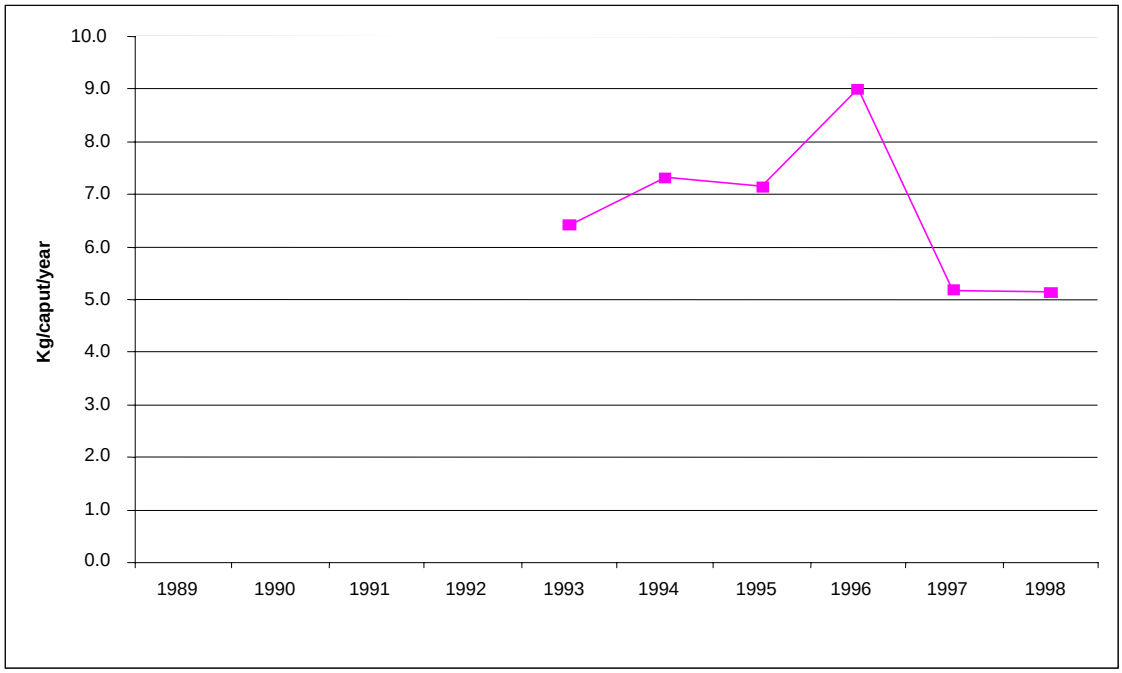

Figure 134: Fish consumption per capita per year in Slovakia 1989-1998

The range of diverse marine fish is not clearly identified in the data. For the other species, herring and pilchard are the leading consumed marine species in Slovakia. Most popular freshwater fish are trout and carp.

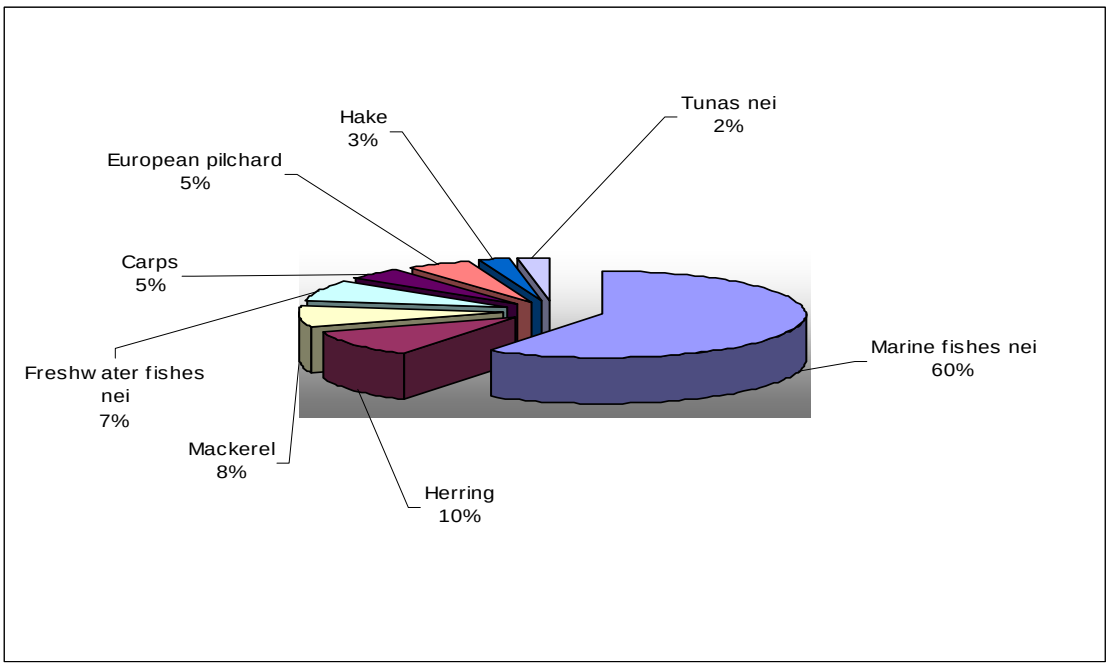

Figure 135: Slovakia - Main species consumed in 1998

Assumptions for projection 2005-2030

Consumption trends for the OECD group of products form the basis of the model's assumptions (see methodology in Part 1 of the study). Further assumptions regarding production, imports and exports and the need for fish in Slovakia between 2005 and 2030 take into account and extrapolate previous trends.

In Slovakia, the main consumption trends for the period 2005-2030 assume:

- A large increase of the demand for crustaceans, fish fillets and prepared/preserved products (100 percent).
- A small decrease (10 percent) in cured fish.
- A stagnation of all other commodities.
- Large increases in imports of crustaceans, fish fillets and prepared/preserved products.

The main feature influencing overall seafood consumption will be the fact that Slovakia is becoming a more and more wealthy market and that the standard of living and per capita disposable income are high compared to many other European Union accession countries (Spencer and Shull, 2002). So, seafood consumption is likely to go up along with the general increase in consumption.

This economic development has as a corollary that the number of single and childless households is on the rise, primarily due to young people waiting longer to have a family and because more women are entering the professional job market (Spencer and Shull, 2002). This increase in the demand for convenience products on the Slovak market is reflected in our assumptions by the increase for prepared/preserved products, fish filets and crustaceans.

Furthermore, the recent introduction of hypermarkets changed shopping behaviour in Slovakia almost overnight. Super- and hypermarkets have helped in the decline in retail food prices, in compensating for the lack of domestic production (e.g. seafood) and in presenting consumers with more product choices. Therefore overall Slovak fish and seafood consumption is also expected to rise quite significantly (Acs, 2000).

Table 714: Slovakia - Assumptions for projection

OECD group	94-98% annual %	Prod % 99-30	T Imp 99-30	% Exp 99-30	T % Cons 99-30	T Prod % Annual	Imp % Annual	Exp% Annual	Cons % Annual
Cephalopods									
Crus., mol. & other aquatic inv., prepared									
Crustaceans	286% 57%	0%	100%	0%	100%		2.2%		2.2%
Fish, cured	-173% -35%	0%	-17%	0%	-10%	0.0%	-0.5%	0.0%	-0.3%
Fish, fillets	60% 12%	0%	98%	0%	100%		2.2%	0.0%	2.2%
Fish, fresh/chilled	-13% -3%	0%	0%	0%	0%		0.0%	0.0%	0.0%
Fish, frozen	-7% -1%	0%	0%	0%	0%	0.0%	0.0%	0.0%	0.0%
Molluscs									
Prepared/preserved fish	-18% -4%	0%	94%	0%	100%		2.1%	0.0%	2.2%
Fish/marine mammal, fat, oil	110% 22%	0%	0%	0%		0.0%	0.0%	0.0%	0.0%
Flour, meal unfit for hum. Cons.	-25% -5%	0%	0%	0%		0.0%	0.0%	0.0%	0.0%

Source: database

Total fish production will reach nearly 3 000 tonnes by 2030 thanks to an increase in aquaculture production. This will not be sufficient to provide any surplus for exports, which will remain at their 1998 level of around a 1 000 tonnes. Imports will rise to meet the increase in demand, especially for crustaceans, fish fillets and prepared/preserved products.

Table 715: Slovakia - Main results for projection

Nature	Average 94-98	2005	2010	2015	2020	2025	2030
Exports FU (t live wt)	704	1047	1047	1047	1047	1047	1047
Imports FU (t live wt)	34179	29741	32086	34693	37589	40809	44387
Production FU (t live wt)	2796	1984	1984	1984	1984	1984	1984
Fish supply FU (t live wt)	36271	30678	33023	35630	38526	41746	45324
Population (X1000)	5366	5408	5414	5419	5425	5431	5436
Per caput supply (kg/h)	7	6	6	7	7	8	8
Production NFU (t live wt)							
Imports NFU (t live wt)	12848	11482	11482	11482	11482	11482	11482
Exports NFU (t live wt)	43	51	51	51	51	51	51
Net supply NFU (t live wt)	12805	11431	11431	11431	11431	11431	11431
Aquaculture (t live wt)	1258	731	807	891	983	1086	1199
Capture (t live wt)	1537	1537	1537	1537	1537	1537	1537
Production total (t live wt)	2796	2268	2344	2428	2520	2623	2736

Source: database

Food use net supply and human consumption 2005-2030

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 (Spencer and Shull, 2002). As a result of this increased wealth, the food use net supply is expected to increase over the period considered to reach 45 000 tonnes per year by 2030.

A rise in both aquaculture and imports will help to respond to the growing domestic consumption. Fish fillets will increase to represent nearly 50 percent of the net supply, while prepared/preserved commodities will account for 30 percent of consumption. The net supply of crustaceans has also increased dramatically but is still not really significant in volume. Frozen fish now account for only 20 percent of the net supply, while it represented 30 percent of the net supply during the 1989-1998 period.

Table 716: Slovakia - FU net supply by OECD group of commodities 2005-2030 (t live weight)

Gp of commodities	Ave. 94-98	2005	2010	2015	2020	2025	2030
Crustaceans	16	44	49	54	61	68	75
Fish, cured	424	152	150	147	145	142	140
Fish, fillets	13921	12674	14128	15747	17547	19551	21780

Gp of commodities	Ave. 94-98	2005	2010	2015	2020	2025	2030
Fish, fresh/chilled	2778	1840	1840	1840	1840	1840	1840
Fish, frozen	9772	8224	8224	8224	8224	8224	8224
Prepared/preserved fish	9360	7745	8633	9618	10711	11922	13266
Total FU net supply	36271	30678	33023	35630	38526	41746	45324

Source: database

Table 717: Slovakia - FU net supply by FAO group of species 2005-2030 (t live weight)

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Freshwater fish	5109	3450	3450	3450	3450	3450	3450
Diadromous fish	31	17	17	17	17	17	17
Marine fish, pelagic, tunas	709	769	850	939	1038	1148	1270
Marine fish, pelagic, small	10123	6696	6915	7158	7428	7727	8059
Marine fish, demersal	3283	776	776	776	776	776	776
Marine fish, others	17000	18926	20967	23235	25757	28560	31676
Crustaceans	16	44	49	54	61	68	75
FU net supply	36271	30678	33023	35630	38526	41746	45324

Source: database

The net supply growth rate (63 percent) is higher than the population growth rate (1 percent) during the period considered, which means that apparent consumption per capita per year increases between 2005 and 2030 to reach 8 kg per capita per year.

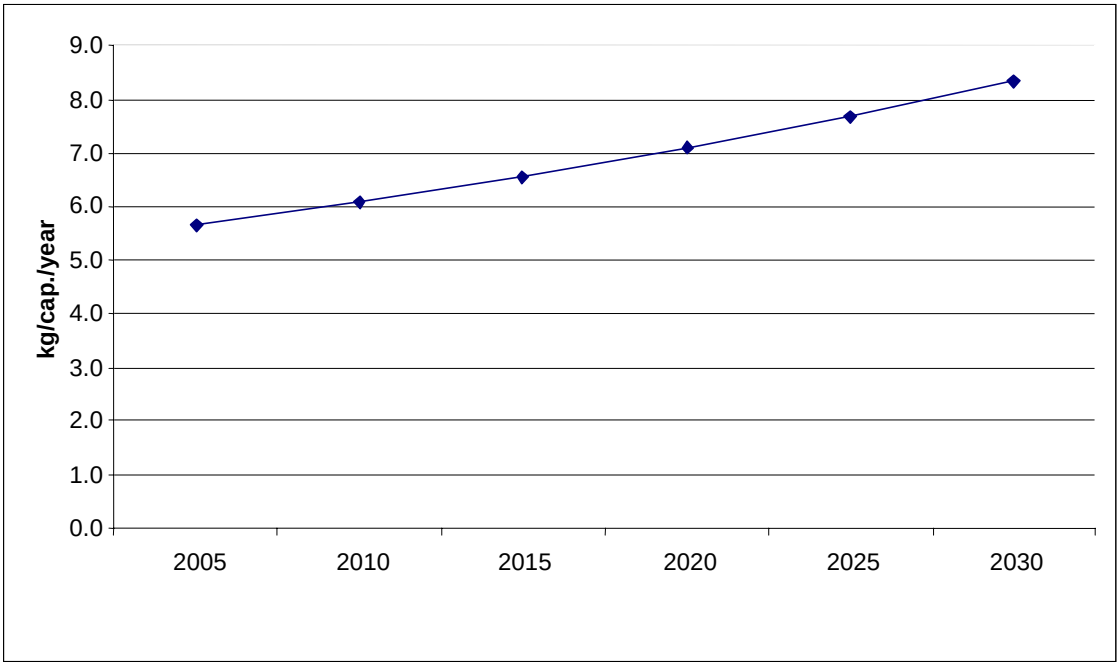

Figure 136: Fish consumption per capita per year in Slovakia 2005-2030

Marine fish have further increased their domination in the Slovakian consumption pattern, although mackerel, herring and hake have seen their share diminish. European pilchards and tunas (species often found as canned product) have increased while carps and other freshwater fish are losing ground.

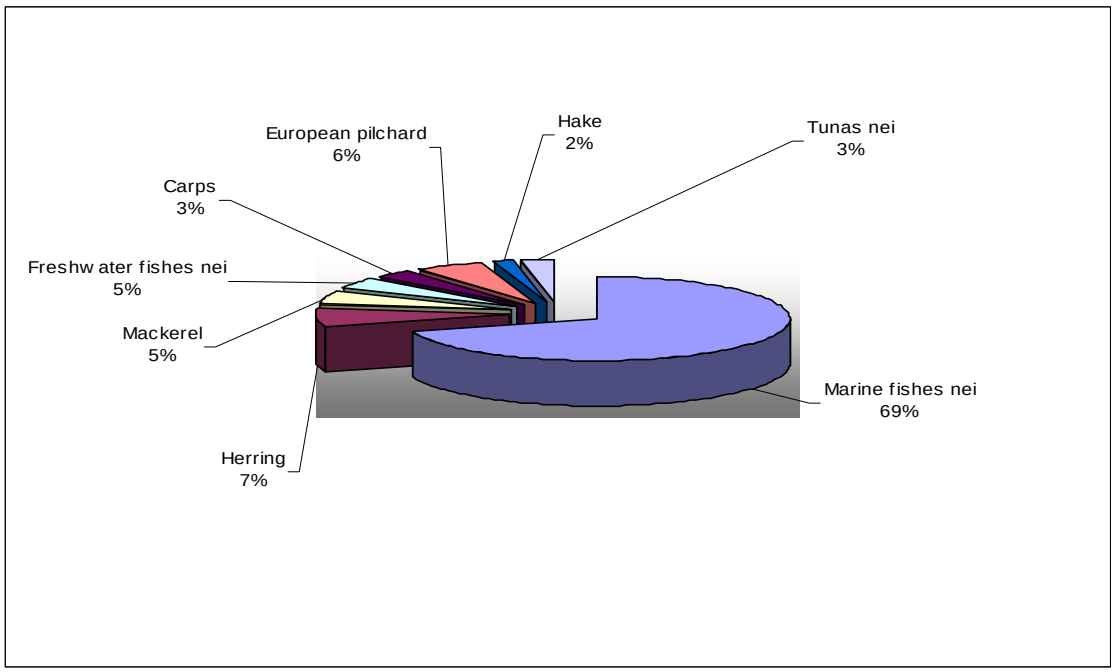

Figure 137: Slovakia - Main species consumed in 2030

Non-food use net supply 2005-2030

The non-food use net supply will not experience any change, as aquaculture production reliance on fish based meal will diminish and therefore not require an increase in non-food use imports.

Production 2005-2030

Capture and aquaculture

The bulk of freshwater fish will consist of various species of carp, while rainbow trout will be the most common diadromous fish produce in Slovakia.

Aquaculture production will increase slightly in both sectors of diadromous production and freshwater fish production to reach a 1 000 tonnes by 2030.

Table 718: Slovakia - Aquaculture by FAO group of species 2005-2030 (t live weight)

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Freshwater fish	537	113	124	137	152	167	185
Diadromous fish	721	618	682	753	832	918	1014
Total	1258	731	807	891	983	1086	1199

Source: database

Table 719: Slovakia - Total production by FAO group of species 2005-2030 (t live weight)

Gp Species	Ave. 94-98	2005	2010	2015	2020	2025	2030
Freshwater fish	1990	1566	1578	1591	1605	1621	1638
Diadromous fish	805	702	766	837	916	1002	1098
Total	2796	2268	2344	2428	2520	2623	2736

Source: database

Commodities

The commodities industry will not experience any major changes between 2005 and 2030 and production will remain around its 1998 level of 2 000 tonnes.

Trade 2005-2030

Imports

Food use commodities imports will increase to reach 44 000 tonnes in 2030. The products more likely to increase are crustaceans, prepared/preserved products (canned fish, fish meat and other fish preparations) and fish fillets. Other commodities will remain stable except for cured fish (various smoked products) whose share in imports will slightly diminish.

Table 720: Slovakia - FU Commodities Imports by OECD group of products 2005-2030 (t live weight)

Gp of commodities	Av. 94-98	2005	2010	2015	2020	2025	2030
Crustaceans	16	44	49	54	61	68	75
Fish, cured	229	104	101	99	97	94	92
Fish, fillets	14094	12913	14367	15985	17786	19789	22018
Fish, fresh/chilled	3000	2109	2109	2109	2109	2109	2109
Fish, frozen	7263	6432	6432	6432	6432	6432	6432
Prepared/preserved fish	9577	8139	9027	10012	11105	12316	13660
Total FU Imports	34179	29741	32086	34693	37589	40809	44387

Source: database

The main species affected by a rise in imports are tunas, pilchards, herring and mackerels for pelagic species; and shrimp and prawns for crustaceans.

Table 721: Slovakia - FU Commodities Imports by FAO group of species 2005-2030 (t live weight)

Gp Species	Av. 94-98	2005	2010	2015	2020	2025	2030
Freshwater fish	2423	1555	1555	1555	1555	1555	1555
Diadromous fish	184	241	241	241	241	241	241
Marine fish, pelagic, tunas	709	769	850	939	1038	1148	1270
Marine fish, pelagic, small	10181	6792	7011	7254	7524	7823	8155
Marine fish, demersal	3306	776	776	776	776	776	776
Marine fish, others	17361	19565	21605	23874	26395	29199	32315
Crustaceans	16	44	49	54	61	68	75
Total FU Imports	34179	29741	32086	34693	37589	40809	44387

Source: database

Exports

There will be no significant changes in the export pattern during the period considered. Exports will remain at their 1998 level of 1 000 tonnes per year.