



COUNTRY ANALYSES

2020 EDITION



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1. The fish smoking industry in the EU

Originally, smoking fish was done for preservation purposes, combining the effects of salting, drying and heating. However, in more recent times, fish has been readily preserved by refrigeration and freezing, and smoking is now generally done for the unique taste and flavour imparted by the smoking process. Smoking fish is an old tradition, especially in Northern EU countries, but the resultant products have become more and more popular across the EU. Most of the volumes produced and traded consist of salmon, but several other smoked species are well appreciated by consumers.

The major steps in the preparation of smoked fish are salting (bath or injection of liquid brine or dry salt mixture), cold/hot smoking, cooling, packaging (air/vacuum or modified), and storage. Typical smoking fish is either done cold (28–32°C) or hot (70–80°C)¹.

1.1 Production

Total EU production of smoked fish² in 2018 amounted to 257.400 tonnes, 3% lower than the average over the last decade. Overall, EU production was steady over the 2009–2018 period, with a sensible rise of 0,9%. Salmon was the main species used by far, accounting for 65% of total volume. Other smoked fish products accounted for the remaining 35% of total volume, including trout, herring, mackerel, haddock, sprat, eel, etc. The main producing countries were Poland, the United Kingdom and Germany, which, together, accounted for almost 60% of total EU production³.

- **Poland:** Polish production has increased by 1,6% over the last decade. This increase is related to the relocation of the German smoking industry into Poland. The share of Polish smoked fish toward total EU production has remained steady over the period, at around 30%. Smoked salmon (including fillets) is the main product processed in the country, accounting for 70% of the smoked fish produced in Poland⁴. By comparison, salmon accounted for only 56% of the Polish smoked fish production in 2009.
- **United Kingdom:** UK production has increased by an average of 6,3% from 2009 to 2018. The share of UK smoked fish production to the EU total has also risen from 11% to 17%. The main product processed is smoked salmon (53% of the British smoked fish production).
- **Germany:** German smoked fish production has risen by 6,3% from 2009 to 2018. The contribution of Germany to the total EU production was 9,8% in 2009 and has slightly increased (+3 points) over the period. Smoked salmon is the country's main smoked product (62% of total volume).

The relative contribution of main producing countries in the EU to global production has increased, except in France. According to PRODCOM data, the contribution of the French smoking industry to total EU production of smoked fish products has decreased from 18% in 2010 to only 7% in 2018.

¹Handbook of Seafood Quality, Safety and Health Applications

²PRODCOM codes used for smoked fish:

10202420: Smoked Pacific, Atlantic and Danube salmon (including fillets)

10202425: Smoked Pacific, Atlantic and Danube salmon (including fillets, excluding heads, tails and maws)

10202450: Smoked herrings (including fillets)

10202455: Smoked herrings (including fillets, excluding heads, tails and maws)

10202480: Smoked fish (including fillets) (excluding Pacific, Atlantic and Danube salmon, herrings)

10202485: Smoked fish (excluding herrings, Pacific, Atlantic and Danube salmon), including fillets, excluding head, tails and maws

³ According to the PRODCOM database, production data from the Netherlands is not available, although processing activity exists (sprat, eel, mackerel, etc.).

This contribution is not presented here (but is estimated as part of the "others" category).

⁴Étude sur la politique d'approvisionnement de produits aquatiques des transformateurs et conserveurs en France Métropolitaine, FranceAgriMer, 2019.

Table 2. SMOKED FISH PRODUCTION IN THE EU (VOLUME IN TONNES)

Country	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Poland	73.773	70.598	75.522	83.797	87.535	80.205	89.131	94.510	78.461	82.048	32%
United Kingdom	26.354	28.607	35.790	38.364	38.059	43.340	40.851	47.485	42.722	43.602	17%
Germany	15.035	15.162	16.424	20.316	21.699	23.429	27.315	26.534	24.462	25.329	10%
Lithuania	11.194	13.779	11.785	15.857	17.198	19.296	22.184	23.727	22.685	21.654	8%
Denmark	16.437	15.092	18.251	18.937	20.857	20.434	20.571	20.248	21.088	19.879	8%
France	43.276	n/a	43.253	42.667	51.664	35.517	27.056	28.746	25.008	17.029	7%
Spain	11.473	11.454	11.739	12.804	11.609	12.324	13.076	12.907	14.459	14.344	6%
Sweden	2.353	89	88	n/a	n/a	n/a	57	3.104	3.284	6.128	2%
Finland	4.285	4.385	5.138	4.978	5.429	4.694	3.714	4.056	4.238	4.246	2%
Romania	1.033	1.140	1.180	990	1.562	1.835	2.051	2.494	2.991	2.892	1%
Ireland	2.054	1.834	1.780	1.911	1.682	2.009	1.898	1.682	1.484	2.310	1%
Italy	2.044	2.038	1.668	1.499	1.541	1.815	2.957	1.769	1.887	1.697	1%
Estonia	3.214	1.335	1.679	2.040	1.905	2.491	2.468	1.734	1.806	1.515	1%
Latvia	3.642	1.409	2.040	1.973	2.609	963	947	1.153	1.567	979	0%
Others ⁵	24.976	104.264	26.287	16.561	16.886	20.203	21.295	13.000	17.253	13.755	5%
Total	241.144	271.185	252.623	262.693	280.235	268.555	275.570	283.148	263.395	257.407	100%

Source: PRODCOM.

⁵ Including NL confidential data.

Table 2. **SHARE OF SMOKED PRODUCTS IN FISH AND SEAFOOD PROCESSING INDUSTRY BY COUNTRY (IN VOLUME TERMS)**

	% smoked products in total processed fish production
EU-28	6,9%
Poland	14,5%
United Kingdom	9,1%
Germany	5,8%
Lithuania	18,7%
Denmark	3,8%
France	3,9%
Spain	1,6%
Sweden	19,6%
Finland	11,1%
Portugal	1,6%
Others	9,7%

Source: PRODCOM.

The contribution of smoked products to a country's total aquatic products processing industry averages 6,9% in the EU, and ranges from 1,6% (Portugal) to 19,6% (Sweden). Among the main producers, the Polish and Lithuanian fish processing industries have the most important share of smoked products to their total production.

In addition to smoked fish production, various products are also referenced as potentially smoked fish and seafood products. According to the PRODCOM data, it can be estimated that a maximum of 237.800 tonnes of these products are processed in the EU. These types of products cover fish roes, fish flour, offal, some invertebrates, and can be dried, smoked, salted or in brine. The three most important types of products represented in this category are molluscs that are frozen, fried, smoked, salted or in brine. For products sold in Spain, the United Kingdom and Portugal are the main producing countries.

1.2 Import – Export

Extra-EU import: EUR 64,6 million in 2018

In 2018, EU countries imported EUR 64,6 million (+16% since 2012) and 8.068 tonnes (+4% since 2012) of smoked fish. Most of the import concerned trout (47% of total value) and salmon (36% of total value). The main country of origin was Turkey, which accounted for 47% of total value of imports of smoked products in 2018 (EUR 30,3 million and 3.988 tonnes), almost exclusively consisting of smoked trout. Other relevant suppliers mainly exported smoked salmon; in particular Norway (with total exports of smoked products at EUR 9,6 million), and Serbia (total exports at EUR 7,9 million). In addition, China exported smoked products for EUR 6 million (almost exclusively unspecified fish other than salmon and trout). Average import price was 8,0 EUR/kg in 2018 (+11% since 2012) with significant differences in trends among the different products: 7,6 EUR/kg for trout (-1% since 2012) and 16,3 EUR/kg for salmon (+24% since 2012).

Main importers of smoked products from extra-EU countries were Austria (EUR 17,9 million), Germany (EUR 12,0 million), the UK (EUR 8,5 million), Italy (EUR 7,4 million) and Sweden (EUR 6,5 million). These Member States accounted for 81% of total value imported from third countries in 2018.

Extra-EU export: EUR 238,4 million in 2018

In 2018, extra-EU export of smoked products reached EUR 238,4 million (+102% since 2012) and 14.389 tonnes (+55% since 2012). Smoked salmon accounted for the largest share with 89% of total value at EUR 212,5 million in 2018, twice the total value of smoked salmon in 2012.

Three destination countries accounted for 74% of the value and 71% of the volume of extra-EU exports of smoked products: Switzerland (EUR 70,2 million in 2018, +128% since 2012), the US (EUR 64,7 million, +63% since 2012) and Australia (EUR 41,8 million, +94% since 2012). Smoked salmon is the main product exported to each of these countries: 83% in Switzerland, 99% in the US and 88% in Australia.

The average export price of smoked products was 16,6 EUR/kg in 2018 and has increased by 30% since 2012. In 2018, it was 17,1 EUR/kg for salmon (+30% since 2012), 14,9 EUR/kg for trout (+18%) and 9,6 EUR/kg for other products (+13%). This increase of price concerned each of the main export markets, +51% between 2012 and 2018 for salmon exported to Switzerland (19,9 EUR/kg in 2018), +23% for salmon exported to the US (16,8 EUR/kg in 2018) and +20% for salmon exported to Australia (16,3 EUR/kg in 2018).

In 2018, the main exporters to third countries were Denmark (EUR 60,8 million, +85% since 2012), the Netherlands (EUR 59,9 million, +94% since 2012) and Germany (EUR 52,5 million, +185% since 2012). These three Member States accounted for 73% of EU exports of smoked fish to third countries in 2018. It should be noted that for smoked fish products, main extra-EU exporters are not main producers, especially for the Netherlands which is a trade hub and many extra-EU exports are shipped from Dutch ports.

Table 3. EXTRA-EU TRADE OF SMOKED FISH BETWEEN 2012 AND 2018

		2012	2013	2014	2015	2016	2017	2018	Evolution from 2012 to 2018		
Extra-EU imports	Value (EUR 1.000)	Salmon	11.830	11.017	11.582	12.403	19.967	22.792	23.224	96%	
		Trout	32.233	34.800	35.394	32.890	35.543	27.549	30.616	-5%	
		Other	11.842	13.700	17.474	15.360	15.507	13.181	10.738	-9%	
		Total	55.905	59.517	64.450	60.653	71.017	63.521	64.579	16%	
	Volume (tonnes)	Salmon	899	732	791	807	1.196	1.234	1.422	58%	
		Trout	4.190	4.408	4.405	4.015	4.342	3.501	4.014	-4%	
		Other	2.647	3.135	3.297	2.449	3.064	3.259	2.632	-1%	
		Total	7.736	8.275	8.493	7.270	8.602	7.995	8.068	4%	
	Extra-EU imports	Value (EUR 1.000)	Salmon	105.975	128.477	149.944	178.671	196.048	221.076	212.507	101%
			Trout	6.318	10.743	13.158	12.245	19.711	21.505	20.498	224%
Other			5.659	5.990	5.779	4.804	5.357	5.391	5.370	-5%	
Total			117.951	145.210	168.881	195.719	221.116	247.972	238.375	102%	
Volume (tonnes)		Salmon	8.088	8.894	10.164	11.105	11.923	12.520	12.455	54%	
		Trout	503	906	1.062	947	1.439	1.504	1.377	174%	
		Other	666	655	506	423	479	533	557	-16%	
		Total	9.256	10.454	11.732	12.475	13.840	14.558	14.389	55%	

Source: EUROSTAT-COMEXT.

Exchanges within the EU

In most Member States, imports from other EU countries accounted for at least 94% of total imports (extra-EU imports and intra-EU imports) in terms of value (2018). The only exceptions were Austria, Sweden, Croatia, the UK, Portugal and the Netherlands, with intra-EU imports accounting for slightly lower shares.

Poland is by far the largest exporter of smoked fish in the EU, with EUR 763,4 million and 56.206 tonnes of exports recorded in 2018. Most of these exports were destined to Germany (66% of the smoked fish exported from Poland, EUR 507,5 million). Exports from Poland increased by 73% in value since 2012 (EUR 440 million in 2012) and by 24% in volume. Exports mainly consist of salmon (89% of value and 82% of volume exported). The average export price from Poland was 14,6 EUR/kg for salmon in 2018 (+47% since 2012) and 13,4 EUR/kg for trout (+25% since 2012). Other significant exporters are Lithuania (EUR 257,4 million), Germany (EUR 235,3 million), Denmark (EUR 182,1 million) and the Netherlands (EUR 104 million).

Main importers were Germany (EUR 753,9 million, of which 98% was from the EU and only 2% from third countries). Germany's main supplier was Poland. The average import price in Germany for smoked fish was 12,9 EUR/kg in 2018 (+33% since 2012), 14,4 EUR/kg for salmon (+41%) and 10,9 EUR/kg for trout (+21%). After Germany, other relevant markets were Italy (EUR 272,4 million, 97% from the EU), France (206,7 million) and Belgium (EUR 130,8 million).

Table 4. TOTAL IMPORTS AND EXPORTS OF SMOKED FISH (TO EU AND NON-EU COUNTRIES) BY MEMBER STATES IN 2018 (value in EUR 1.000, volume in tonnes)

Member State	Imports		Exports	
	Value	Volume	Value	Volume
DE	753.877	58.312	235.289	15.548
IT	272.418	19.065	2.552	156
FR	206.725	21.085	67.819	3.465
BE	130.753	12.730	45.656	2.501
AT	77.719	5.780	33.982	3.350
UK	63.002	8.864	58.488	5.513
NL	49.726	3.828	104.390	7.738
DK	42.460	4.096	182.073	13.576
ES	39.732	4.032	23.479	2.125
SE	32.217	2.308	12.964	806
PT	16.432	1.125	2.349	184
PL	14.945	1.200	763.414	56.206
GR	11.891	1.291	59.074	3.482
IE	10.568	964	7.141	372
FI	10.082	764	1.753	138
CZ	9.383	1.186	3.667	556
LU	9.081	453	687	28
RO	5.983	1.064	1.983	344
HU	3.579	285	62	5
HR	3.504	208	850	52
SK	3.162	1.168	8	1
LT	2.836	667	257.381	18.213
EE	2.754	355	6.785	534
BG	2.690	554	2.090	184
SI	2.367	146	22	2
LV	2.262	401	24.717	2.441
CY	1.955	178	2	0
MT	1.944	153	0	0

Source: EUROSTAT-COMEXT.

1.3 Quality schemes

Some Protected Geographical Indications (PGIs) specifically cover smoked fish produced in the UK and Romania:

- Arbroath Smokies (smoked haddock from the UK)
- London Cure Smoked Salmon (the UK)
- Novacul afumat din Țara Bârsei (smoked carp from Romania)
- Scrumbie de Dunăre afumată (smoked pontic shad from Romania)
- Traditional Grimsby Smoked Fish (smoked cod and haddock from the UK).



*Traditional Grimsby Smoked fish.
Source: alfredenderby.co.uk*



Other geographical indications (GIs) cover smoked products among other preservation forms (the GI specification covers both fresh and processed products), for instance Schwarzwaldforelle (trout from Germany, PGI), Třeboňský kapr (carp from Czechia, PGI), Pohořelický kapr (carp from Czechia, protected designation of origin (PDO)).



The French public scheme "Label Rouge" also covers smoked Scottish salmon.



In addition, all Irish salmon and a share of Scottish salmon are certified under the organic aquaculture scheme, as well as a share of rainbow trout production especially in France and Denmark, reaching a 30-35% higher price premium compared to conventional smoked fish⁶. Therefore, significant volumes of smoked salmon and trout (farmed in the EU or in Norway) are marketed under the organic labelling.

*PGI, Label Rouge
and organic logos.*

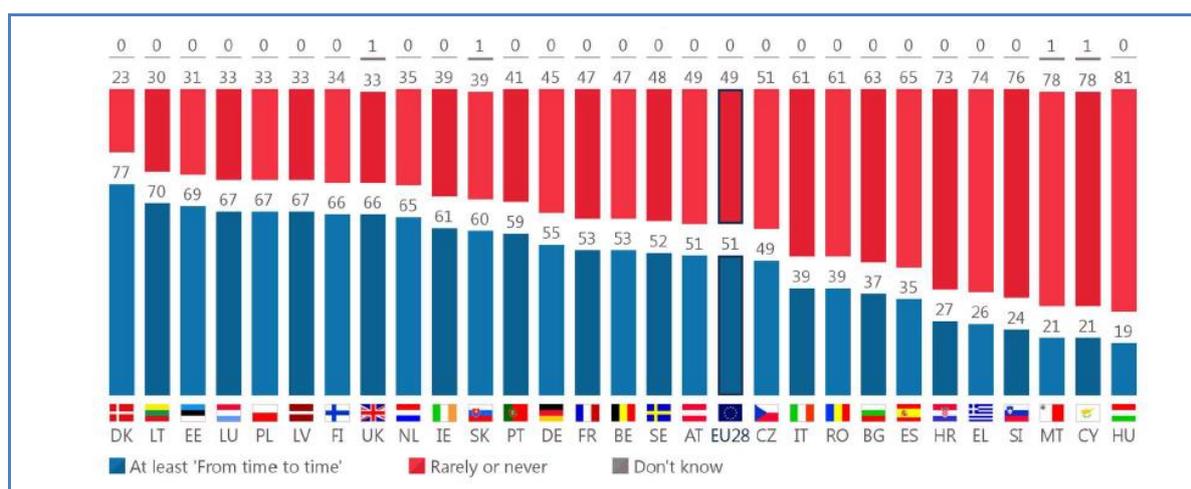
⁶https://www.eumofa.eu/documents/20178/84590/Study+report_organic+aquaculture.pdf

1.4 Consumption

Smoked fish consumption habits may vary a lot depending on regions in the EU, especially in Northern and Baltic EU countries where there is a long history of consuming smoked fish products (particularly herring and salmonids). “Southern” and landlocked countries consume less smoked fish.

In the last Eurobarometer survey⁷, respondents who declared buying fishery and aquaculture products were asked how frequently they were buying products that are smoked, salted, dried or in brine. The answers illustrate this geographical pattern, with high frequencies of product purchases in countries around the Baltic Sea basin and significantly lower frequencies in Mediterranean and landlocked countries (except Luxembourg).

Figure 1. FREQUENCY OF FISHERIES AND AQUACULTURE PRODUCTS BUYERS PURCHASING PRODUCTS THAT ARE SMOKED, SALTED, DRIED OR IN BRINE (IN %)



Sources: Eurobarometer.

According to the EUMOFA study on EU consumer habits regarding fishery and aquaculture products⁸, smoking is the main fish preservation technique used in Lithuania, where 58% of consumers prefer smoked fish (herring). In Latvia and Austria, smoked fish is among the main fish preservation methods, together with fresh and frozen. In other EU countries, smoked fish represents a minority in total fish and seafood consumption. However, its popularity has been growing in Poland (mostly smoked salmon and trout), in Italy, in Belgium (12,4% increase over the 2012-2014 period), in Spain (14% increase in 2008-2014) and in Germany. In Germany, smoked fish consumption has been rising from 6% of total fish consumption in 2005-2007 to 12% in 2014 due to wide availability of cheap smoked salmon from Poland.

Focus on French consumption market

In France, the household consumption of smoked fish products reached 28.406 tonnes in 2018, with salmon accounting for 59% of total volume, and trout and herring for 19% and 16%, respectively. Between 2012 and 2018, household consumption of smoked fish has decreased by 14% in volume, but increased by 13% in value, as product prices have risen by 32% on average.

In particular, household consumption of smoked salmon has decreased in volume (-29%) and remained stable in value (EUR 592 million) between 2012 and 2018. It reached the highest rate of increase in price during the period (+42%). This increase in price has been accompanied by a loss of consumers (-8%), who have shifted their consumption towards smoked trout. Indeed, household consumption of smoked trout has increased by 116% in volume and by 220% in value in the same time period (2012–2018). Household consumption of herring also decreased (-18% in volume; -36% in value).

In 2018, smoked salmon was still the main smoked fish consumed in France (59% of total volume), followed by smoked trout (19%) and herring (16%). Other main smoked species consumed included haddock (2%) and mackerel (1%).

Total consumption of smoked salmon and trout (all channels included) was estimated to be around 41.100 tonnes in 2015⁹.

⁷<http://ec.europa.eu/commfrontoffice/publicopinion/index.cfm/survey/getsurveydetail/instruments/special/surveyky/2206>

⁸ https://www.eumofa.eu/documents/20178/84590/EU+consumer+habits_final+report+.pdf

⁹ ADEPALE.

Table 5. FRENCH HOUSEHOLD CONSUMPTION OF SMOKED FISH BETWEEN 2012 AND 2018

Volume (tonnes)	2012	2013	2014	2015	2016	2017	2018	% total	Evolution from 2012 to 2018
Total smoked fish	33.088	31.879	29.922	29.988	30.280	27.953	28.406	100%	-14%
Salmon	23.653	21.932	19.858	19.749	19.179	16.885	16.790	59%	-29%
Trout	2.536	3.080	3.488	3.945	4.525	4.879	5.476	19%	116%
Herring	5.451	5.304	5.142	4.933	4.981	4.485	4.478	16%	18%
Haddock	658	661	605	589	607	637	604	2%	-8%
Mackerel	274	325	328	315	387	380	403	1%	47%
Other smoked fish	517	576	501	457	601	687	655	2%	27%

Source: Households consumption, Kantar Worldpanel for FranceAgriMer.

2. Fisheries and aquaculture in Norway

The Kingdom of Norway is a Nordic country in north-western Europe, whose territory comprises the western and northernmost portion of the Scandinavian Peninsula; the remote island of Jan Mayen and the archipelago of Svalbard (in the Barents Sea)¹⁰. The length of the Norwegian coastline is 25.148 km, inclusive of its fjords.

Norway is part of the European Economic Area (EEA) through its membership in the European Free Trade Association (EFTA), meaning that the country is to a very large degree a partner in the internal market on the same terms as EU Member States. However, EU common agriculture and fisheries policy, the customs union, and the common trade policy are not covered by the EEA agreement.

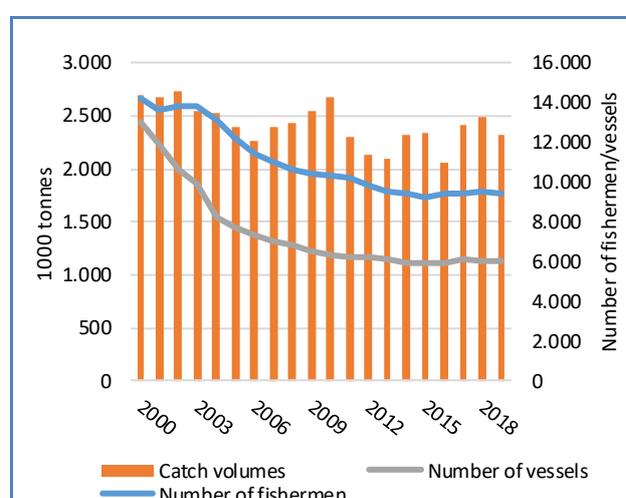
The EU has three fisheries agreements with Norway: the bilateral, the trilateral and the neighbouring agreements. The bilateral agreement encompasses the North Sea and the Atlantic, while the trilateral agreement covers Skagerrak and Kattegat (Denmark, Sweden and Norway), and the neighbourhood agreement covers the Swedish fishery in Norwegian waters of the North Sea¹¹.

The seafood sector is important for Norway. Value creation in the total seafood value chain (including ripple effects) was estimated at NOK 94 billion in 2017 (EUR 10 billion¹²), and the number of people employed in the sector was estimated to be 58.000 Full Time Equivalents (FTEs)¹³. Production in Norway amounted to 3,67 million tonnes in 2019. Approximately 2,6 million tonnes of fisheries and aquaculture products were exported from the country at value of EUR 10,75 billion¹⁴.

2.1 Fisheries

Following the expansion of the Norwegian exclusive economic zone in the 1970s to 200 nautical miles, the fishing grounds for the Norwegian fishing fleet expanded to include Svalbard and the Barents Sea in the north and Skagerrak in the south. Together with Russia, Norway manages the world's largest stock of Atlantic cod, which is found in the Barents Sea. The North Sea is the main fishing ground for pelagic species such as herring and Atlantic mackerel.

Figure 2. NORWEGIAN CATCH VOLUMES, NUMBER OF VESSELS AND NUMBER OF FISHERMEN



Source: Norway Directorate of Fisheries.

In Norway, first sales of fisheries products are managed through a system of six sales cooperatives. One is Norges Sildesalgslag (the Norwegian Fishermen's Sales Organization for Pelagic Fish)¹⁵, Europe's largest marketplace for first sales of pelagics (1,6 million tonnes in 2018). First sales of other species are made through the remaining five organisations, of which Norges Råfisklag (the Norwegian Fishermen's Sales Organization)¹⁶ is the largest, covering more than half of the Norwegian coastline and accounting for around 80% of the remaining sales volume.

Over the past 20 years, catch volumes have been relatively stable, ranging between 2,1 and 2,7 million tones. Until 2015, the number of registered vessels and fishermen fell steadily. From 2015 to 2018 the number of vessels increased slightly to more than 6.000. In 2019, a total of 5.978 vessels were operating, of which 80% were coastal vessels with a hull length of less than 11 meters, typically operated by only one person. In the same year, 9.438 people registered fishing as their main occupation.

¹⁰ The Spitsbergen Treaty (also known as the Svalbard Treaty) of 9 February 1920 recognises Norway's full and absolute sovereignty over the Arctic Archipelago of Spitsbergen (now called Svalbard).

¹¹ https://ec.europa.eu/fisheries/cfp/international/agreements/norway_en

¹² Exchange rate as available in European Central Bank was used for converting NOK to EUR (2017 average exchange rate: 0.10730 EUR for 1 NOK).

¹³ Sintef Community, Sintef Oceans; The Norwegian seafood industry – Importance for the national economy.

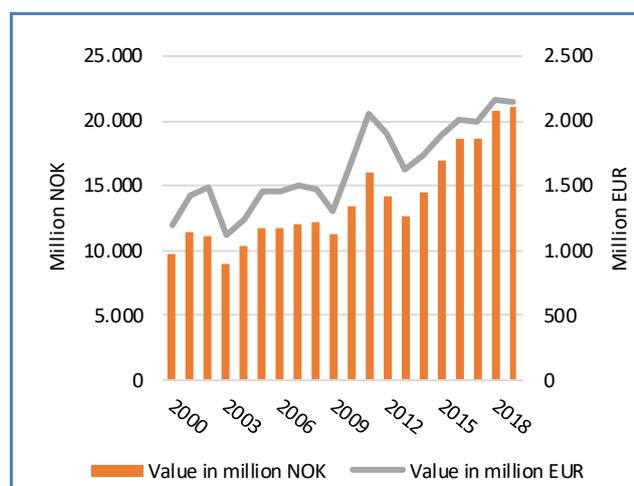
¹⁴ Norway Directorate of Fisheries.

¹⁵ Norwegian Fishermen's Sales Organization for Pelagic Fish: <https://www.sildelaget.no/en>

¹⁶ Norwegian Fishermen's Sales Organisation: https://www.rafisklaget.no/portal/page/portal/NR/Omoss/Norwegian_fishermens_sales_organization

The value of Norwegian first sales has increased steadily over the past 20 years and exceeded NOK 20 billion for the first time in 2018. The first-sales value in 2018 amounted to NOK 20,8 billion (EUR 2,17billion). In 2019, first-sales value increased by 1% to NOK 21,1 billion (EUR 2,14 billion).

Figure 3. VALUE OF LANDINGS BY THE NORWEGIAN FLEET



Source: Norway Directorate of Fisheries.

In 2019, Norwegian vessels landed more than 2,3 million tonnes of fish and shellfish in Norway and abroad, valued at EUR 2,14 billion. This represented a 7% decrease in volume and a 1% decrease in value compared with 2018. Of this, 395.000 tonnes were landed abroad. The species landed abroad were mainly Antarctic krill (237.000 tonnes landed in Uruguay), blue whiting (90.000 tonnes landed in Denmark, Ireland and Iceland), and herring (33.000 tonnes mainly landed in Denmark).

In terms of volume, pelagic species accounted for approximately 56% of all landings in 2019. Codfish made up 29%, shellfish formed 12%, and flatfish accounted for 3%. In terms of value, cod and codfish¹⁷ accounted for around 52% of the total, while pelagic fish represented 32%, shellfish 8% and flatfish 8%.

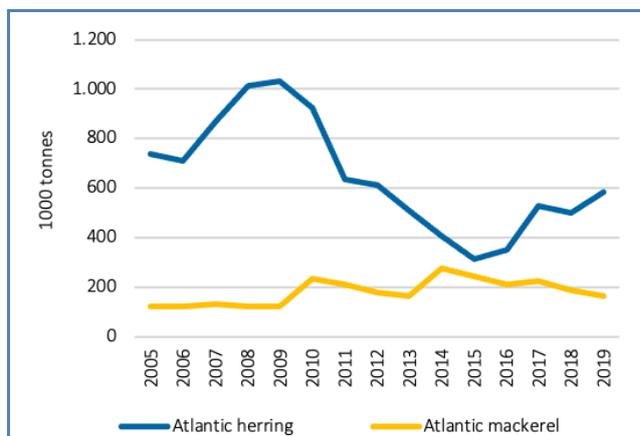
Table 6. LANDINGS BY THE NORWEGIAN FLEET IN NORWAY AND ABROAD BY SPECIES GROUP (value in 1000 tonnes and value in million EUR)

Year	2016		2017		2018		2019	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Cod and codfish	721	1.024	749	1.105	718	1.127	665	1.111
Pelagic	1.061	683	1.390	606	1.465	677	1.302	681
Shellfish and molluscs	226	152	228	131	248	195	278	179
Flatfish and other bottom fish	56	147	55	152	61	169	68	172
Sharks and skates	2	1	2	0	2	1	3	1
Total	2.066	2.007	2.424	1.994	2.494	2.169	2.316	2.144

Source: Norway Directorate of Fisheries.

¹⁷ The main species in the cod and codfish category are: Atlantic cod (*gadus morhua*), saithe (*pollachius virens*) and haddock (*melanogrammus aeglefinus*). The 3 species constitute 95% of the landing value of the cod and codfishes category.

Figure 4. CATCHES OF MAIN PELAGIC SPECIES



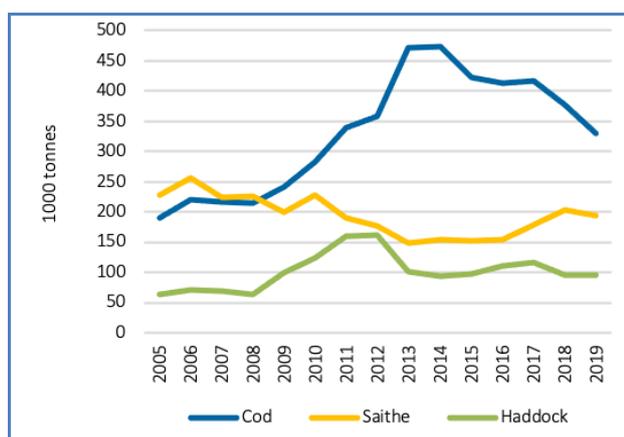
Source: Norway Directorate of Fisheries.

Mackerel and herring are the two main pelagic species landed by the Norwegian fleet, together accounting for around 80% of sales value of pelagic species in 2019¹⁸. The Norwegian quotas account for around 23% of the Atlantic mackerel Total Allowable Catches (TACs), more than 70% of the Norwegian spring spawning (NSS) herring TACs, and around 30% of the North Sea herring TACs¹⁹. From 2005 to 2019, Norwegian herring catches fluctuated between 313.000 tonnes at their lowest in 2015 to above 1 million tonnes in 2008 and 2009. In 2019, they totalled 582.000 tonnes: a 16% increase from 2018. Around 95% of total herring catch was landed in Norway. Catches of Atlantic mackerel varied between 119.000 tonnes at their lowest in 2005 to above 277.000 tonnes in 2014. In 2019, they were below their 10-year average reaching 162.000 tonnes, a 13% decrease from 2018.

Cod, saithe and haddock are the main groundfish species landed by the Norwegian fleet. In 2019, they accounted for 93% of the volume and 95% of the value of total landings of the "cod and codfish"²⁰ group.

During the past 20 years, Atlantic cod catches varied between 190.000 tonnes at their lowest (in 2005) to 473.000 tonnes (in 2014). In 2019, they totalled 329.000 tonnes, a 13% decrease from the previous year. Saithe is the second most landed species, with levels between 147.000 tonnes (in 2013) to 256.000 tonnes (in 2006). In 2019, landings amounted to 195.000 tonnes, a 4% decrease from 2018. Haddock landings amounted to around 160.000 tonnes at their highest in 2011 and 2012 and have remained relatively stable (between 90.000 tonnes and 110.000 tonnes) over the past six years. In 2019, 95.000 tonnes of haddock were landed by Norwegian vessels, the same as in 2018.

Figure 5. CATCHES OF MAIN COD AND CODFISH SPECIES



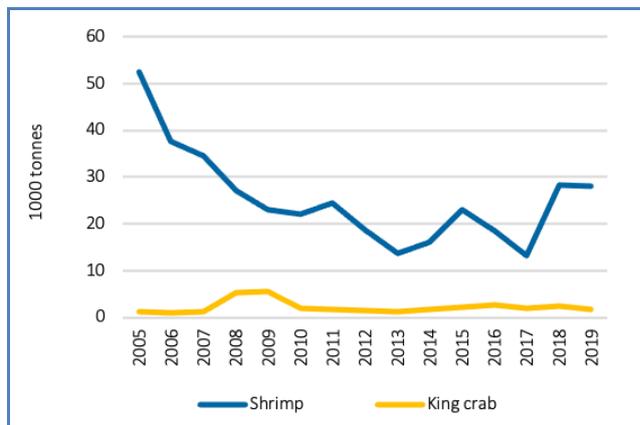
Source: Norway Directorate of Fisheries.

¹⁸ <http://www.sildelaget.no>

¹⁹ <https://www.regjeringen.no/contentassets/3214ab8d45c34db3adef7388feb9da22/norwegian-spring-spawn---agreed-record.pdf>

²⁰ Cod, saithe and haddock are grouped as cod and codfish by the Norway Directorate of Fisheries. That is why the same grouping is used in the text.

Figure 6. CATCHES OF MAIN SHELLFISH SPECIES



Source: Norway Directorate of Fisheries.

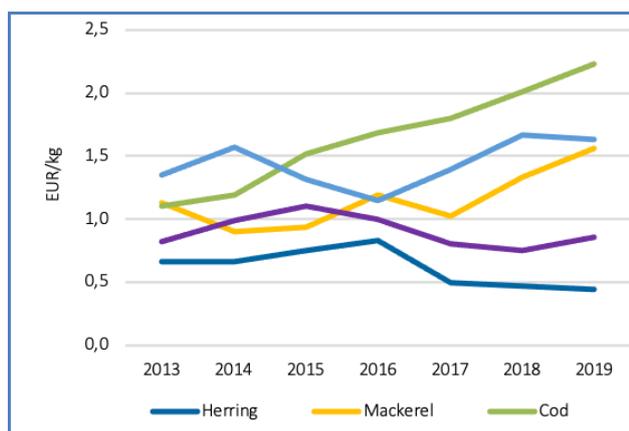
Shrimp landings ranged from 52.000 tonnes at their peak in 2005 to 13.300 tonnes at their lowest in 2017. In 2019, they accounted for 28.000 tonnes, a 1% decrease from 2018. King crab is a relatively new species in Norwegian fisheries, originally coming from waters around the Kamchatka peninsula. The species has now spread to coastal areas in northern Norway and become an increasingly important commercial species due to a steep rise in market prices over recent years.

Price development at landing stage

From 2013 to 2019, the price of Atlantic cod increased dramatically (+102%) reaching 2,23 EUR/kg, while the price of haddock increased to 1,63 EUR/kg (+21%) and the price of saithe increased to 0,86 EUR/kg (+4%).

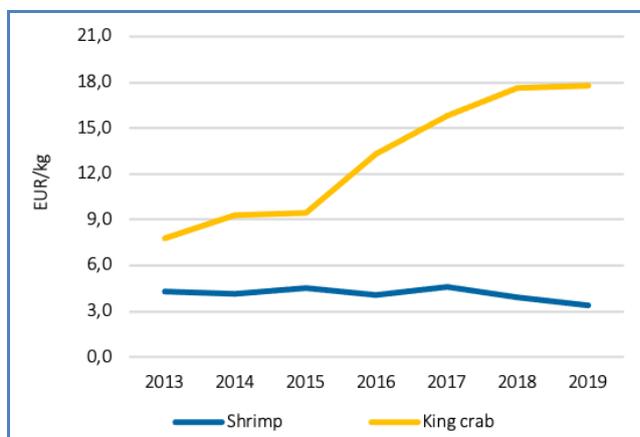
Atlantic mackerel also showed a significant price increase, reaching 1,56 EUR/kg in 2019, a 37% growth from 2013. In contrast, the price of NSS herring declined, falling to 0,45 EUR/kg in 2019, a 32% decrease from 2013.

Figure 7. PRICE OF MAIN WHITE FISH AND PELAGIC SPECIES AT LANDING STAGE



Source: Norway Directorate of Fisheries.

Figure 8. PRICE OF SHRIMP AND KING CRAB AT LANDING STAGE



Source: Norway Directorate of Fisheries.

The price of king crab grew considerably (+128% from 2013), reaching 17,80 EUR/kg in 2019. This increase in price must be seen in relation to increase in demand from the EU, South Korea and the USA. As with NSS herring, the price of shrimp fell. A 20% decrease was recorded from 2013 to 2019, with shrimp prices reaching 3,41 EUR/kg.

2.2 Aquaculture

Since the first commercial salmonid farming began in the 1970s, aquaculture has become an increasingly important industry for Norway. Together with the fisheries sector, petroleum and shipbuilding industry, aquaculture contributes to the maintaining of strong communities along the coast. It is estimated that, as of 2017, the aquaculture-based value chain (including ripple effects) employed around 33.700 FTEs²¹.

According to the Norway Directorate of Fisheries, aquaculture production in Norway totalled 1,35 million tonnes in 2018 for a value of NOK 68,6 billion (EUR 7,1 billion). Although 2018 saw lower total production than in 2015, the value of the catch was high, and set a new record.

Table 7. AQUACULTURE PRODUCTION BY SPECIES GROUP (volume in tonnes round weight²² and value in million NOK)

Year	2014		2015		2016		2017		2018	
	Volume	Value								
Salmon	1.258.356	41.822	1.303.346	44.438	1.233.619	60.121	1.236.353	61.635	1.282.003	64.511
Trout	68.986	2.305	73.007	2.221	87.852	3.682	66.999	3.096	68.344	3.055
Other finfish ²³	2.967	192	1.712	175	2.020	210	2.305	228	2.869	239
Shellfish ²⁴	2.016	14	2.773	29	2.213	25	2.450	33	1.721	38
Algae ²⁵	n/a	n/a	51	0	60	1	149	1	178	1
Total	1.332.498	44.394	1.380.890	47.132	1.326.217	64.342	1.308.634	65.563	1.355.119	68.551

Source: Norway Directorate of Fisheries.

The primary species farmed in Norway is Atlantic salmon, followed by (ocean-farmed) rainbow trout. Of the total production volume in 2018 Atlantic salmon accounted for 94,6% and rainbow trout for 5%. Half (50%) of all Atlantic salmon in Norway is produced in the mid-region (Møre og Romsdal, Trøndelag and Nordland), while 25% is produced in the north (Troms and Finnmark) and the remaining 25% in the west and south west (Agder, Rogaland, Hordaland and Sogn og Fjordane). Rainbow trout is only produced in the mid-region (27% of production) and west and south west (73% of production).

Preliminary data show that Atlantic salmon production in 2019 rose to 1,36 million tonnes while rainbow trout production rose to 79,6 thousand tonnes. The 10 largest farming corporations accounted for 67% of the sales volume of farmed salmonids in Norway²⁶.

The other finfish category is dominated by Atlantic halibut. Over the last few years production has increased steadily – from 1.243 tonnes in 2015 to 1.843 tonnes in 2018. The peak in the production of Atlantic halibut was seen in 2011 when production reached 2.767 tonnes. Atlantic cod production amounted to 495 tonnes in 2018. Farming of cod exceeded 20.000 tonnes both in 2009 and 2010 but biological challenges (slow growth and high mortality rates) and market-related influences caused by increases in wild stocks led to a collapse in production, with levels falling to zero in 2015. As a result of developments in breeding and production technology, as well as a steady increase in market prices, some companies are planning to resume cod farming.

The aquaculture sector which has demonstrated the most growth over the last few years is production of farmed clean fish to producers of Atlantic salmon and rainbow trout. Sea lice have become an increasing concern for salmon and trout farmers in Norway. High levels of sea lice impact fish health and welfare, and excessive numbers in salmon farming may also infect wild stocks of Atlantic salmon and sea trout, causing increased mortality. Under Norwegian aquaculture regulations there is a maximum limit for the number of sea lice which can be attached to each fish. In order to keep sea lice levels under control, farmers can de-lice salmon by using chemicals, mechanical de-liceing (brushing and flushing), conducting freshwater treatments, or introducing cleaner fish to farming enclosures. The production of cleaner fish, primarily lumpfish and certain species of wrasse, is driven in part by the demand for sea lice mitigation, particularly from salmonid farmers who wish to avoid the use of chemicals. Production of cleaner fish has accelerated from 3,8 million fish in 2014 to almost 31 million fish in 2018. Increased demand has pushed prices up for both farmed cleaner fish and for targeted trap/pot fisheries. After farming began, ex-farm price per cleaner fish increased from 1,37 EUR/fish (in 2012) to 2,29 EUR/fish in 2018 (+74%).

²¹ Sintef Community, Sintef Oceans: The Norwegian seafood industry – Importance for the national economy.

²² Other marine species are in number of fish.

²³ Atlantic cod (production based on produced juveniles and wild caught fish), Atlantic halibut, Arctic char and other species.

²⁴ Blue mussel, great Atlantic scallops, oysters and other.

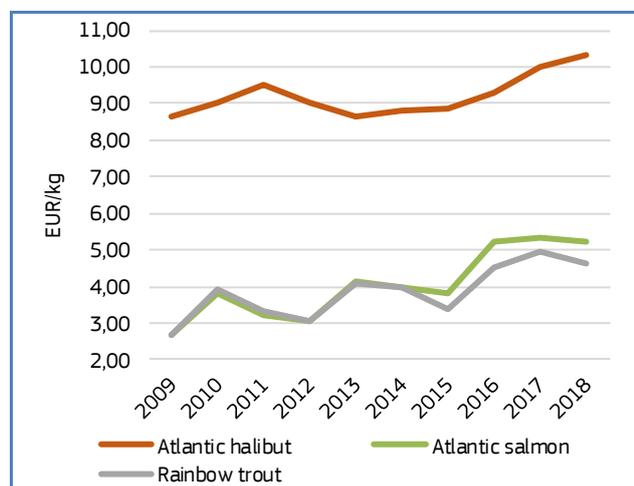
²⁵ Sea belt, babberlocks and other species.

²⁶ Norway Directorate of Fisheries; 67% in 2016, 2017 and 2018.

There has been increasing interest in algae production in Norway. Historically, algae production has been limited. However, recent research seeking to identify potential sites for the farming of macroalgae indicates potential future production.

Since 2016 prices paid to farmers for Atlantic salmon and trout have shown a high trend. Prices for (ocean farmed) rainbow trout averaged 4,7 EUR/kg in the period from 2016 to 2018, while prices for Atlantic salmon averaged 5,27 EUR/kg. Spot market prices for fresh whole farmed Atlantic salmon from Norway decreased by 3% from 2018 to 2019 and it is expected that ex-farm prices followed the same trend. Prices for farmed Atlantic halibut have shown an upward trend for some years, and in 2018 ex-farm prices for the species surpassed 10 EUR/kg for the first time.

Figure 9. EX-FARM PRICE DEVELOPMENT OF MAIN FARMED SPECIES



Source: Norway Directorate of Fisheries, ECB (converting NOK to EUR).

2.3 Processing

In 2017, 11.400 people were employed in the Norwegian processing industry (including both aquaculture and fisheries). From 2015 to 2017, it is estimated that the value of fish processing in Norway increased by 58% to EUR 1,56 billion²⁷.

Among the main drivers behind higher margins in the processing activities associated with wild fish were positive development in the raw material situation for fishmeal and fish oil, and increased prices in the conventional industry (groundfish). The Norwegian groundfish processing industry consists of around 200 companies and includes production of clip fish, salted fish, dried fish, whole gutted fish, and fillets.

In the aquaculture sector the processing share is relatively low. Unlike the fishing processing industry, most products from aquaculture are sold fresh and only a limited share of the production is actually processed in Norway. Based on trade data²⁸, only 16% of the total export volume of salmon and trout was processed in Norway. The low processing share is impacted by high tariffs on products with high value added. Consequently, some Norwegian salmon and trout farming companies have established or acquired processing capacities in the EU for processing of smoked salmon and other ready-to-eat products.

2.4 Exports

From 2016 to 2019, Norwegian fisheries and aquaculture exports rose by 8% in volume and 10% in value.

The main species exported from Norway is salmon. In 2019, exports of salmon exceeded 1,1 million tonnes at a value of EUR 7,34 billion. This represents an increase of 15% in volume and 11% in value from 2016. Cod was the species with the second highest export value in 2019.

Herring ranked second in export volume in 2019. Between 346 and 524 tonnes of herring products were exported from Norway at a value of EUR 305 million in the same year. Despite a 48% increase in export volume from 2016 to 2019, export value dropped by 8%.

The highest export growth in the period was observed for redfishes with increases in both volume and value of 52% and 58%, respectively.

²⁷ https://www.sintef.no/contentassets/d727158330ac4d00a00c77783b89acf2/nasjonal-verdiskapning_2018_endelig_100818.pdf

²⁸ EUMOFA.

Table 8. NORWEGIAN EXPORTS OF MAIN COMMERCIAL SPECIES (volume in tonnes and value in million EUR)

Year	2016		2017		2018		2019	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Salmon	965.149	6.606	985.985	6.922	1.041.627	7.063	1.105.796	7.344
Cod	212.588	932	215.283	979	193.113	976	177.344	1.018
Mackerel	308.799	443	370.490	483	68.013	99	238.581	431
Trout	68.442	420	38.415	299	46.509	312	59.578	373
Herring	234.480	331	253.880	272	291.423	271	346.524	305
Saithe (=Coalfish)	72.574	194	83.857	205	106.290	221	115.443	252
Haddock	71.193	155	75.119	181	61.605	175	60.109	179
Fish oil	85.186	106	88.794	102	99.224	119	115.673	134
Crab	7.045	98	4.920	86	4.936	90	5.638	107
Fishmeal	45.603	76	43.799	62	55.337	85	60.263	98
Halibut, Greenland	11.565	61	16.414	78	13.785	69	15.744	77
Caviar, livers and roes	9.984	25	8.526	20	11.083	31	13.145	47
Redfish	14.899	24	18.007	30	15.153	28	22.583	38
Other groundfish	9.114	27	11.232	33	11.062	33	11.616	36
Ling	8.300	34	8.085	37	7.400	36	7.190	33
Halibut, other	2.314	24	2.260	23	2.398	24	2.867	28
Other	321.932	210	385.206	251	485.080	277	278.410	242
Total	2.449.169	9.766	2.610.274	10.062	2.514.038	9.909	2.636.505	10.745

Source: EUMOFA, based on Statistics Norway data.

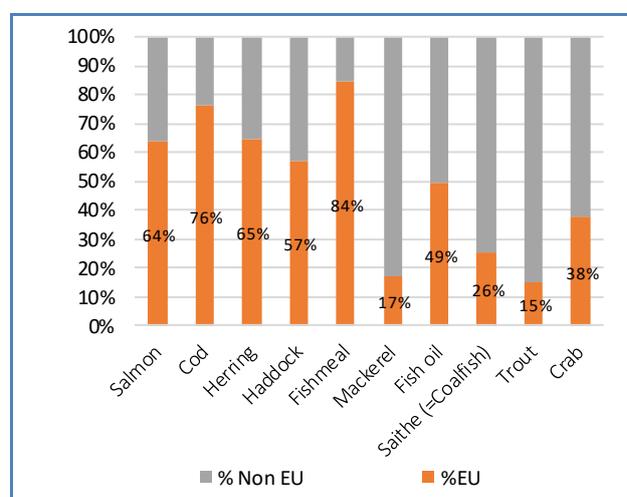
In 2019, Norway exported seafood to 151 different countries. However, the export markets for Norwegian seafood are dominated by the EU, with Poland, Denmark and France the most prominent export partners. In 2019, 1,5 million tonnes of seafood were exported from Norway to the EU for a value of EUR 6,36 billion. This represented 57% of the country's total export volume and 59% of its export value. The United States represents Norway's largest non-EU market, with a share of export value of 6%, followed by China at 5%.

Table 9. NORWEGIAN EXPORTS OF TOTAL FISHERIES AND AQUACULTURE PRODUCTS BY MAIN DESTINATION (volume in tonnes and value in million EUR)

Year	2016		2017		2018		2019	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Poland	210.013	1.044	192.239	961	225.766	1.064	230.516	1.079
Denmark	353.128	825	386.631	869	402.410	883	338.133	935
France	132.491	848	120.414	752	132.312	811	117.799	721
United States	70.414	499	79.179	605	78.378	623	79.859	679
United Kingdom	144.851	600	125.696	557	146.037	638	155.874	630
Netherlands	131.559	471	134.932	500	113.837	498	125.166	532
China	143.339	298	193.280	378	114.577	335	169.271	530
Spain	74.544	431	78.345	464	87.363	485	86.534	504
Italy	53.950	391	58.280	398	66.996	449	73.475	481
Japan	121.199	478	135.954	459	53.653	314	96.843	439
Other EU	358.543	1.497	379.029	1.518	392.723	1.462	376.629	1.474
Other non-EU	655.137	2.383	726.294	2.600	699.985	2.348	786.406	2.741
Total	2.449.169	9.766	2.610.274	10.062	2.514.038	9.909	2.636.505	10.745
EU total	1.459.078	6.108	1.475.567	6.019	1.567.444	6.290	1.504.125	6.355

Source: EUMOFA, based on Statistics Norway data.

Figure 10. EXPORT SHARES TO THE EU OF SELECTED SPECIES/COMMODITIES – MEASURED IN EXPORT VALUE



Source: EUMOFA, based on Statistics Norway data.

The total export value of salmon in 2019 amounted to EUR 7,34 billion, 64% of which was destined to the EU (Poland, France, Denmark and the Netherlands in descending order).

The EU accounted for 76% of the export value of cod from Norway. The main EU market for cod in 2019 was Portugal and the main products were dried and salted cod²⁹. Denmark followed suit, with a strong preference for fresh cod.

The highest export share to the EU is recorded for fishmeal with 84%. Conversely, the EU only accounts for 15% of the export value of farmed rainbow trout. The main markets for both species are Eastern Europe and Asia.

²⁹ For an analysis of the price structure in the supply chain of dried salted cod from Norway to Portugal, see the EUMOFA case study via the following link https://www.eumofa.eu/documents/20178/113218/Cod+in+NO_EN.pdf.

2.5 Imports

Although Norway is a net exporter of fisheries and aquaculture products, its large aquaculture industry has made the country dependent on imports of fish feed ingredients, particularly fish oil. From 2016 to 2019, Norwegian imports of fish oil increased by 14% in terms of volume and 5% in terms of value. While fish oil is still a vital component of fish feed, the share and amount of fish meal used for fish feed has declined over the last decade as fish meal has been increasingly substituted with alternative (plant-based) protein sources. From 2016 to 2019 import volume of fish meal dropped by 18% while value dropped by 15%. In 2019, a large part of fish oil imports came from Peru (30% of the import volume) and Denmark (21%). In imports of fish meal, Denmark and Iceland were the main trade partners with import shares of 36% and 33%, respectively.

The third most important imported species is mackerel (82.504 tonnes in 2019). The majority of imports (95%) consist of landings of foreign vessels in Norway. The United Kingdom is the predominant foreign lander of mackerel in Norway with an import share of 71% in 2019, followed by Denmark (15%) and Ireland (7%). Most of the mackerel landed in Norway is re-exported to other markets.

Like mackerel, most of the cod imported to Norway is landed by foreign vessels. Of 28.080 tonnes of cod imported in 2019, 16.900 tonnes originated from Russia.

Table 10. NORWEGIAN IMPORTS OF MAIN COMMERCIAL SPECIES (volume in tonnes and value million EUR)

Year	2016		2017		2018		2019	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Fish oil	191.887	355	211.523	322	204.490	322	219.076	373
Fishmeal	175.859	281	191.412	251	168.296	247	143.565	238
Mackerel	106.346	127	111.400	130	96.529	134	82.504	138
Cod	21.000	73	20.470	83	23.057	101	28.038	129
Shrimp, miscellaneous	5.880	68	6.759	72	6.206	67	6.275	69
Other marine fish	9.517	37	10.276	37	11.797	41	10.770	43
Other	123.486	213	107.572	188	121.599	205	122.283	203
Total	633.976	1.154	659.413	1.082	631.974	1.118	612.510	1.192

Source: EUMOFA, based on Statistics Norway data.

2.6 Consumption

According to the FAO, Norway was ranked 11th in the list of countries with the highest per capita seafood consumption. With a total production of seafood for human consumption at 3,3 million tonnes (past 5-year average) production per capita is around 600 kg. Per capita consumption of seafood and aquaculture products in Norway is estimated at 53 kg³⁰. According to research conducted on consumer habits³¹, Norwegians eat an average of 140 seafood-based meals per year. The corresponding figure for Europe was 97. Despite relatively high consumption, at-home consumption of seafood has fallen by 22% since 2013. The biggest drop in consumption is observed for the youngest generations. For people aged 34 years and under, at-home seafood consumption fell by half³². The youngest generation also consumes seafood the least in the EU. Results from studies on consumer habits in the EU show that the percentage of consumers of fisheries and aquaculture products in the age class 15-24 is lower than the average of regular consumers.

Salmon is the most consumed species in Norway, followed by cod, mackerel and trout. Salmon and cod are the most consumed species on weekdays, whereas shrimp and trout score highest as the preferred species at weekends, and there is a preference for halibut and wolfish when eating at restaurants.

Consumers in Norway purchase most of their seafood for home consumption at large-scale retailers (super-/hypermarkets) or at local shops. Over the last few years, an increasing share has been purchased at local shops as opposed to super- and hypermarkets.

³⁰ Norwegian Seafood Council.

³¹ Norwegian Seafood Council; <https://seafood.no/markedsinnsikt/fiskemarked-h2018/norge-h2018/>.

³² Ibidem.

3. Fisheries and aquaculture in Turkey

3.1 Introduction

Turkey covers a geographic area of 783.560 km², with 8.333 km of coastline. It borders the Mediterranean Sea in the south, the Black Sea in the north and the Aegean Sea and Sea of Marmara in the west. The capital Ankara has a population of about 5 million citizens, while the largest city, Istanbul, has about 15 million citizens (suburbs included). In total the population is about 83 million³³.

In 2018, the Gross Domestic Product (GDP) was EUR 654 billion, up 20% (in TRY) from 2017, and GDP per capita was EUR 8.030, up 18% (in TRY) from 2017³⁴.

With a total available water surface area of 26 million ha and rivers with a total length of 177.714 km, Turkey has the natural resources necessary for fish production³⁵. Between 2013 and 2017, Turkey was the 23rd largest aquaculture producer in the world, producing 0,2% of the global volume (0,6% with China excluded), and was the 3rd largest aquaculture producer in the Mediterranean Basin (after Egypt and Spain)³⁶. With respect to fisheries, Turkey is the 46th largest producer in the world and ranks 5th in the Mediterranean Basin. In 2018, production from fisheries amounted to 314.000 tonnes, of which 284.000 tonnes were from marine capture and 30.000 tonnes from freshwater fisheries, down 12% and 6%, respectively, from 2017. Total aquaculture production amounted to 315.000 tonnes in 2018, up 14% from 2017³⁷.

3.2 Fisheries

In 2017, the total number of registered fishing vessels was 17.497 and the marine fleet employs about 32.000 people. Most of the Turkish fleet consists of small vessels: about 90% are less than 12 meters in length³⁸. Just under three quarters of total annual catch stems from the Black Sea. European anchovy, European pilchard, European sprat and Mediterranean horse mackerel are the most frequently caught small pelagic species, representing 63% of total captures in 2018. These are used mainly for fishmeal and fish oil production and are the main ingredients in fish feed³⁹.

Table 11. PRODUCTION FROM FISHERIES IN THE PERIOD 2014–2018 (volume in 1.000 tonnes)

Fisheries	2014	2015	2016	2017	2018
European anchovy	96.440	193.492	102.595	158.094	96.452
Striped venus clam	21.828	37.404	20.932	34.941	44.533
European sprat	41.648	76.996	50.225	33.950	20.057
European pilchard (sardine)	18.077	16.693	18.162	23.426	18.854
Marine molluscs nei	7.193	8.980	10.654	10.700	10.434
Tarek (pearl mullet)	8.310	8.850	9.950	9.830	9.945
Whiting	9.555	13.158	11.541	8.248	6.814
Mediterranean horse mackerel	12.213	14.290	8.860	8.066	14.222
Atlantic bonito	19.032	4.573	39.460	7.578	30.920
Goldfish	5.408	6.745	7.652	7.035	6.134
Silversides (sand smelts) nei	6.918	5.257	5.157	5.381	5.222
Atlantic horse mackerel	4.110	2.373	2.289	4.919	6.456
Mulletts nei	2.913	2.944	2.962	3.738	2.680
Common carp	8.036	7.223	4.736	3.543	2.906
Other	40.533	32.931	40.151	34.871	38.466
Total	302.214	431.909	335.326	354.320	314.095

Source: FAO.

³³ Turkish Statistical Institute (TurkStat), 2019, <http://www.turkstat.gov.tr/Start.do>

³⁴ Ibidem.

³⁵ Eurofish.

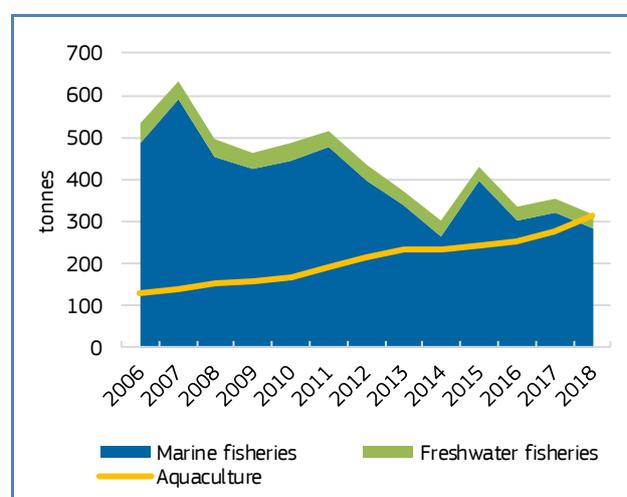
³⁶ FAO.

³⁷ TurkStat, <http://www.turkstat.gov.tr/Start.do>

³⁸ DG Fisheries and Aquaculture, Ministry of Food Agriculture and Livestock, Republic of Turkey, 2017.

³⁹ FAO.

Figure 11. **AQUACULTURE PRODUCTION AND FISHERIES (MARINE AND FRESHWATER), 2006–2018 (volume in 1.000 tonnes)**



Source: TurkStat.

Total fisheries volumes vary from year to year, mainly due to fluctuation in anchovy catches. However, analysing a longer period, there is a clear declining trend for marine and freshwater fisheries, though weaker for freshwater. From 2006 to 2018, annual catches from marine fisheries declined by 43% (from 490.000 to 280.000 tonnes) while annual catches from freshwater fisheries declined by 32% (from 44.000 to 30.000 tonnes).

This trend is welcomed by the Turkish authorities who state that “Our Ministry set the conservation and sustainable exploitation of resources that are already limited as an important objective”. Fishing licenses have not been issued for marine vessels since 2002, and from 2012, a fishing vessel decommissioning scheme was launched. Fishing licenses for 1.225 vessels over 10 meters were annulled and removed from the fleet in 2012, and the program continues⁴⁰.

3.3 Aquaculture

In contrast to the fisheries sector, aquaculture production has increased steadily and is about to bypass fisheries. This development is mainly related to the combination of technological advances and government strategy. Furthermore, Turkey is now the leading producer in the Mediterranean region for farmed species such as trout, European seabass and gilthead seabream, produced both in the Mediterranean and in the Black Sea. Almost 40% of aquaculture production in 2017 was freshwater aquaculture (specifically rainbow trout). Mariculture is dominated by European seabass and gilthead seabream, accounting for about 98% of production in 2018. The main regions for marine aquaculture are the provinces on the coast of the Aegean Sea. Turkey is now the largest producer and exporter of both European seabass and gilthead seabream in the world. The country also has a significant bluefin tuna ranching industry, catching and fattening tuna primarily for the Japanese market. Mariculture production mostly uses offshore sea cages, while freshwater production mostly involves land-based units supplied with water from rivers, but also in cages in lakes and hydro-electric or irrigation dams. In 2016, there were 2.326 fish farms, 1.901 freshwater farms and 425 marine farms, with a total capacity of almost 500.000 tonnes. The number of vertically integrated groups which are operating their own hatcheries, fish feed plants, fish farms, and processing and packaging plants is increasing steadily. It is reported that the aquaculture sector employs 10.500 people⁴¹.

Table 12. **AQUACULTURE PRODUCTION, 2014–2018 (volume in 1.000 tonnes)**

Aquaculture	2014	2015	2016	2017	2018
Rainbow trout	112.345	106.598	104.355	106.733	112.427
European seabass	74.653	75.164	80.847	99.971	116.915
Gilthead seabream	41.873	51.844	58.254	61.090	76.680
Trouts nei	1.248	1.440	2.658	2.924	2.70
Atlantic bluefin tuna	305	340	770	777	715
Meagre	3.281	2.801	2.463	697	1.486
Mediterranean mussel	n/a	3	329	489	907
Common carp	157	206	196	233	212
Other	440	568	459	563	269
Total	234.302	238.964	250.331	273.477	311.681

Source: FAO.

⁴⁰ Directorate General of Fisheries and Aquaculture, Ministry of Food Agriculture and Livestock, Republic of Turkey, “Turkish Fisheries, 2017”.

⁴¹ FAO.

3.4 Processing industry

There were 210 fish processing enterprises in 2017, employing approximately 6.500 people⁴². The main processed products are seabass and seabream. Processed fish is mainly exported, since the domestic market prefers fresh whole fish. Farmed seabass and seabream are exported chilled or frozen as gutted or filleted, in vacuum-sealed trays. More recently, they have also been exported as frozen ready meals. Farmed rainbow trout is filleted and smoked for western markets.

3.5 Export

The EU is Turkey's primary market for fish and seafood exports, but exports are increasing to Russia, the Middle East and even Asia and the US. The total volume of exported fisheries and aquaculture products increased to almost 219.000 tonnes in 2019, with a value of approximately EUR 942 million.

Table 13. EXPORT FROM TURKEY, 2015–2019 (volume in 1.000 tonnes and value in EUR 1.000)

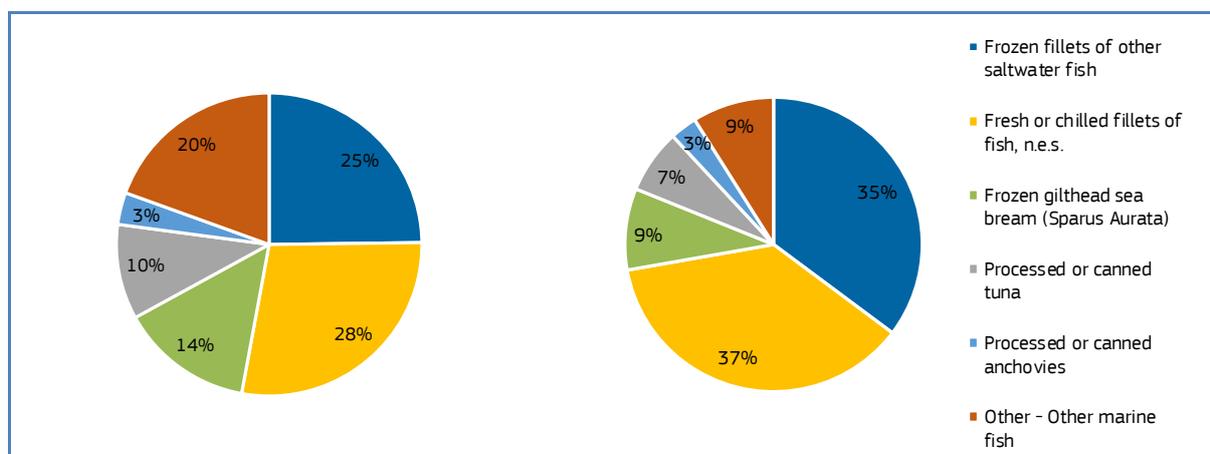
Main Commercial Species	Volume					Value				
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019
Other marine fish	49.397	29.914	33.632	37.799	40.382	350.430	215.476	223.832	228.848	237.446
Seabream, other	58.194	41.961	43.226	48.971	55.086	269.778	161.416	165.664	167.784	189.227
Seabass, other	52.243	27.201	32.785	42.567	49.315	259.370	136.386	151.355	164.581	173.718
Trout	36.710	21.993	23.628	25.334	27.407	155.375	92.855	95.619	110.862	130.158
Tuna, bluefin	5.312	2.978	4.071	4.122	7.000	77.527	39.047	51.068	48.731	76.943
Molluscs and aquatic invert., other	3.853	2.665	2.582	3.222	3.246	20.747	13.658	12.947	19.718	21.917
Fish oil	12.926	9.944	3.584	10.249	7.329	22.737	16.451	7.239	18.117	11.865
Sea cucumber	324	379	855	944	1.292	7.323	7.879	14.647	18.924	32.335
Clam	1.737	1.254	1.574	1.860	2.289	5.782	3.750	4.875	6.519	8.357
Other crustaceans	719	1.119	829	978	1.043	5.334	8.274	5.893	6.757	7.111
Shrimp, miscellaneous	1.424	673	677	580	778	10.222	5.405	5.201	4.200	7.243
Carp	15.316	10.850	7.750	5.912	7.471	8.761	7.934	2.958	2.123	2.203
Fishmeal	146	1.157	2.562	6.031	11.304	233	1.775	3.517	7.757	14.499
Other	6.876	4.149	4.768	4.410	4.970	25.907	19.820	19.352	20.050	28.542
Total	245.177	156.237	162.524	192.978	218.912	1.219.526	730.126	764.168	824.971	941.562

Source: EUMOFA, based on Global Trade Atlas – IHS Markit data.

The largest Main Commercial Species category exported is “Other marine fish”. By analysing and comparing with export statistics from the Turkish Statistical Institute (TurkStat), this category consists of several frozen and or processed products of the main aquaculture species (gilthead seabream and tuna), as well as anchovies from fisheries. The two largest categories represent pooled groups of “Frozen fillets of other saltwater fish” and “Fresh or chilled fillets of fish, n.e.s.” with a share of respectively 25% and 28% of the volume and 35% and 37% of the value.

⁴² <https://www.eurofish.dk/turkey>

Figure 12. VOLUME (LEFT) AND VALUE (RIGHT) SHARE OF THE UNDERLYING CATEGORIES IN THE MAIN COMMERCIAL SPECIES EXPORT CATEGORY "OTHER MARINE FISH" IN 2019



Source: TurkStat.

Turkey mainly produces fillets of European seabass, Gilthead seabream and trout, for exports to the EU. Fresh trout fillets are declared separately, so it is reasonable to assume that the two products "Frozen fillets of other saltwater fish" and "Fresh or chilled fillets of fish n.e.s." mainly consist of fillets from seabass and seabream. These categories represent 10% and 18% of the total export volume and value, respectively, in 2019.

3.6 EU Imports from Turkey

Out of a total export volume of 219.000 tonnes in 2019, 127.000 tonnes (58%) of fisheries and aquaculture products from Turkey were destined for the EU, led by the three main aquaculture species (seabream, seabass, and trout), followed by anchovies from the fisheries sector.

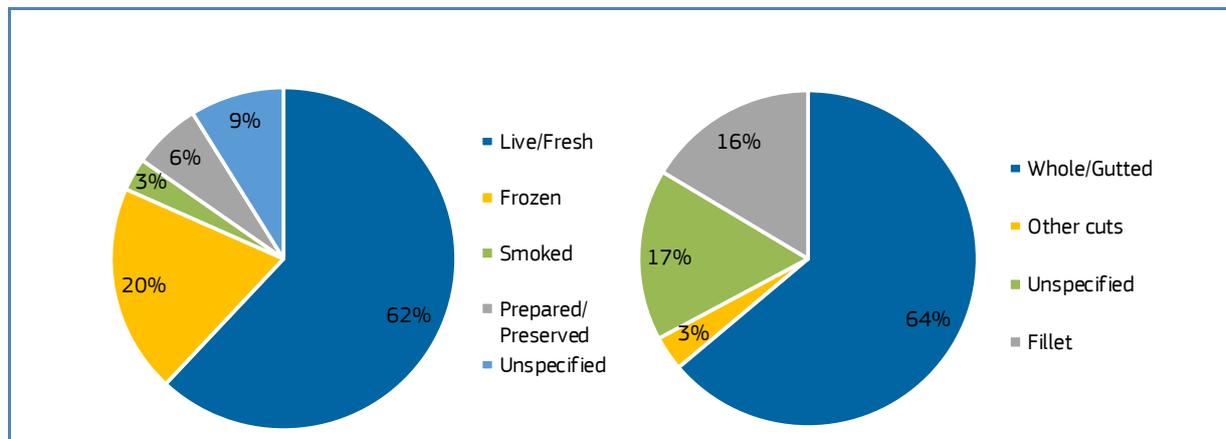
Table 14. IMPORT BY MAIN COMMERCIAL SPECIES FROM TURKEY TO THE EU, 2015–2019 (volume in 1.000 tonnes and value in EUR 1.000)

Main Commercial Species	2015		2016		2017		2018		2019	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Other marine fish	14.604	137.216	19.260	176.791	18.600	169.286	19.894	164.221	22.836	179.362
Seabream, gilthead	17.559	88.562	28.348	122.095	29.600	126.806	32.216	125.966	37.934	148.510
Seabass, European	14.781	78.124	16.839	88.069	20.342	99.691	25.763	107.603	28.989	109.714
Trout	13.683	65.081	15.624	73.791	16.461	71.308	13.716	64.642	13.263	65.462
Anchovy	1.930	7.978	1.749	7.761	1.698	7.207	1.521	7.040	1.602	7.379
Clam	2.342	8.341	1.749	5.854	1.868	6.201	2.154	7.615	2.040	7.517
Fish oil	65	135	4.505	6.884	523	1.082	7.215	14.352	4.632	7.298
Other freshwater fish	3.138	4.207	2.906	4.724	3.381	5.716	3.085	6.077	2.636	4.638
Shrimp, deep-water rose	571	4.407	528	4.757	547	4.665	305	2.516	349	3.256
Other products	n/a	n/a	n/a	n/a	2.272	5.443	2.126	4.901	3.007	7.062
Other salmonids	341	2.931	483	4.067	239	1.970	363	2.874	384	3.175
Seabream, other	1.601	8.927	142	1.326	207	1.795	329	2.005	145	697
Other	1.855	9.792	2.047	11.637	3.281	12.765	4.988	17.189	9.428	24.114
Total	72.468	415.702	94.180	507.754	99.020	513.935	113.675	527.001	127.243	568.183

Source: EUMOFA.

The majority of the imports consists of live/fresh and whole or gutted products (62% and 64%, respectively), but also a considerable share of fillet or other processed products.

Figure 13. PRESERVATION STATE (LEFT) AND PRESENTATION STATE (RIGHT) OF THE FISHERIES AND AQUACULTURE PRODUCTS IMPORTED FROM TURKEY TO THE EU IN 2019

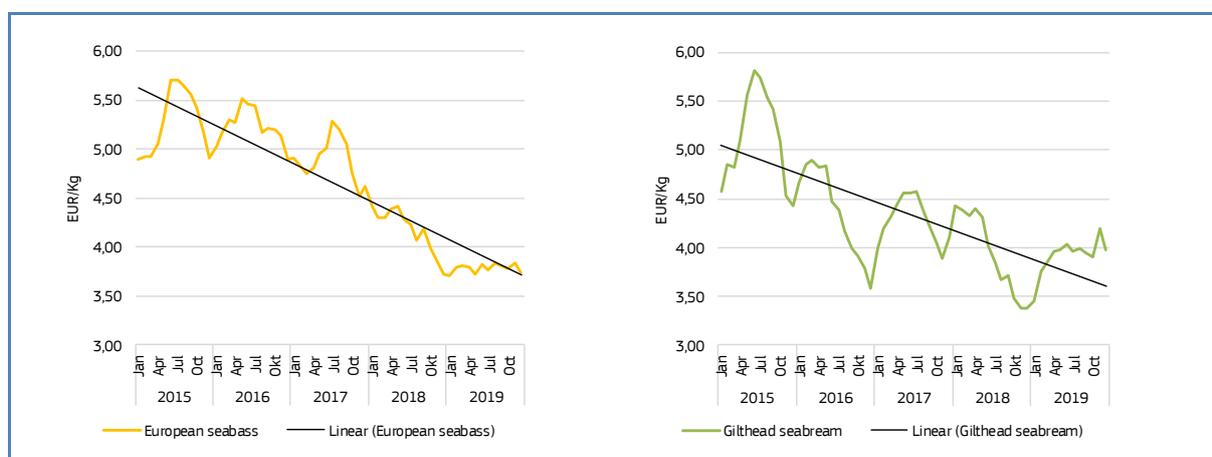


Source: EUMOFA.

3.7 EU import prices

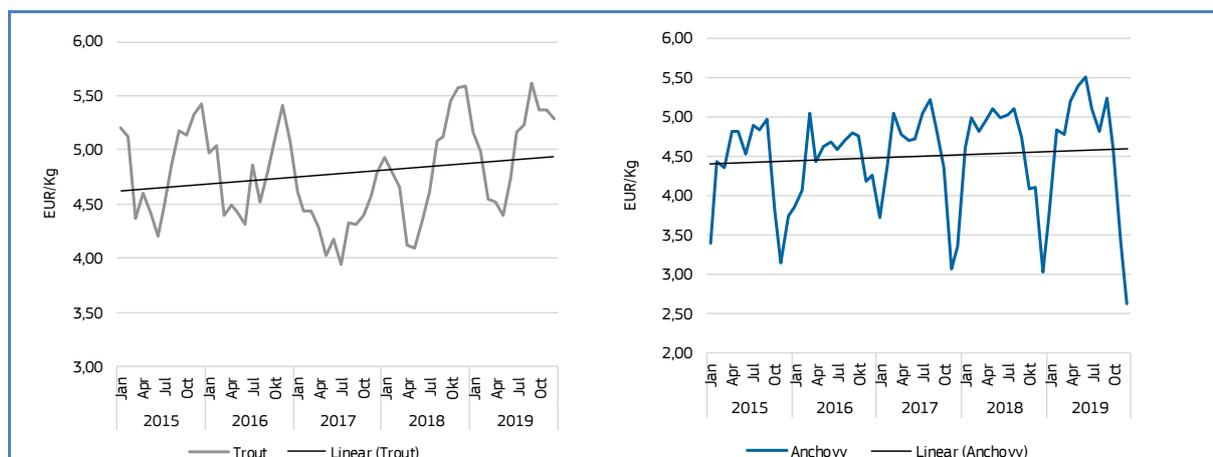
The aquaculture sector is known for boom and bust cycles with rapid volume growths followed by price collapses, repeating themselves. There is a steep decline in price for the two main aquaculture species (seabass and gilthead seabream) from 2015 to 2019, associated with rapid growth in production over the same period to meet the demand level. However, towards the end of the period, the supply levels exceed the demand. In contrast, both trout species and anchovies show a weak increasing price trend over the same period.

Figure 14. EUROPEAN SEABASS AND GILTHEAD SEABREAM MONTHLY IMPORT PRICES FROM TURKEY TO THE EU 2015–2019



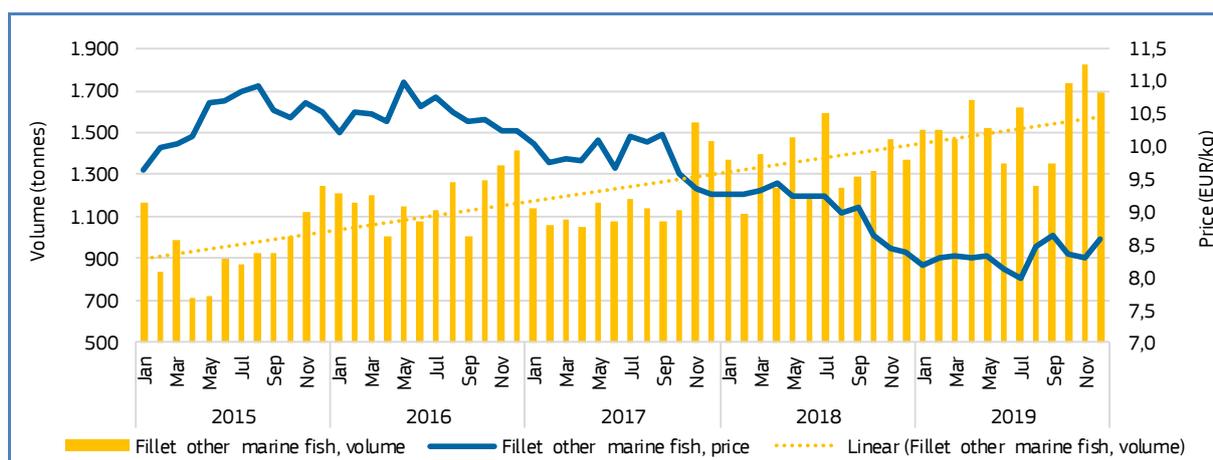
Source: EUMOFA.

Figure 15. TROUT AND ANCHOVY MONTHLY IMPORT PRICES FROM TURKEY TO THE EU, 2015–2019



Source: EUMOFA.

Figure 16. MONTHLY IMPORT VOLUME AND PRICES FOR FILLET OF OTHER MARINE FISH FROM TURKEY TO THE EU, 2015–2019



Source: EUMOFA.

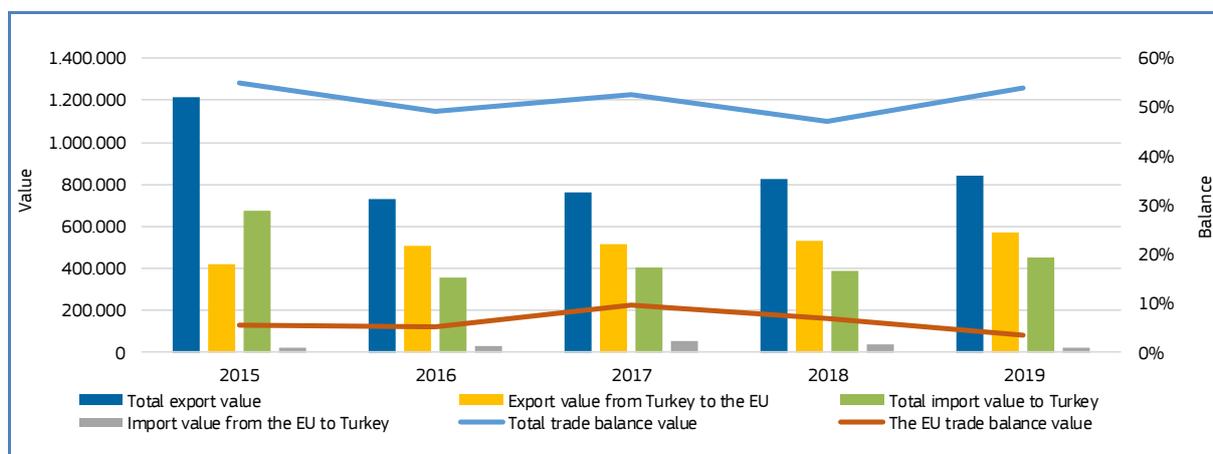
*Assumed to include a significant share of seabass and seabream.

3.8 Trade balance for fisheries and aquaculture products

In terms of value, the share of the largest main commercial species imported to Turkey between 2015 and 2019 are fishmeal (32% of total import value), fish oil (16%), mackerel (11%), salmon (11%), skipjack tuna (6%), saithe (4%), and bluefin tuna (3%). Fishmeal and fish oil are main inputs to the aquaculture sector and represent almost 50% of the total import value. The total trade balance for Turkey (total import versus total export value) varies from 47% to 55% (on average 52%) over the period.

The trade balance between Turkey and the EU varies from 3 to 10% (on average 6%), and the main commercial species exported to Turkey over the period 2015–2019, are skipjack tuna (27% of total value), fishmeal (21%), salmon (7%), and yellowfin tuna (6%).

Figure 17. TRADE VALUE AND BALANCE FOR FISHERIES AND AQUACULTURE PRODUCTS BETWEEN THE EU AND TURKEY, 2015–2019



Source: EUMOFA based on Global Trade Atlas - HIS Markit data.

*Assumed to include a significant share of seabass and seabream.

Table 15. EU EXPORT TO TURKEY BY MAIN COMMERCIAL SPECIES, 2015–2019 (volume in 1.000 tonnes and value in EUR 1.000)

Main Commercial Species	2015		2016		2017		2018		2019	
	Volume	Value								
Tuna, skipjack	3.516	3.513	7.114	8.073	10.053	14.483	8.591	10.224	5.914	7.088
Fishmeal	3.192	4.548	1.931	2.720	12.596	15.922	7.600	9.290	1.521	1.873
Salmon	220	2.322	167	1.895	136	1.563	155	1.993	101	1.346
Tuna, yellowfin	1.624	2.246	1.988	2.877	1.649	2.459	518	748	73	106
Other marine fish	657	1.771	179	1.293	365	980	825	1.588	187	857
Other products	0	0	0	0	1.159	2.754	1.111	2.682	576	1.562
Mackerel	4.171	1.953	936	564	3.664	1.895	2.106	975	254	169
Squid	537	1.305	493	1.533	193	676	223	888	76	320
Fish oil	193	445	211	609	479	1.306	1.055	1.853	192	533
Swordfish	81	886	133	1.437	42	443	47	508	44	565
Tuna, bigeye	538	599	827	887	1.084	1.767	344	450	319	415
Other	1.424	3.667	842	3.609	2.226	5.595	2.211	4.685	2.929	4.298
Total	16.151	23.254	14.820	25.499	33.645	49.843	24.785	35.884	12.187	19.133

Source: EUMOFA.

3.9 Consumption

Per capita consumption of fisheries and aquaculture products was about 5,49 kg in 2017 and 6,14 kg in 2018⁴³. This is low compared to the world average of 21 kg/capita and the European Union average of 22 kg/capita⁴⁴, despite Turkey being surrounded by seas. Trout and seabass are popular in the Mediterranean region of Turkey, while in eastern Turkey, European anchovy is the preferred fish, followed by trout. The Marmara and Aegean regions are the leading areas as far as volume and variety of fish consumption are concerned. Fish consumption in Turkey increased from about 4 kg in the 1960s up to about 8 kg in the 1980s and 1990s, and started declining again from the mid-2000s⁴⁵. Turkish consumers have historically preferred meat products, and fish consumption differs between regions⁴⁶, being lowest in inland areas and more predominant in coastal areas. The authorities are working on a media campaign to foster an increase in fish consumption⁴⁷.

3.10 Future aspects

According to the FAO, the threats to the Turkish seafood sector are overfishing, fleet overcapacity, poor environmental planning, and unregulated fishing. However, opportunities for increasing production in a sustainable manner are sought through the promotion of co-management schemes, stock assessment, efforts in monitoring, control and surveillance, increased market access for Turkish fisheries products into the EU, and the development of recreational fisheries. After moving fish farms offshore, conflicts between the marine aquaculture sector and other coastal users, primarily the tourism industry, were significantly reduced. This change has allowed further growth in aquaculture production and the sector now aims for a production of 600.000 tonnes, including trout, in 2023. This is to be reached through freshwater cage production, thanks to recent construction of dams and designation of new marine aquaculture areas. Turkey has access to well-developed research infrastructure. Faculties, departments and university laboratories have close links to the industry. These sites provide insight and competence for the industry, as well as a supply of well-educated employees who are important for the growth of the sector. New sectors like mussel and shrimp farming, which the government is keen to develop, will also play a role in the overall expansion in production⁴⁸. Certification to standards such as Global GAP⁴⁹, Friend of the Sea, and ISO 14000 is becoming widespread.

⁴³ TurkStat.

⁴⁴ Statista, <https://www.statista.com/statistics/820953/per-capita-consumption-of-seafood-worldwide/>

⁴⁵ Our world in data/FAO, <https://ourworldindata.org/grapher/fish-and-seafood-consumption-per-capita>

⁴⁶ Eurofish.

⁴⁷ <https://www.undercurrentnews.com/2016/04/28/commerce-proposes-hike-in-shrimp-duties-for-india-lowers-vietnamese-rates-across-the-board-2-50/>

⁴⁸ Eurofish.

⁴⁹ Good Agricultural Practices.

4. The fisheries and aquaculture products market in the Republic of Korea

4.1 Introduction

The Republic of Korea (South Korea) is a country in East Asia, constituting the southern part of the Korean Peninsula, and covering a total area of 100.000 km². South Korea is mostly surrounded by water and has 2.413 kilometres of coastline bordering three seas. To the west is the Yellow Sea, to the south is the East China Sea, and to the east is the Sea of Japan. In South Korea, these are often referred to as the West, South and East Seas, respectively. In 2016, South Korea's population was estimated to be around 50,8 million. Endowed with an abundance of fisheries resources, Koreans have developed a distinct seafood culture⁵⁰.

Domestic consumption of seafood was estimated to reach 5,23 million tonnes in 2019. Thus, South Korea's per capita consumption of seafood is among the highest in the world, at almost 70 kilograms a year⁵¹. Catches are decreasing but this is offset by soaring production and consumption of seaweed products.

4.2 Fisheries production

In 2018, total capture fisheries production reached around 1,35 million tonnes, mostly from marine resources. Tuna and tuna-like species accounted for 28% of total catches (mostly skipjack and yellowfin tuna). Small pelagics (16%) and miscellaneous pelagic fish (14%) were the other most important species groups. The volume of Korean catches has experienced a significant decreasing trend over the past decade (-28% between 2009 and 2018), mostly due to cephalopods (-71%), small pelagics (-10%), demersal fish (-37%), and coastal fish (-47%)⁵².

Table 16. KOREAN CATCHES BY MAIN SPECIES GROUPS (volume in tonnes)

Product	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Tuna, bonito, billfish	376.422	364.344	283.260	347.426	311.543	363.409	374.098	397.965	337.208	378.780
Herring, sardine, anchovy	247.375	276.489	320.536	260.580	260.061	254.739	249.081	175.029	253.351	221.660
Miscellaneous pelagic fish	201.840	174.882	228.799	198.313	183.838	203.190	216.208	222.177	165.862	192.752
Squid, cuttlefish, octopus	313.469	256.652	269.059	292.475	281.487	356.246	334.223	167.951	165.037	91.542
Miscellaneous demersal fish	142.823	114.295	91.758	89.894	99.082	95.452	91.458	86.675	98.339	90.692
Miscellaneous coastal fish	114.080	111.484	132.849	96.572	95.161	77.057	70.475	56.928	51.126	60.308
Crabs, sea-spiders	73.314	75.432	69.813	73.340	76.421	71.857	65.950	56.284	50.210	43.823
Clams, cockles, arkshells	45.259	33.572	27.492	21.290	21.798	21.362	23.192	19.886	24.048	38.944
Oysters	24.254	22.686	24.985	18.424	12.751	19.794	21.484	14.076	14.539	38.341
Others	333.068	305.164	308.568	278.957	261.209	291.106	211.462	173.524	202.071	187.945
Total	1.871.904	1.735.000	1.757.119	1.677.271	1.603.351	1.754.212	1.657.631	1.370.495	1.361.791	1.344.787

Source: FAO.

⁵⁰ <https://ec.europa.eu/jrc/en/news/how-much-fish-do-we-consume-first-global-seafood-consumption-footprint-published>

⁵¹ Korea Rural Economy Institute (KREI) 2017 Food Balance Sheet, KMI Fishery Outlook 2020.

⁵² FAO.

4.3 Aquaculture production

In 2018, total Korean aquaculture production reached around 2,28 million tonnes, mostly from marine aquaculture. Seaweed accounted for three quarters of total production volume: mostly Japanese kelp, nori and wakame. The second most important species group farmed in Korea was molluscs, dominated by the Pacific cupped oyster (72%). They were followed by marine fishes, with 80.000 tonnes produced in 2018, mostly bastard halibut (also called olive flounder) and Korean rockfish. Diadromous fishes, freshwater fishes and crustaceans accounted for only a very small share of the production⁵³.

Over the 2009–2018 period, the volume of Korean aquaculture production has experienced a significant increasing trend, mostly due to seaweeds and oysters, whereas production of marine fishes has declined.

Table 17. KOREAN AQUACULTURE PRODUCTION BY MAIN SPECIES GROUPS (volume in tonnes)

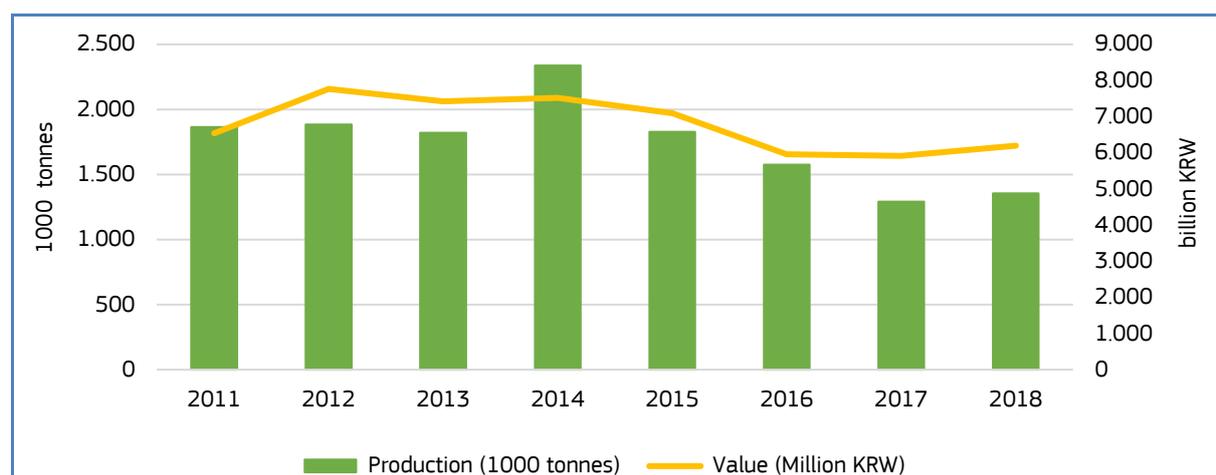
Product	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Aquatic plants	858.659	901.672	992.283	1.022.326	1.131.305	1.087.048	1.197.125	1.351.258	1.761.525	1.710.500
Molluscs	329.298	359.784	394.502	373.488	293.773	359.292	338.115	361.706	430.397	417.644
Marine fishes	109.507	80.133	72.333	76.210	73.036	83.318	85.251	79.755	86.114	80.145
Miscellaneous aquatic animals	16.438	15.014	19.165	17.672	16.161	15.906	30.558	39.314	28.324	43.326
Diadromous fishes	9.440	10.602	10.372	7.494	8.678	9.117	12.323	13.342	14.938	14.450
Freshwater fishes	6.458	7.271	7.807	9.198	6.645	8.221	7.547	8.027	8.235	8.260
Crustaceans	1.919	2.757	2.873	2.838	3.848	4.540	5.566	5.818	5.186	4.525
Total	1.331.719	1.377.233	1.499.335	1.509.226	1.533.446	1.567.442	1.676.485	1.859.220	2.334.719	2.278.850

Source: FAO.

4.4 Processing

Korean processed seafood products totalled 1,36 million tonnes in 2018, up 5,4% from 2017. However, this is still well below the production levels recorded just a few years previously, as there has been a decline in demand from the institutional and food service sectors. Seafood processors also face higher production costs due to minimum wage increases and higher raw material costs⁵⁴.

Figure 18. PROCESSED SEAFOOD PRODUCTION IN SOUTH KOREA



Source: USDA based on Korea Statistics Service (<http://kosis.kr>) – nominal values.

⁵³ FAO.

⁵⁴ United States – Department of Agriculture (https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?FileName=Korea%20Seafood%20Market%20Update%202020_Seoul%20ATO_Korea%20-%20Republic%20of_05-26-2020).

4.5 Imports and Exports

Despite high levels of production in both the fisheries and aquaculture sectors, the Korean trade deficit is significantly high and has followed an increasing trend over the last 5 years. It reached EUR 3 billion in 2019.

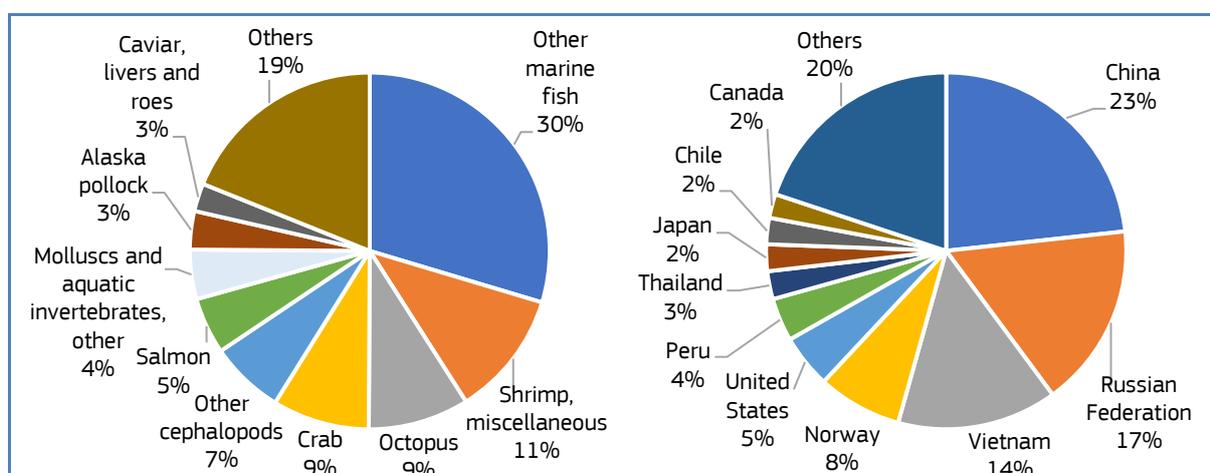
Table 18. KOREAN TRADE BALANCE FOR FISHERIES AND AQUACULTURE PRODUCTS (value in million EUR)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Imports	2.371	2.773	2.869	2.688	3.198	3.911	4.099	4.447	4.922	4.953
Exports	1.204	1.449	1.687	1.451	1.378	1.504	1.676	1.762	1.699	1.862
Balance	-1.167	-1.324	-1.182	-1.237	-1.820	-2.407	-2.423	-2.684	-3.223	-3.090

Source: EUMOFA, based on elaboration of data from Global Trade Atlas - IHS Markit.

In 2019, Korean imports of FAPs (fisheries and aquaculture products) amounted to 1,5 million tonnes, with a value of almost EUR 5 billion. In value terms, frozen products accounted for 58% of total imports, followed by live/fresh products (20%) and prepared/preserved products (12%). The main commercial species imported were other marine fish⁵⁵ (30% of total value), miscellaneous shrimps (11%), octopus and crab (9% each). The main countries of origin in terms of value were China (23%, mostly other marine fish and cephalopods), Russia (17%, dominated by miscellaneous shrimps), Vietnam (14%, dominated by miscellaneous shrimps), Norway (14%) and the USA (5%, dominated by Alaska pollock).

Figure 19. MAIN COMMERCIAL SPECIES (LEFT) AND MAIN ORIGINS (RIGHT) OF KOREAN IMPORTS IN 2019 IN TERMS OF VALUE

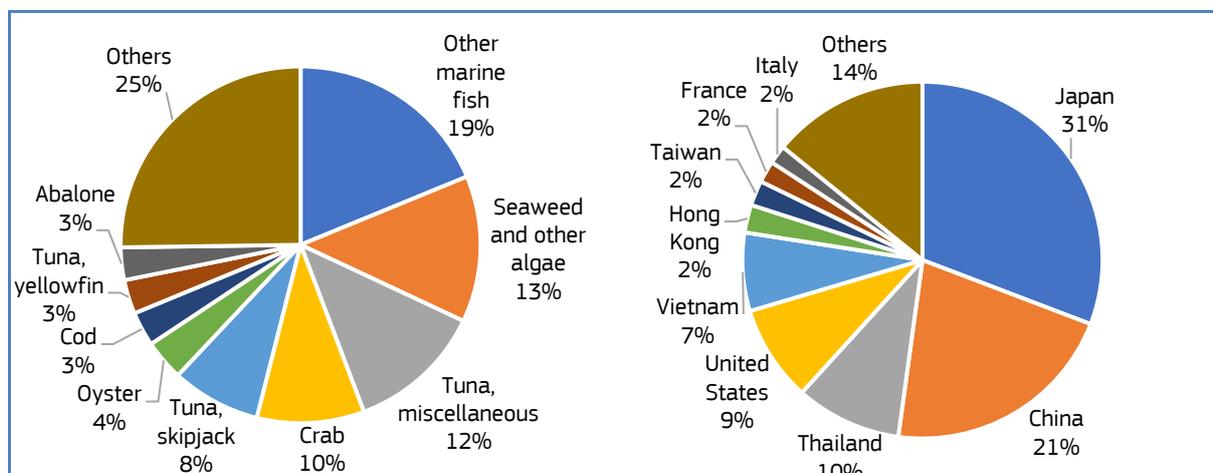


Source: EUMOFA, based on elaboration of data from Global Trade Atlas - IHS Markit.

Korean exports of FAPs in 2019 reached 623.894 tonnes, with a value of EUR 1,9 billion. In value terms, frozen products accounted for 53% of total exports, followed by products in unspecified preservation state (18%), live/fresh products (18%) and prepared/preserved products (11%). The main commercial species exported were other marine fish (19% of total export value), seaweed and other algae (13%), miscellaneous tuna (12%) and crab (10%). The main destinations in value terms were Japan (31%, mostly miscellaneous tunas, other marine fish and seaweed), China (21%, dominated by other marine fish, crab, cod and seaweed), Thailand (10%, mostly skipjack tuna and seaweed) and the USA (9%, dominated by other marine fish and toothfish).

⁵⁵ "Other marine fish" is an EUMOFA aggregation of several species of lesser commercial importance at EU level.

Figure 20. MAIN COMMERCIAL SPECIES (LEFT) AND MAIN DESTINATIONS (RIGHT) OF KOREAN EXPORTS IN 2019 IN TERMS OF VALUE



Source: EUMOFA, based on elaboration of data from Global Trade Atlas - IHS Markit.

4.6 Trade with the EU

South Korea is not among the EU's major partners for fisheries and aquaculture products. The EU trade balance with Korea in value terms has been relatively equal over the last decade, although progressively going from deficit to positive balance, with the profit from EU exports minus cost of imports reaching EUR 30 million in 2019.

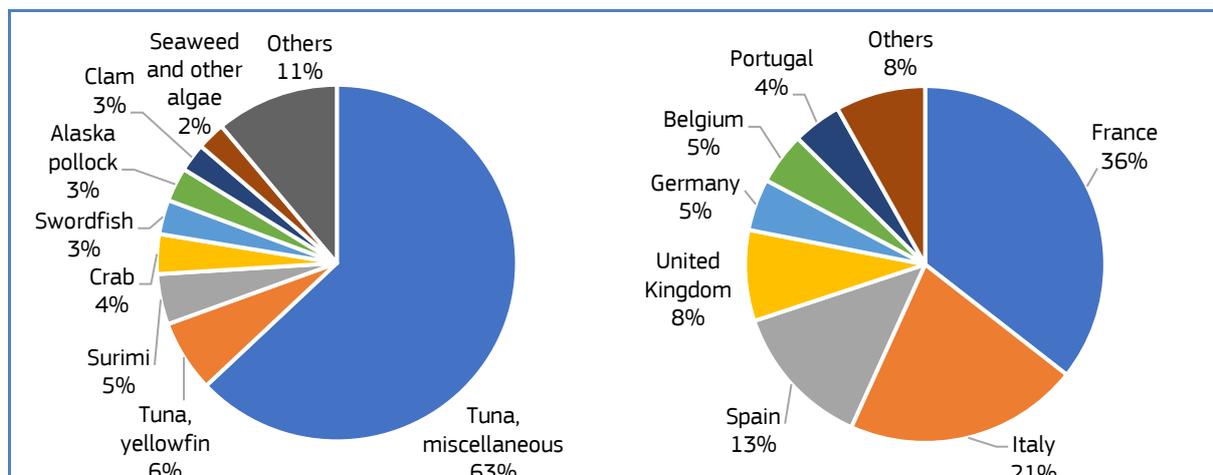
Table 19. EU TRADE BALANCE WITH SOUTH KOREA FOR FISH AND SEAFOOD (value in million EUR)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Exports to South Korea	48	46	59	69	76	114	124	158	127	144
Imports into the EU	86	75	79	63	84	103	125	144	125	115
Balance	-38	-30	-20	6	-8	11	-1	13	2	30

Source: EUMOFA based on Eurostat-COMEXT.

In 2019, EU imports from South Korea amounted to 16.686 tonnes, reaching a value of EUR 115 million. In value terms, frozen products accounted for 84% of total imports, followed by prepared/preserved products (13%). Miscellaneous tuna products dominated imports into the EU (63% of total value). The main destinations in value terms were France (36%, mostly miscellaneous tuna), Italy (21%, mostly miscellaneous tuna), Spain (13%, dominated by yellowfin tuna), and UK (8%, dominated by miscellaneous tuna).

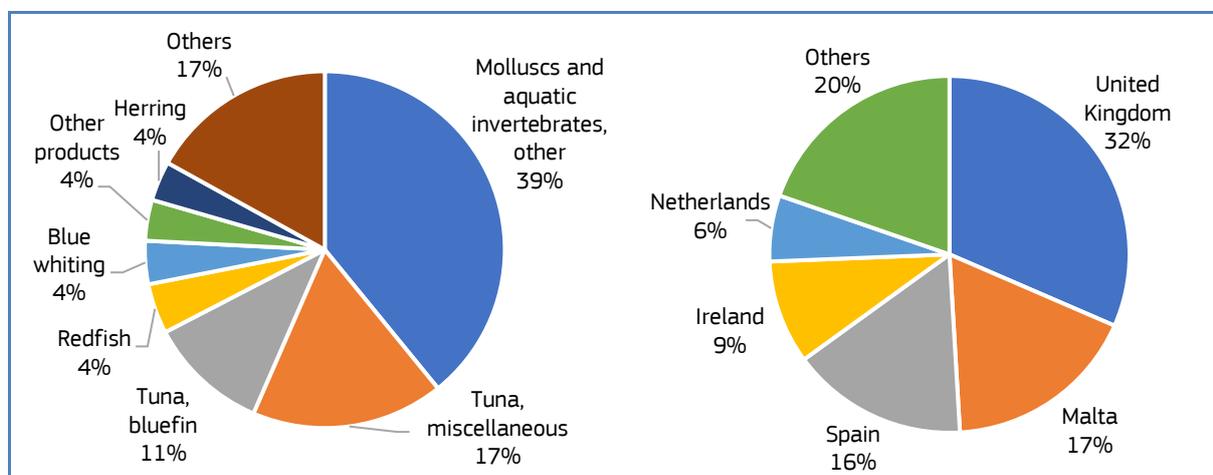
Figure 21. MAIN COMMERCIAL SPECIES (LEFT) AND MAIN DESTINATIONS (RIGHT) OF EU IMPORTS FROM KOREA IN 2019 IN TERMS OF VALUE



Source: EUMOFA based on Eurostat-COMEXT.

The same year, EU exports to South Korea reached 50.398 tonnes with a value of EUR 144 million. In value terms, frozen products accounted for 57% of total exports, followed by prepared/preserved products (30%) and live/fresh products (18%). The main commercial species exported were other molluscs and aquatic invertebrates (39% of total export value), miscellaneous tuna (17%), and bluefin tuna (11%). The main origins in value terms were the UK (32%, mostly other molluscs), Malta (17%, mostly bluefin and miscellaneous tuna), Spain (16%, mostly miscellaneous tuna) and Ireland (9%, dominated by other molluscs).

Figure 22. MAIN COMMERCIAL SPECIES (LEFT) AND MAIN ORIGINS (RIGHT) OF EU EXPORTS TO KOREA IN 2019 IN TERMS OF VALUE



Source: EUMOFA based on Eurostat-COMEXT.

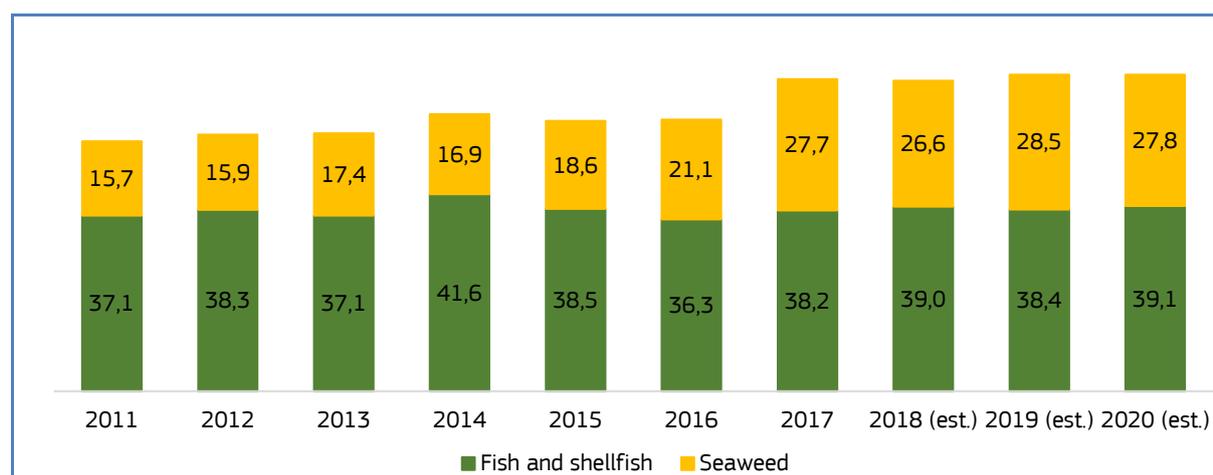
4.7 Consumption

Despite declining production, however offset by increased imports, Korean seafood consumption has continued to grow in recent years, particularly thanks to communication efforts by the Korean seafood industry to promote seafood as a healthy alternative to red meat. The self-sufficiency rate was estimated at 73,8% in 2019, up by 10% compared to 2016 but down by 3% compared to 2013⁵⁶. Seafood businesses have also worked to diversify fish products, improve quality, and research new processing technologies. The major seafood species consumed in Korea are shrimp, anchovy, squid, Alaska pollock, mackerel, tuna, hairtail, flat fish, oyster and octopus. The most important factors for Korean consumers are freshness, origin, taste, cost, and food safety. Total domestic consumption of seafood was estimated at 5,23 million tonnes in 2019, with close to 74% of products coming from domestic markets thanks to the increase in aquaculture production.

Demand for precooked, prepared and preserved foods has been growing quickly. This includes processed ready-to-eat seafood products and prepared meals incorporating seafood ingredients. The trend has been driven by a steady rise in the labour participation rate for women and the growing number of single-person households⁵⁷.

Per capita fish and shellfish consumption in South Korea has remained steady over the last decade despite declining consumption by young people. In contrast, per capita seaweed consumption has nearly doubled over the last decade. As a result, the Korean fish and seafood per capita total annual consumption is estimated around 70 kg. The Korean population eats fresh, chilled and frozen fish, in that order of preference. Some fish are consumed raw (“Hoi”, or “sashimi”), and reach a price premium.

Figure 23. KOREAN ANNUAL PER CAPITA CONSUMPTION OF SEAFOOD PRODUCTS (volume in kg)



Source: Korea Rural Economy Institute (KREI) 2017 Food Balance Sheet, KMI Fishery Outlook 2020.

⁵⁶ Korean Fisheries Yearbook 2019, KMI Fishery Outlook 2020.

⁵⁷ United States – Department of Agriculture

(https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Korea%20Seafood%20Market%20Update%202020_Seoul%20ATO_Korea%20-%20Republic%20of_05-26-2020)

5. Fisheries and aquaculture in Thailand

5.1 Introduction

Thailand is a kingdom located in Southeast Asia, bordering Cambodia, Myanmar, Burma and Malaysia. The country's long coastline extends along the Gulf of Thailand in the east, and the Andaman Sea (Indian Ocean) in the west, with several territorial islands close to its shore.

The population of Thailand is approximately 70 million people (2020)⁵⁸. As a coastal state, the seafood industry plays a particularly important role: it is estimated that more than 650,000 people worked in the seafood industry in 2017⁵⁹, and the low price of seafood means that it is the most accessible source of animal protein for the country's citizens⁶⁰.

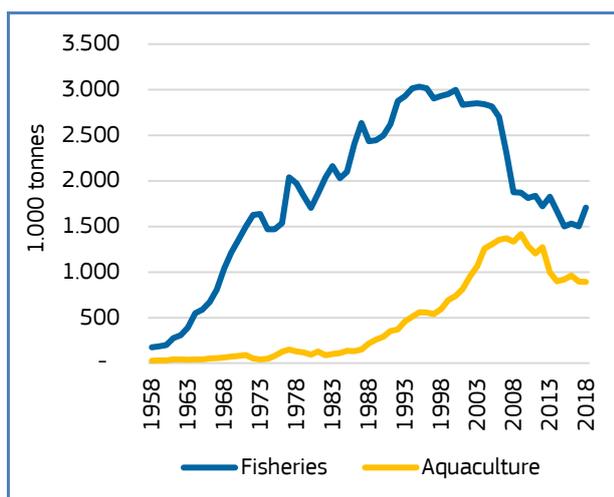
The majority of Thailand's seafood production is derived from fisheries, with aquaculture accounting for roughly 35% of total production. Despite producing lower volumes, aquaculture dominates in terms of value. Marine species are the most important for both capture and aquaculture⁶¹ with tuna and shrimp as the primary contributors for capture and aquaculture production, respectively. In terms of trade, Thailand ranks amongst the top 10 seafood trading countries in the world, in terms of both imports and exports⁶².

Thailand's fishing industry is dominated by small-scale, artisanal vessels. Similarly, the country's aquaculture industry has a fragmented infrastructure which is largely comprised of small operations.

5.2 Fisheries and aquaculture

Total volume of wild catch steadily increased from 1958 until the year 2000, when the trend began to decline. Volume of wild catch has since continued to decrease. Conversely, production in the aquaculture sector remained stable until 1988 when volume began to increase. The trend peaked in 2010, after which total production volume fell by 30%.

Figure 24. WILD CATCH AND AQUACULTURE PRODUCTION IN THAILAND (volume in 1.000 tonnes)



Source: FAO.

Overfishing could be identified as a possible cause for the decline in production volume. Poorly regulated fishing has resulted in limited stock sizes for several main commercial species⁶³ (MCS), which in turn has reduced catch sizes from the year 2000 onwards. In the absence of large catch volumes from fisheries, the aquaculture sector has flourished, gradually supplying larger quantities which have stabilised in recent years.

⁵⁸ <https://www.worldometers.info/world-population/thailand-population/>

⁵⁹ <http://www.seafdec.org/fisheries-country-profile-thailand/>

⁶⁰ Ibidem.

⁶¹ <http://www.seafdec.org/fisheries-country-profile-thailand/>

⁶² <https://research.rabobank.com/far/en/sectors/animal-protein/world-seafood-trade-map.html>

⁶³ EUMOFA aggregation for species (Metadata 2, Annex 3: <https://eumofa.eu/supply-balance-and-other-methodologies>)

Fisheries

According to FAO, the total volume from wild catch in Thailand in 2018 was 1,71 million tonnes. From 2014 to 2018 the total annual volume of wild catch remained relatively stable, yielding a modest increase of roughly 2% throughout the period. Marine fishes nei ('not elsewhere included'), anchovies, and freshwater species nei were the largest categories in terms of volume⁶⁴.

Table 20. WILD CATCH IN THAILAND, MAIN SPECIES (volume in 1.000 tonnes)

Species	2014	2015	2016	2017	2018
Marine fishes nei	459	406	389	371	448
Anchovy	128	102	130	121	165
Freshwater fishes nei	94	97	98	96	98
Common squid nei	68	68	86	68	87
Indian scad	36	40	55	56	83
Carangidae	44	51	68	97	83
Sardinella	75	81	73	72	79
Indian mackerel	50	47	50	49	66
Other species	716	610	583	570	599
Total	1.670	1.502	1.532	1.500	1.708

Source: FAO.

Historically, Thailand's fisheries sector has faced problems as a result of overfishing and conflict between fishermen over limited fish stocks. Elevated costs of labour and fuel, in conjunction with low bargaining power, lead to reduced profitability and further exacerbate the situation.

Illegal, unreported, and unregulated (IUU) fishing is a significant problem in Thailand. This leads to over-exploited fish stocks and has resulted in restrictions being imposed for several species. In 2015, the European Union issued a warning that they would impose a trade ban if Thai authorities did not take action against IUU fishing. The EU subsequently issued a "yellow card", highlighting that Thailand was not taking sufficient steps to combat IUU fishing. This may have led to a trade ban if the necessary measures were not implemented within the set period.

Following improvements to fishing regulation and enforcement, the EU rescinded the yellow card⁶⁵. Such improvements heralded benefits to the industry as a whole, and could continue to change market dynamics and improve the sustainability of threatened species (e.g. tuna)⁶⁶.

Aquaculture

In 2018, Thailand's aquaculture production surpassed 890.000 tonnes, according to FAO. From 2014 to 2016, total aquaculture production in Thailand increased by 7%. Conversely, the period from 2017 to 2018 yielded a decrease of 8% in total production. Overall, total production of aquaculture products has slightly decreased from 2014 to 2018 in terms of volume. The most heavily-farmed species in Thailand is whiteleg shrimp (*Litopenaeus vannamei*), which accounted for 39% of total production in 2018, followed by Nile tilapia and African bighead catfish.

⁶⁴ The first and the latter are general categories for various types of species, which is "not elsewhere included", thereof nei.

⁶⁵ https://ec.europa.eu/fisheries/press/commission-lifts-%E2%80%9Cyellow-card%E2%80%9D-thailand-its-actions-against-illegal-fishing_en

⁶⁶ http://agri.eco.ku.ac.th/cv_detail/Kulapa_Supongpa_%20Kuldilok_s_Thesis.pdf

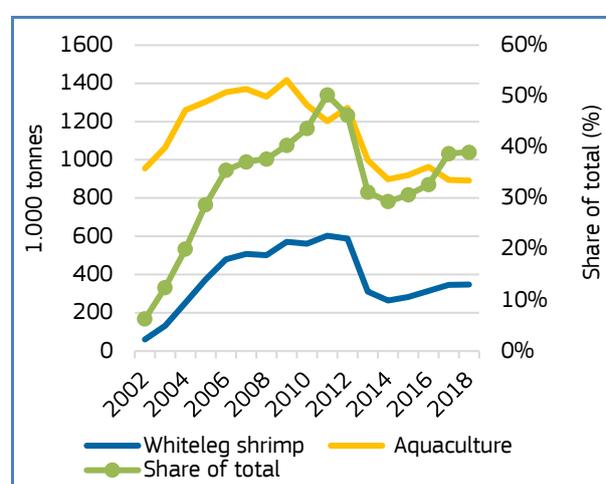
Table 21. AQUACULTURE PRODUCTION IN THAILAND, MAIN SPECIES (volume in 1.000 tonnes)

Species	2014	2015	2016	2017	2018
Whiteleg shrimp	263	282	314	346	347
Nile tilapia	190	203	208	218	211
African bighead catfish (hybrid) ⁶⁷	114	109	112	105	112
Green mussel	117	116	115	50	45
Blood cockle	54	59	62	26	27
Silver barb	29	30	31	24	25
Giant river prawn	17	16	15	21	22
Barramundi	17	17	18	20	20
Other species	98	88	88	83	81
Total	899	920	963	893	890

Source: FAO

Production volume of whiteleg shrimp has fluctuated since farming began in the early 2000s. In 2012, the shrimp industry experienced an extensive disease outbreak. This led to a stock reduction of over 50% and caused closures to aquaculture sites used for shrimp farming. The mortality from disease and reduced stocking, combined with export bans and unfavourable trade terms reduced Thailand's production by more than half in 2013 and 2014⁶⁸. In 2014, the Seafood Task Force, an international industry coalition, was formed to lead Thailand's seafood supply chain toward a more sustainable pathway⁶⁹. In 2016, the first whiteleg shrimp farm in Thailand was granted Aquaculture Stewardship Council (ASC) certification⁷⁰. Since then, an additional eight farms have received ASC certification⁷¹, indicating an increased focus on sustainably-farmed prawns with reduced impact on crucial habitats.

Figure 25. COMPARISON OF WHITELEG SHRIMP FARMING AND TOTAL AQUACULTURE PRODUCTION IN THAILAND (volume in 1000 tonnes)



Source: FAO, Kontali.

Whiteleg shrimp accounts for a significant portion of total aquaculture production in Thailand, meaning that total production volumes from aquaculture are highly correlated with the welfare of the shrimp farming industry. Prevalence of disease in aquaculture has caused issues in the long term, and was a key driver behind industry players switching production from giant tiger prawn (*Penaeus monodon*) to whiteleg shrimp⁷².

⁶⁷ The African bighead catfish is a hybrid between North African catfish (*Clarias gariepinus*) and bighead catfish (*C. macrocephalus*).

⁶⁸ <https://media-publications.bcg.com/BCG-A-Strategic-Approach-to-Sustainable-Shrimp-Production-Thailand-July-2019.pdf>

⁶⁹ Ibidem

⁷⁰ <https://www.asc-aqua.org/news/latest-news/asc-welcomes-first-certified-shrimp-farm-in-thailand/>

⁷¹ <https://www.asc-aqua.org/find-a-farm/>

⁷² <https://www.aquaculturealliance.org/advocate/thailands-white-shrimp-revolution/>

5.3 Imports

In 2019, imports of fisheries and aquaculture products to Thailand amounted to 1,98 million tonnes with a value of EUR 3,35 billion. The most imported species was skipjack tuna (486.075 tonnes, valued at EUR 604 million). Salmon was the second most imported species, coming primarily from Norway and Chile.

A large proportion of skipjack tuna imports come as landings by foreign vessels from Taiwan, South Korea, and The Federal States of Micronesia. It is imported to Thailand for processing (canning) before being re-exported. Total imports of tuna by tuna canning factories is estimated to amount to 700.000-800.000 tonnes annually⁷³.

Table 22. IMPORTS TO THAILAND BY SPECIES (volume in 1000 tonnes, value in million EUR)

Main commercial species	2015		2016		2017		2018		2019	
	Volume	Value								
Tuna, skipjack	479	514	529	681	475	748	588	754	486	604
Salmon	48	192	40	194	49	262	47	259	54	288
Tuna, albacore	34	93	38	100	44	115	47	133	53	187
Tuna, miscellaneous	38	102	52	133	50	109	54	127	69	164
Tuna, yellowfin	127	161	122	181	123	227	105	174	84	145
Mackerel	94	78	114	102	88	86	105	100	119	139
Other	777	1.185	951	1.461	1.095	1.688	1.180	1.839	1.118	1.826
Total	1.597	2.325	1.846	2.852	1.923	3.236	2.125	3.387	1.983	3.352

Source: EUMOFA.

China, Vietnam, Taiwan, India, and Norway are the top five countries in terms of import value to Thailand. Norway and Taiwan provide salmon and skipjack tuna, while China supplies substantial volumes of cephalopods and mackerel. Vietnam is the second largest supplier to Thailand, mainly exporting various types of marine fishes and freshwater catfish.

Table 23. IMPORTS TO THAILAND BY COUNTRY OF ORIGIN (volume in 1000 tonnes, value in million EUR)

Country	2015		2016		2017		2018		2019	
	Volume	Value								
China	238	348	266	424	198	364	194	358	206	407
Vietnam	101	212	146	271	130	256	127	275	129	279
Taiwan	145	181	152	225	129	232	136	218	133	221
India	57	121	77	168	128	243	150	295	91	218
Norway	27	99	29	132	28	143	31	148	37	199
Japan	111	151	86	133	94	151	149	205	128	195
Myanmar	60	29	253	103	325	143	328	156	330	184
Korea, South	91	110	98	174	71	183	88	188	102	172
United States	126	190	104	184	108	212	94	210	77	167
Pakistan	26	47	27	52	48	76	56	98	78	150
Other countries	614	838	605	984	664	1.231	772	1.236	671	1.160
Total	1.597	2.325	1.846	2.852	1.923	3.236	2.125	3.387	1.983	3.352

Source: EUMOFA.

⁷³ <http://www.fao.org/fishery/facp/THA/en>

5.4 Processing

The fish processing industry in Thailand has grown in recent years, and a significant amount of the country's population is employed in processing plants (184.000 people)⁷⁴. The most common plants are small and traditional, and freezing and canning are the main methods used⁷⁵.

Large volumes of seafood imported to Thailand are processed before being re-exported (primarily tuna)⁷⁶.

According to the United Nations' International Labour Organization (ILO), recent improvements have been made to working conditions in Thailand's fishing and seafood processing sectors. Such changes may be a result of EU pressure on Thailand regarding IUU fishing⁷⁷, although the ILO did find some outstanding issues regarding forced labour, indicating that the industry still has areas for improvement⁷⁸.

5.5 Exports

Two major MCS, namely miscellaneous tuna and miscellaneous shrimp, accounted for 67% of total export value and 55% of total export volume from Thailand in 2019.

Table 24. EXPORTS FROM THAILAND BY SPECIES (volume in 1000 tonnes, value in million EUR)

Main commercial species	2015		2016		2017		2018		2019	
	Volume	Value								
Tuna, miscellaneous	566	1.802	565	1.821	489	1.845	518	1.938	537	1.970
Shrimp, miscellaneous	170	1.479	207	1.763	213	1.807	188	1.527	180	1.491
Salmon	25	179	22	148	22	164	17	144	20	162
Miscellaneous small pelagics	76	145	56	110	53	101	65	125	61	137
Fishmeal	156	184	154	157	79	78	105	109	108	102
Mackerel	36	74	30	67	27	59	33	75	33	101
Other	447	1.205	403	1.184	396	1.209	388	1.161	366	1.184
Total	1.476	5.069	1.437	5.251	1.278	5.262	1.313	5.080	1.305	5.147

Source: EUMOFA.

Thailand's main export markets are the United States and Japan, which together accounted for 29% of export volume and 42% of export value in 2019. These two markets are followed by China, accounting for 10% of export volume and 9% of export value. According to Thailand's export statistics, the EU accounted for 4% of the export volume and 5% of the value in 2019.

⁷⁴ <http://www.seafdec.org/fisheries-country-profile-thailand/>

⁷⁵ <http://www.fao.org/fishery/facp/THA/en>

⁷⁶ *Ibidem*.

⁷⁷ https://ec.europa.eu/commission/presscorner/detail/en/IP_19_61

⁷⁸ <https://www.seafoodsource.com/news/environment-sustainability/ilo-finds-improvements-in-thailand-seafood-sector>

Table 25. EXPORTS FROM THAILAND BY DESTINATION COUNTRY (volume in 1000 tonnes, value in million EUR)

Country	2015		2016		2017		2018		2019	
	Volume	Value								
United States	196	1.139	202	1.236	201	1.284	183	1.031	190	1.075
Japan	205	1.003	195	1.043	175	1.029	186	1.033	192	1.062
China	109	201	119	224	83	215	105	318	136	450
Australia	60	267	65	286	66	314	68	313	59	280
Canada	44	214	48	242	42	228	42	205	39	200
Libya	21	67	30	97	24	87	25	93	38	134
Saudi Arabia	35	106	33	101	27	92	44	123	44	129
South Korea	28	145	24	130	26	158	25	148	21	126
Egypt	73	160	63	144	30	73	52	139	47	124
Italy	30	120	26	126	22	118	21	109	20	113
Other countries	674	1.648	632	1.622	582	1.664	562	1.568	517	1.454
Total	1.476	5.069	1.437	5.251	1.278	5.262	1.313	5.080	1.305	5.147

Source: EUMOFA.

5.6 EU-28 imports from Thailand

EU imports from Thailand amounted to 63.000 tonnes in 2019, with a value of EUR 324 million. Squid (mainly frozen) was the most imported MCS in terms of value and was primarily imported by Italy (91% of the total value). In terms of volume, skipjack tuna was the largest MCS (and the second largest in terms of value). The United Kingdom, Finland, the Netherlands, France and Sweden were the main importers of skipjack tuna, respectively accounting for 28%, 15%, 14%, 10%, and 9% of the total volume.

Table 26. EU-28 IMPORTS FROM THAILAND, BY SPECIES (volume in 1000 tonnes, value in million EUR)

Main commercial species	2015		2016		2017		2018		2019	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Squid	17	85	16	95	15	107	13	85	13	87
Tuna, skipjack	34	124	29	106	23	104	16	74	14	64
Shrimp, warmwater	3	28	3	30	3	30	3	27	3	29
Shrimp, miscellaneous	6	66	5	52	4	44	4	36	3	27
Surimi	10	27	9	23	9	24	10	24	9	23
Tuna, miscellaneous	15	46	9	31	8	28	7	24	6	22
Other	28	112	24	96	20	78	20	81	16	71
Total	114	489	96	433	83	415	72	351	63	324

Source: EUMOFA.

Table 27 depicts the preservation state of the various species and products exported to the EU from Thailand. The majority of products are prepared/preserved or frozen. Prepared products include various types of cuts, fillets, or packaging states (e.g. canned tuna).

Table 27. EXPORTS FROM THAILAND TO EU-28 MEMBER STATES, BY PRESERVATION STATE (volume in 1000 tonnes, value in million EUR)

Preservation	2015		2016		2017		2018		2019	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Prepared/Preserved	81	313	65	256	56	234	46	190	40	167
Frozen	31	162	28	162	25	165	24	148	22	143
Other	2	14	2	15	2	16	1	13	1	13
Total	114	489	96	433	83	415	72	351	63	324

Source: EUMOFA.

5.7 Trade balance between EU-28 and Thailand

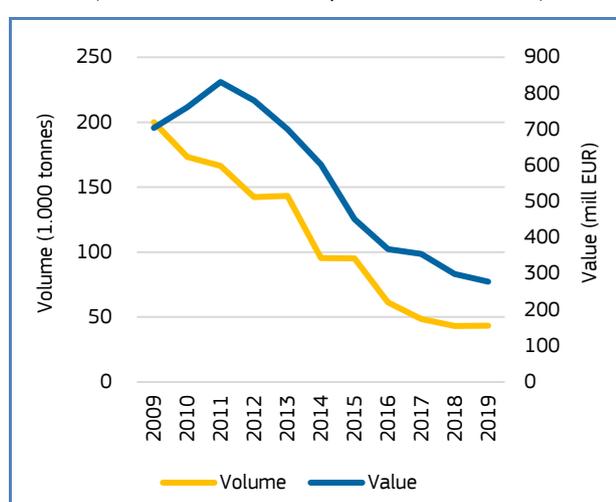
The EU trade deficit with Thailand has been narrowing over the recent years due to decreasing EU import from Thailand. The decrease concerns all Commodity Groups, but most prominently tuna and tuna-like species, crustaceans and cephalopods, which accounted for more than 80% of the decrease in terms of volume.

In 2019, EU import of tuna and tuna-like species from Thailand was 86.000 tonnes lower compared to 2009. This decline is more than offset by increased import from Ecuador, Papa New Guinea and China.

EU imports of crustaceans from Thailand were almost 47.000 tonnes lower in 2019 compared to 2009. Over the same period, imports from Ecuador, Argentina and Vietnam increased by almost 100.000 tonnes.

Regarding cephalopods, EU imports from Thailand had decreased by 19.000 tonnes from 2009 to 2019, while imports from Peru increased 60.000 tonnes.

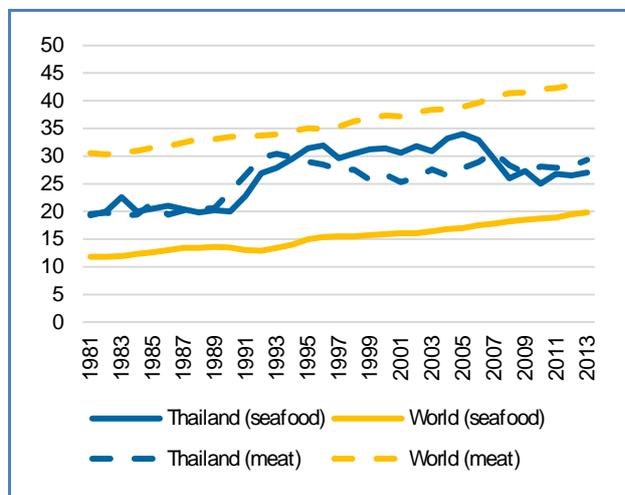
Figure 26. THAILAND'S TRADE BALANCE WITH EU-28 (volume in 1000 tonnes, value in million EUR)



Source: EUMOFA.

5.8 Consumption

Figure 27. CONSUMPTION PER CAPITA OF SEAFOOD IN THAILAND VS. THE REST OF THE WORLD (volume in kilogram)



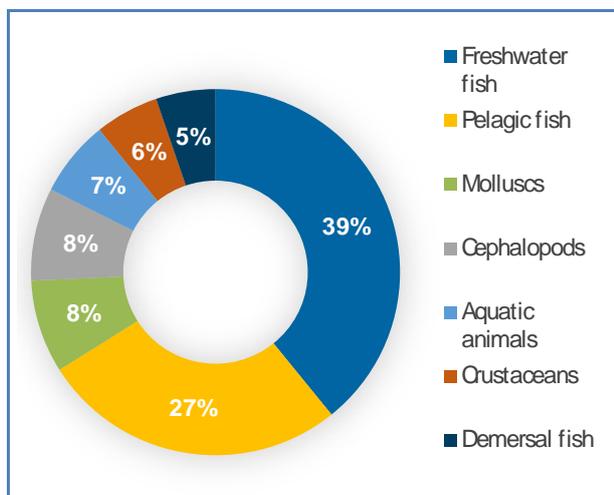
Source: FAO.

Figure 27 depicts consumption per capita of seafood and meat in Thailand relative to the rest of the world from 1981 up until 2013. While the global trend has shown increasing consumption per capita during the period, Thailand's consumption per capita has fluctuated, with an overall increase.

Furthermore, compared to the world average, seafood is a relatively more important food source than meat in Thailand. While seafood consumption per capita is around the same level or higher than meat consumption in Thailand, the latter is more than twice that of seafood in the rest of the world.

Consumers in Thailand have a low consumption of marine fish, primarily opting for freshwater and pelagic species. Tilapia is the preferred freshwater species, followed by Thai silver barb and striped snakehead. It is worth noting that there are significant geographical trends within fish consumption in Thailand, with people in coastal areas consuming significantly more seafood than those inland.

Figure 28. SHARE OF CONSUMPTION BY CATEGORY IN THAILAND IN 2013



Source: FAO.

6. Fisheries and aquaculture in Peru

6.1 Introduction

Peru is a republic located in western South America. It shares borders with Ecuador, Colombia, Brazil, Bolivia, and Chile, and its 3.100 km long coastline⁷⁹ borders the Pacific Ocean.

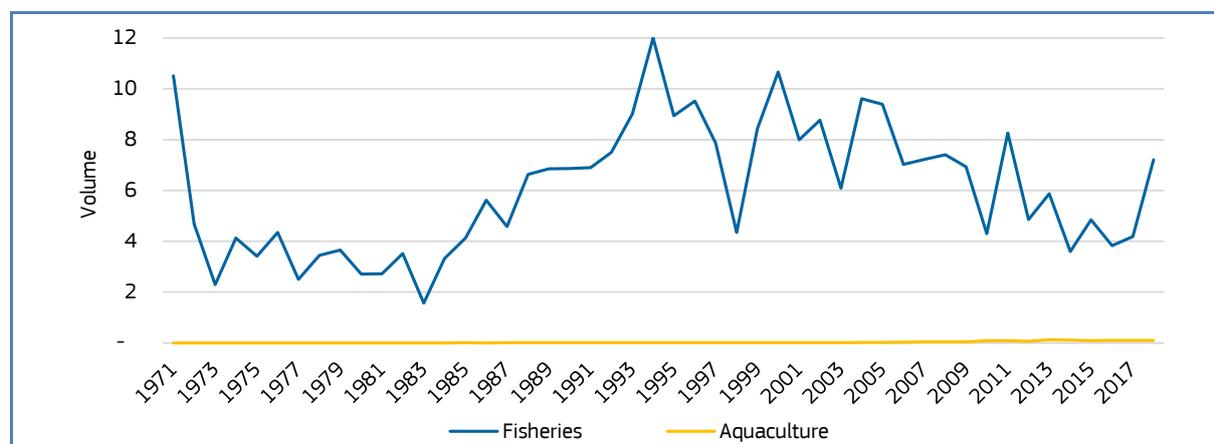
The population of Peru reached 33 million in 2020⁸⁰. The Peruvian people consume large amounts of seafood, especially compared to neighbouring countries⁸¹. Furthermore, the fisheries sector in Peru is a significant provider of jobs (about 232.000 in 2014). Consequently, the seafood industry is important for the economy of the country, and contributes 1-1,5% of Peru's Gross Domestic Product (GDP)⁸².

An upwelling system⁸³ off Peru's coast makes the area highly productive in terms of fisheries. The nutrient-rich waters enable Peru to be the third largest fishery nation in the world in terms of volume, mainly due to landings of anchoveta, which make Peru the world's largest provider of fishmeal. Most of Peru's seafood production derives from fisheries, with aquaculture accounting for only about 1,4% of total production volume. Even though fisheries dominate in terms of volume, the Peruvian aquaculture industry has great potential for growth⁸⁴. Marine species are the most important for fisheries, whereas freshwater species represent the majority of aquaculture production.

6.2 Fisheries and aquaculture

From a historical point of view, there are large differences between the development of fisheries and aquaculture in Peru. Output from fisheries is highly fluctuating and high-volume, whereas aquaculture is more stable but produces smaller volumes. The fluctuating output of fisheries is due to the effects of El Niño, namely temperature oscillations that greatly affect wild stocks⁸⁵. For instance, the Peruvian anchoveta is sensitive to higher temperatures and stocks can even collapse during El Niño events⁸⁶.

Figure 29. WILD CATCHES AND AQUACULTURE PRODUCTION (volume in million tonnes)



Source: FAO.

⁷⁹ <http://www.fao.org/3/a-i1140e.pdf#page=343>

⁸⁰ <https://www.worldometers.info/world-population/peru-population/>

⁸¹ <https://ourworldindata.org/grapher/fish-and-seafood-consumption-per-capita?country=-BRA>

⁸² <https://seafood-tip.com/sourcing-intelligence/countries/peru/>

⁸³ More information on upwelling, definition and consequences for fish resources might be useful in footnote, see International Maritime Organization website: <http://www.imo.org/EN/Pages/Default.aspx>

⁸⁴ http://www.fao.org/fishery/legalframework/nalo_peru/en

⁸⁵ <https://doi.org/10.4060/ca9229en>

⁸⁶ <http://www.fao.org/3/ca8348en/CA8348EN.pdf>

Fisheries

According to FAO, wild catches in Peru amounted to 7,7 million tonnes in 2018, making Peru the world's third largest fisheries nation. From 2014 to 2018, production was highly fluctuating, mainly due to the vast increase in catches of anchoveta, which accounted for an increased share of total catches (from 65% in 2014 to 86% in 2018).

Table 28. **WILD CATCHES IN PERU, MAIN SPECIES (volume in 1.000 tonnes)**

Species	2014	2015	2016	2017	2018
Anchoveta (Peruvian anchovy)	2.322	3.770	2.855	3.297	6.195
Jumbo flying squid	612	518	323	296	362
Eastern Pacific bonito	41	93	79	101	82
South Pacific hake	64	56	72	80	76
Pacific chub mackerel	74	50	165	113	72
Chilean jack mackerel	82	23	15	10	58
Marine fishes nei	81	21	41	7	52
Common dolphinfish	55	62	40	31	48
Penaeus shrimps nei	29	36	32	21	39
Other species	239	215	206	230	224
Total	3.599	4.844	3.828	4.186	7.208
Change from previous year (%)	-39 %	+35 %	-21 %	+9%	+72%

Source: FAO.

The Peruvian fisheries sector may be divided into two sub-sectors: the pelagic large-scale modern fleet and the small-scale artisanal fleet⁸⁷. The latter makes up the majority of fishing vessels (90%), accounting for about 18.000 vessels in the Pacific Ocean⁸⁸.

Overall fisheries production in Peru is highly related to changes in anchoveta catch. The Peruvian anchoveta is a small pelagic fish that takes advantage of the upwelling region of the Pacific Ocean⁸⁹. Globally, anchoveta is the most important fisheries species, and Peru contributed 88% of the volume caught in 2018. Despite these large volumes, anchoveta only contributes about 31% of the value and 13% of the employment in the Peruvian seafood sector⁹⁰.

Peruvian anchoveta fisheries are regulated by the Peruvian government. The Ministry of Production takes action if the stock is dominated by juvenile individuals⁹¹ and overfishing is limited by catch quotas⁹². In 2018, they shared their surveillance information on fishing activity in their waters with the free access platform Global Fishing Watch⁹³. Other sustainability efforts include their aim to make their anchovy fisheries certified⁹⁴.

Peru is also working towards certification for jumbo flying squid fisheries⁹⁵, which is the second most productive species in the whole south-east Pacific⁹⁶ and the most important for Peruvian artisanal fishers⁹⁷.

⁸⁷ <http://www.fao.org/3/a-i1140e.pdf> - page=343

⁸⁸ <https://seafood-tip.com/sourcing-intelligence/countries/peru/>

⁸⁹ <https://oceana.org/marine-life/ocean-fishes/peruvian-anchoveta>

⁹⁰ https://www.lenfestocean.org/~media/legacy/lenfest/pdfs/peruvian_anchovies_eng_web.pdf

⁹¹ <https://globalfishingwatch.org/news-views/worlds-largest-commercial-fishery-publicly-tracked-on-global-fishing-watch-map/>

⁹² <https://seafood-tip.com/sourcing-intelligence/countries/peru/>

⁹³ <https://rpp.pe/blog/mongabay/peru-comparte-con-el-mundo-sus-datos-de-vigilancia-pesquera-noticia-1162105>

⁹⁴ <https://www.undercurrentnews.com/2020/06/29/peru-anchovy-fishery-almost-ready-to-start-msc-assessment/>

⁹⁵ <https://www.undercurrentnews.com/2017/04/07/peru-to-launch-worlds-largest-giant-squid-certification-project/>

⁹⁶ <https://doi.org/10.4060/ca9229en>

⁹⁷ <https://fisheryprogress.org/fip-profile/peru-jumbo-flying-squid-jig>

Aquaculture

According to FAO, the total volume of aquaculture production in Peru amounted to 103.000 tonnes in 2018. Rainbow trout was the primary contributor, followed by whiteleg shrimp and Peruvian calico scallop. Both rainbow trout and whiteleg shrimp farmed production have shown a slight increase since 2014, while farmed production of scallop dropped.

Table 29. AQUACULTURE PRODUCTION IN PERU, MAIN SPECIES (volume on 1.000 TONNES)

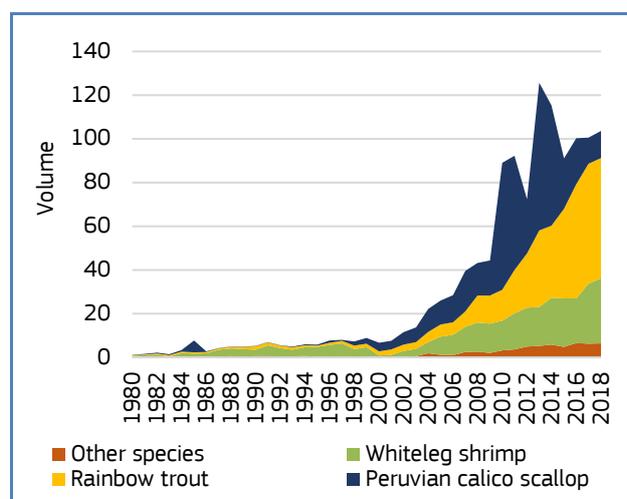
Species	2014	2015	2016	2017	2018
Rainbow trout	33	41	52	55	55
Whiteleg shrimp	21	22	20	27	30
Peruvian calico scallop	55	23	21	12	12
Nile tilapia	5	3	3	3	3
Other species	1	2	4	3	3
Total	115	91	100	100	103

Source: FAO.

Aquaculture operations can be found throughout Peru, from rearing trout in the mountains and highlands, farming tilapia (as well as other species) in the Amazon, and shrimp and scallop along the coast⁹⁸.

Rainbow trout was the first species introduced in aquaculture in Peru back in 1934⁹⁹. It is currently produced both in intensive ponds (closed systems in rivers) and cages in large lakes¹⁰⁰, such as Lake Titicaca. Whiteleg shrimp is mainly produced in semi-intensive ponds¹⁰¹ along the coast. This shrimp has been vulnerable to white spot syndrome¹⁰², which led to population decreases in 1999.

Figure 30. AQUACULTURE PRODUCTION IN PERU BY MAIN SPECIES (volume 1.000 tonnes)



Source: FAO.

In 2018, the farmed production of scallop, once the most important aquaculture species in Peru, had decreased by 82% since 2013. In 2013 scallop production peaked, contributing more than half the total volume of aquaculture production in the country. Indeed, total aquaculture production in Peru achieved an all-time high in 2013.

The reasons behind the decline of scallop production could include an unfavourable market (including low purchasing power)¹⁰³ and environmental conditions. El Niño led to temperature changes that negatively affected scallops¹⁰⁴ in 2016 and 2017¹⁰⁵. However, market conditions seemed to recover, and Peru became the main exporter of wild caught and farmed scallop in the world in 2019¹⁰⁶.

Peruvian scallops are mainly produced through bottom farming¹⁰⁷. The world's first ASC certified scallops were produced in Peru and hit the market in 2015¹⁰⁸.

⁹⁸ <https://seafood-tip.com/sourcing-intelligence/countries/peru/>

⁹⁹ http://www.fao.org/fishery/countrysector/naso_peru/en

¹⁰⁰ <https://seafood-tip.com/sourcing-intelligence/countries/peru/trout/>

¹⁰¹ <https://seafood-tip.com/sourcing-intelligence/countries/peru/shrimp/>

¹⁰² White spot syndrome (WSS) is a viral infection of penaeid shrimp. The disease is highly lethal and contagious, killing shrimp quickly. Outbreaks of this disease have wiped out the entire populations of many shrimp farms within a few days, in places throughout the world.

¹⁰³ <https://www.seafoodsource.com/features/where-the-opportunity-lies-for-scallop-producers>

¹⁰⁴ <https://www.undercurrentnews.com/2018/08/23/peruvian-scallop-output-bullish-but-french-demand-still-sluggish/>

¹⁰⁵ <http://www.fao.org/3/ca7968en/CA7968EN.pdf>

¹⁰⁶ Ibidem.

¹⁰⁷ <https://seafood-tip.com/sourcing-intelligence/countries/peru/scallops/>

¹⁰⁸ <https://www.seafoodsource.com/news/environment-sustainability/first-asc-certified-scallops-to-hit-the-market>

6.3 Processing industry

Major quantities of fisheries and aquaculture products in Peru are processed into fishmeal and fish oil. Peru also processes some products imported from other countries. For instance, a lot of the tuna that is imported into Peru is further processed into canned products. The Peruvian tuna canning industry has grown fast over the last few years, rising from processing around 500 tonnes in 2008 to 40.000 tonnes in 2018. In the same period, the tuna canning workforce rose from 500 to 17.500 employees. A contributing factor behind the increase is that foreign vessels fishing tuna in Peruvian waters by law have to land 30% of their catches in Peru. At the end of 2019, the National Superintendence of Customs and Tax Administration (SUNAT) of Peru introduced a 30% duty for tuna landed by foreign vessels in Peru. Within the Peruvian industry there is major concern that this duty may drive vessels away and interrupt the supply of tuna to the canneries¹⁰⁹.

Fishmeal and fish oil

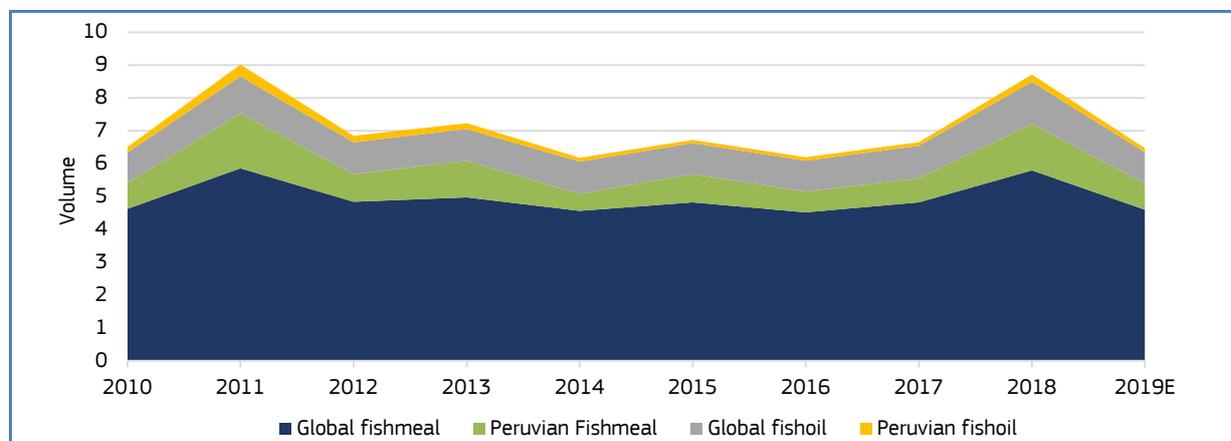
Fishmeal and fish oil can be made from whole fish, fish trimmings or other by-products from fish¹¹⁰, the latter representing a unique possibility for product utilisation, using otherwise unusable resources¹¹¹. Fishmeal is made by drying whereas fish oil is made from pressing, cooking and centrifugation.

Global fishmeal production reached a peak in 1994 and has shown a declining trend ever since¹¹². Today, fishmeal is mainly used for aquaculture (carnivorous and omnivorous species), followed by pig feed, poultry feed and other sectors¹¹³. Hence, the demand for fishmeal is dependent on the needs of these sectors. As the aquaculture sector is trying to rely less on capture fisheries by using feed made from e.g. plants¹¹⁴, global fishmeal producers have to be aware of the implications of such trends, as 75% of fishmeal and 70% of fish oil is used in aquaculture production globally¹¹⁵. Fishmeal and fish oil are highly valuable for carnivorous and omnivorous aquatic reared species due to their composition of omega 3 and omega 6 fatty acids¹¹⁶.

Several species are used for producing fishmeal and fish oil around the world, including industrial-grade forage fish (sand eel, menhaden, pout), food-grade forage fish (anchovy, sardinella, capelin, blue whiting, sprat) and food-fish (mackerel, pilchard, herring) as the most important¹¹⁷. In contrast, Peru is less diversified and mostly uses anchoveta as the primary source of fishmeal and fish oil.

Fish oil from Peru is mainly used in salmon and shrimp aquaculture production, whereas fishmeal is used for several species with large amounts used for pig rearing.

Figure 31. FISHMEAL AND FISH OIL PRODUCTION (volume in million tonnes)



Source: International Fishmeal and Fish Oil Organisation (IFFO).

¹⁰⁹ <https://www.undercurrentnews.com/2020/02/14/peru-scores-own-goal-for-tuna-industry-with-new-tax-on-foreign-landings/>

¹¹⁰ <https://www.seafish.org/article/fishmeal-and-fishoil>

¹¹¹ https://www.seafish.org/media/SeafishInsight_FishmealGlobalPicture_201811.pdf

¹¹² https://www.seafish.org/media/SeafishInsight_FishmealGlobalPicture_201811.pdf

¹¹³ <https://effop.org/wp-content/uploads/2019/06/EUMOFA-Monthly-Highlights-April-2019-Fishmeal-and-Fish-Oil.pdf>

¹¹⁴ https://www.researchgate.net/publication/233078215_Responsible_Aquaculture_and_Trophic_Level_Implications_to_Global_Fish_Supply

¹¹⁵ Kontali Monthly Pelagic Report – March 2020.

¹¹⁶ <http://www.fao.org/3/a-y3781e.pdf>

¹¹⁷ <https://www.iffonet/forage-fish-and-whole-fish>

6.4 Trade

Peru's economy relies mainly on its natural resources, including fisheries. This is the main reason why Peru has become a member (and associate member) of regional organisations (Andean Community (CAN), the Pacific Alliance, and Mercosur) and entered into many Free Trade Agreements (FTAs) in recent decades. Peru has bilateral FTAs with many of its main trade partners for fisheries and aquaculture products, including Chile (enacted in 2009), the EU (2013), China (2010), Thailand (2011), and South Korea (2011).

Import

In 2019, imports of fisheries and aquaculture products into Peru amounted to 99.000 tonnes worth EUR 239 million. The most imported species were various types of tuna, followed by horse mackerel and other species. Miscellaneous tuna mainly consists of prepared/preserved products from Thailand, frozen horse mackerel from Chile and other marine fish as live/fresh products from Ecuador.

Overall import volume decreased by 17% from 2015 to 2019 whereas value increased by 5%. The fluctuating values during the five-year period analysed could be linked to imports of miscellaneous shrimps (primarily frozen) from Argentina.

Table 30. IMPORTS TO PERU OF MAIN COMMERCIAL SPECIES, RANKED BY VOLUME (volume in 1.000 tonnes, value in million EUR)

Main commercial species ¹¹⁸	2015		2016		2017		2018		2019	
	Volume	Value								
Tuna, miscellaneous	16	60	14	52	16	64	14	52	25	93
Horse mackerel, other	41	49	44	44	45	42	25	24	21	20
Other marine fish	12	19	12	21	13	20	14	13	14	11
Tuna, skipjack	8	7	8	8	1	1	8	11	9	11
Shrimp, miscellaneous	3	23	3	26	8	65	9	64	7	48
Tilapia	2	7	3	9	5	13	5	12	5	13
Mackerel	17	15	10	11	14	13	9	7	4	3
Other species	22	47	25	54	19	43	22	48	15	39
Total	121	227	119	225	121	261	106	231	100	238

Source: EUMOFA elaboration of data from Global Trade Atlas - IHS Markit.

Chile, Ecuador, and Thailand are the top three countries of origin in terms of import volumes. In terms of value, high-value shrimps have brought Argentina into the top three countries in 2018 and 2019.

Table 31. IMPORTS TO PERU OF MAIN COMMERCIAL SPECIES, RANKED BY VOLUME (volume in 1.000 tonnes, value in million EUR)

Countries of origin	2015		2016		2017		2018		2019	
	Volume	Value								
Chile	42	54	47	49	46	49	30	34	27	33
Ecuador	36	63	30	70	37	79	35	55	27	47
Thailand	14	49	10	36	11	44	8	33	15	60
China	3	9	4	12	7	16	5	12	8	23
Argentina	3	14	4	14	9	43	10	56	6	37
Other countries	21	39	23	43	11	31	17	40	17	39
Total	121	227	119	225	121	261	106	231	100	238

Source: EUMOFA elaboration of data from Global Trade Atlas - IHS Markit.

¹¹⁸ Peruvian import data is aggregated on main commercial species (MCS) – an aggregation/harmonisation that allow the EUMOFA's end-users to easily select different products or to allow comparison along the different supply chain stages. For information on EUMOFA aggregation from CN-8 to MCS see: <https://www.eumofa.eu/harmonisation>

Even though Peruvian imports of FAP from the EU have shown an increasing trend over the last couple of years, imports are limited. With very few exceptions, imports consist of frozen tuna from the EU tuna fleet and vary with the fishing activity of EU vessels. In 2019, Peruvian imports of FAP from the EU amounted to 3.956 tonnes at a value of EUR 8,1 million. This represents an increase in import value of 5% from 2018. Of the total volume, 3.762 tonnes were frozen tuna (1.873 tonnes of skipjack, 1.005 tonnes of yellowfin tuna and 880 tonnes of bigeye tuna, and 4 tonnes of other tuna species).

Export

In 2019, exports of fisheries and aquaculture products from Peru amounted to 1,8 million tonnes worth EUR 3,2 million, which represents an increase in terms of both volume (46%) and value (47%) since 2015. As mentioned above, Peru is the world's largest provider of fishmeal. It mainly exports fishmeal to China (73% of the total volume in 2019), followed by Japan (7%) and Vietnam (4%). Despite these large volumes exported until 2019, the amount of fishmeal exported to China has recently decreased.

As China mainly uses fishmeal to feed pigs and aquatic species¹¹⁹, their diminishing demand could partly be explained by the combination of environmental protection and the effects of African Swine Fever (ASF)¹²⁰. Thus, many open aquaculture sites have been closed and the occurrence of pigs in China has been drastically reduced.

Cephalopods, which are the second most exported species from Peru, are also mainly exported to China. Fish oil is the third most exported product, mainly exported to Denmark.

Table 32. EXPORTS OF MAIN COMMERCIAL SPECIES FROM PERU, RANKED BY VOLUME (volume in 1.000 tonnes, value in million EUR)

Main commercial species and products	2015		2016		2017		2018		2019	
	Volume	Value								
Fishmeal	714	1.062	644	913	977	1.247	949	1.228	1.063	1.359
Other cephalopods	279	315	168	293	172	347	198	499	352	775
Fish oil	118	267	95	243	165	286	189	305	184	375
Horse mackerel, other	0	0	0	0	0	0	7	5	46	35
Other non-food use	25	19	22	17	28	29	29	25	36	23
Shrimp, miscellaneous	19	131	18	141	26	191	26	171	34	206
Other species	78	356	103	373	130	379	77	355	85	385
Total	1.233	2.150	1.050	1.980	1.498	2.479	1.476	2.588	1.800	3.158

Source: EUMOFA elaboration of data from Global Trade Atlas - IHS Markit.

China is the dominating market for exports from Peru, accounting for 53% of the volume and 42% of the value of total exports of fisheries and aquaculture products from Peru in 2019. Japan and Spain follow as the second and third largest markets, mainly due to export of fishmeal to Japan and cephalopods to Spain. In value terms, Spain is the 2nd largest market, followed by Japan and South Korea.

¹¹⁹ <https://www.undercurrentnews.com/2019/12/06/lower-demand-from-china-worries-peruvian-fishmeal-industry-says-new-snp-head/>

¹²⁰ <http://www.fao.org/in-action/globefish/market-reports/resource-detail/en/c/1199564/>

Table 33. EXPORTS FROM PERU BY COUNTRIES OF DESTINATION, RANKED BY VOLUME (1.000 tonnes, million EUR)

Countries of destination	2015		2016		2017		2018		2019	
	Volume	Value								
China	644	932	512	731	867	1.152	856	1.170	959	1.338
Japan	37	62	39	81	56	99	62	113	110	197
Spain	76	132	62	153	67	160	75	203	90	235
Korea, Republic of	36	71	31	85	33	88	44	137	75	193
Viet Nam	23	33	26	41	54	79	40	67	53	79
Denmark	51	97	21	44	30	39	39	66	46	75
Taiwan	29	48	21	36	31	49	31	52	42	63
Chile	39	68	25	47	44	62	36	47	38	53
Germany	46	62	65	94	20	35	28	44	37	60
Thailand	34	24	15	17	17	21	19	29	34	54
Other countries	218	620	234	653	279	695	245	661	316	809
Total	1.233	2.150	1.050	1.980	1.498	2.479	1.476	2.588	1.800	3.158

Source: EUMOFA elaboration of data from Global Trade Atlas - IHS Markit

EU imports from Peru

In 2019, EU imports of fisheries and aquaculture products from Peru amounted to roughly 196.000 tonnes with a value of EUR 531 million. In the last five-year period, EU imports fell by 13% but their value rose by 12%. Most EU imports from Peru consist of cephalopods (largely comprising jumbo flying squid) imported by Spain, followed by fishmeal by Germany and fish oil by Denmark.

Table 34. EU-28 IMPORTS OF MAIN COMMERCIAL SPECIES FROM PERU, RANKED BY VOLUME (volume in 1.000 tonnes, value in 1.000 EUR)

Main commercial species and products	2015		2016		2017		2018		2019	
	Volume	Value								
Other cephalopods ¹²¹	3	5	4	8	62	124	71	189	76	197
Fishmeal	45	60	64	87	19	24	28	35	41	58
Fish oil	58	90	22	48	35	54	62	89	38	66
Tuna, skipjack	4	14	2	6	4	18	6	26	8	34
Shrimp, warmwater	7	42	5	35	7	49	7	43	6	34
Hake	9	17	6	13	7	13	7	12	5	11
Anchovy	6	30	5	26	4	20	5	28	4	27
Other	94	214	68	205	21	93	17	95	18	104
Total	226	472	176	428	159	395	203	517	196	531

Source: EUMOFA elaboration of Eurostat-COMEXT data (online data code: DS-016890).

Spain is by far the main target market for Peru's exports to the EU, covering 45% of the volume and 48% of the total value of Peru's exports to EU countries in 2019.

¹²¹ The volumes of cephalopod imports appears to have drastically increased from 2016 to 2017. However, this do not reflect the reality as the classification of cephalopods (HS product codes) changed during this time and needs to be taken into consideration when comparing annual volumes.

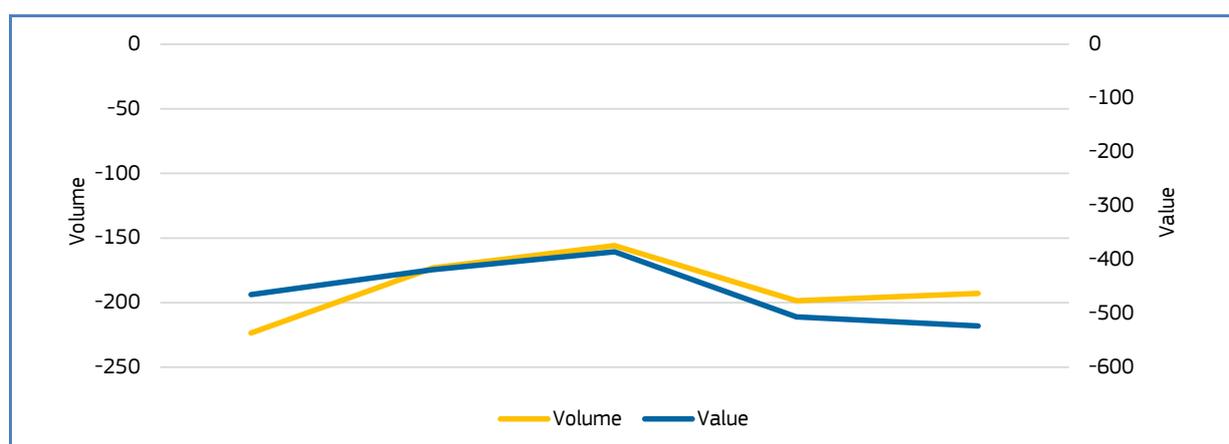
Table 35. EU-28 IMPORTS FROM PERU BY IMPORTING MEMBER STATE, RANKED BY VOLUME (volume in 1.000 tonnes, value in million EUR)

Importing Member State	2015		2016		2017		2018		2019	
	Volume	Value								
Spain	79	152	59	153	72	182	79	238	88	254
Denmark	43	84	20	43	25	35	31	50	30	50
Germany	46	72	61	93	19	36	28	47	30	54
Italy	19	49	15	41	14	42	16	54	17	59
France	11	68	9	50	10	49	15	50	11	53
Other	28	48	11	45	20	51	34	78	20	61
Total	226	472	176	428	159	395	203	517	196	531

Source: EUMOFA elaboration of Eurostat-COMEXT data (online data code: [DS-016890](#)).

As a part of the Andean region, Peru, together with Colombia, entered into a FTA with the EU in 2013¹²². The agreement includes free trade in goods, fish, and marine products¹²³ which benefits the seafood sector in Peru. It will also be favourable for EU importers, enabling imports from Peru of both seafood and non-food use products for aquaculture feed (fishmeal, fish oil) free of tariffs¹²⁴. The figure below shows a significant deficit in EU trade in fisheries and aquaculture products with Peru. In volume, the trade deficit amounted to 193.000 tonnes in 2019 which is 31.000 tonnes less than in 2015, while the trade value deficit amounted to EUR 524 million, which is EUR 59 million higher than in 2015¹²⁵.

Figure 32. EU TRADE BALANCE IN FISHERIES AND AQUACULTURE PRODUCTS WITH PERU (volume in 1.000 tonnes, value in 1.000 EUR)



Source: EUMOFA elaboration of Eurostat-COMEXT data.

6.5 Consumption

Fish consumption in Peru has historically fluctuated, reaching an all-time low in 1983 (11,01 kg per capita in live weight equivalent) and all-time high in 1989 (27,48 kg per capita in live weight equivalent). Consumption has decreased in recent years, falling to 25,04 kg per capita in 2017. Still, Peru has one of the highest per capita seafood consumption rates in South America¹²⁶. In 2017, the main consumed species in Peru were albacore tuna, jack mackerel, and mackerel¹²⁷.

Even though most of the Peruvian anchoveta goes to fishmeal, the amounts utilised for human consumption have increased in recent years¹²⁸. As seafood for human consumption provides more revenue and jobs than fish oil and fishmeal¹²⁹, this change is likely to be profitable for Peru.

¹²² <https://trade.ec.europa.eu/tradehelp/colombia-ecuador-and-peru>

¹²³ <https://www.efta.int/free-trade/free-trade-agreements/peru>

¹²⁴ <https://seafood-tip.com/sourcing-intelligence/countries/peru/>

¹²⁵ EU trade balance with Peru is calculated as EU exports to Peru minus EU imports from Peru.

¹²⁶ <https://ourworldindata.org/grapher/fish-and-seafood-consumption-per-capita?tab=chart&country=-PER>

¹²⁷ <https://www.intrafish.com/news/peru-seafood-consumption-increases-year-on-year/2-1-305459>

¹²⁸ <https://www.sciencedirect.com/science/article/pii/S0308597X13002194>

¹²⁹ https://www.lenfestoceano.org/-/media/legacy/lenfest/pdfs/peruvian_anchovies_eng_web.pdf

7. Fisheries and aquaculture in Brazil

7.1 Introduction

Brazil, officially the Federative Republic of Brazil, is the largest country in South America, with a land area of 8.515.770 square kilometres¹³⁰. It has a coastline of 7.491 kilometres¹³¹ in length, which borders the Atlantic Ocean from the north east to the south east¹³² of the country. The capital of Brazil is Brasília, while São Paulo is the most populous city. The total population stands at around 211.049.527¹³³.

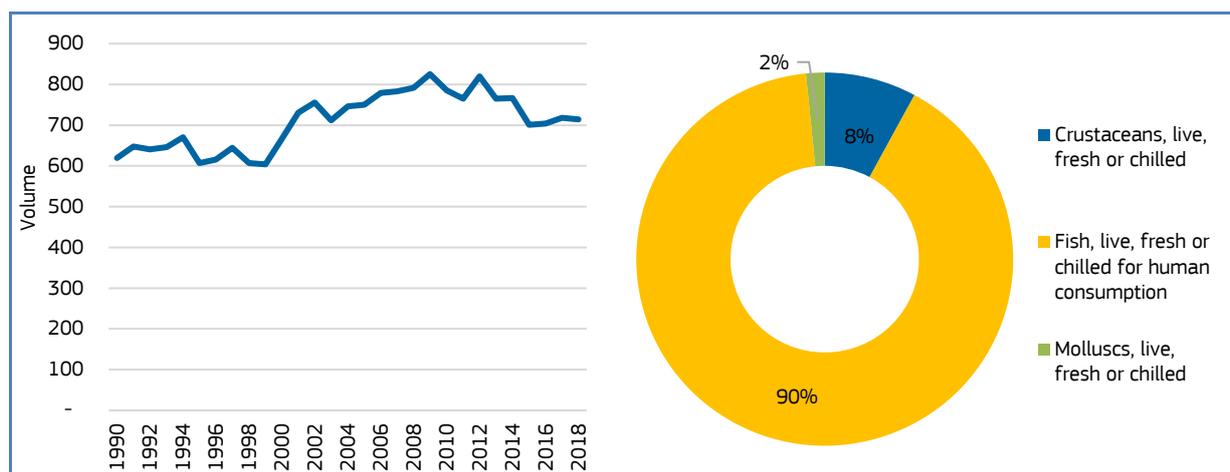
Brazil's fisheries and aquaculture sector directly or indirectly provides employment for an estimated 3,5 million people¹³⁴. Artisanal fisheries represent more than 60% of total fish landings and account for 90% of employment in the catch sector¹³⁵.

More than 30% of fisheries production comes from inland freshwater fisheries, whilst marine production accounts for the remaining 70%. Marine catch is highly diverse in terms of species, ranging from tropical fish species found in the north to colder fish species in the south. Brazilian marine fish resources are currently heavily exploited, but there is huge potential for development of the aquaculture sector¹³⁶. At present, Brazil is the second largest aquaculture producer in the Latin American and Caribbean region after Chile. It also is the largest importer of fish in the Latin American region¹³⁷.

7.2 Fisheries

In 2018, the FAO reported wild catches of 714.290 tonnes for Brazil, consisting of 151 species of fish, 11 species of crustaceans and 6 species of molluscs.

Figure 33. TOTAL CATCHES OF THE BRAZILIAN FLEET (LEFT, volume in 1.000 tonnes) AND CATCHES IN 2018 BY FAO COMMODITY GROUP (RIGHT)



Source: FAO.

According to the latest estimates (2017), there are 1.083.778 full-time fishers in Brazil¹³⁸. The fishing fleet is estimated to contain 108.346 vessels, 30% without a motor and mostly under 12 metres in length.

More than 60% of total marine landings can be traced to the artisanal fleet, which consists of roughly 60.000 vessels mainly operating in the northern regions. Industrial vessels operate mainly in the south.

Brazilian sardinella and whitemouth croaker are the main species caught by the Brazilian fleet, although together they accounted for only 13% of total catches in 2018. Catches of Brazilian sardinella reached a peak in 2013, when they alone covered 13% of total catches, while in 2018 the species' share dropped to 6%.

¹³⁰ <https://data.worldbank.org/indicator/AG.SRF.TOTL.K2?locations=BR>

¹³¹ <https://www.cia.gov/library/publications/the-world-factbook/geos/br.html>

¹³² <https://www.lonelyplanet.com/maps/south-america/brazil/>

¹³³ <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=BR>

¹³⁴ <https://seafood-tip.com/sourcing-intelligence/countries/brazil/>

¹³⁵ <http://www.fao.org/fishery/facp/BRA/en>

¹³⁶ See more in the "Aquaculture" section below.

¹³⁷ <http://www.fao.org/fishery/facp/BRA/en>

¹³⁸ <http://www.fao.org/fishery/facp/BRA/en>

Brazil has a strategic proximity to the migratory routes of the main stocks of tuna in the South Atlantic Ocean¹³⁹ and was one of the founding members of the International Commission for the Conservation of Atlantic Tunas (ICCAT). Of the tuna caught, skipjack tuna covers by far the largest share, although in 2014 its catches dropped to 25.000 tonnes from the peak of 33.000 tonnes achieved the previous year. Conversely, yellowfin tuna catches registered a noteworthy growth from 2016 to 2017, increasing from 2.500 tonnes to 18.000 tonnes. Still, in 2018 total catches of tuna species represented only 6,3% of the total, with an increase of only 0,8% since 1990.

Table 36. MAIN SPECIES IN BRAZIL'S FISHERIES (volume in 1.000 tonnes)

Species	2010	2011	2012	2013	2014	2015	2016	2017	2018
Brazilian sardinella	62	75	96	98	52	46	46	46	46
Whitemouth croaker	43	40	44	38	46	41	42	40	40
Sea catfishes nei	31	29	32	27	33	30	30	30	30
Marine fishes nei	41	38	43	35	33	29	29	29	29
Prochilods nei	28	27	27	27	27	26	26	26	26
Laulao catfish	25	23	23	24	23	22	22	22	22
Acoupa weakfish	21	19	21	18	22	20	20	21	21
Skipjack tuna	21	31	31	33	25	18	18	20	20
Other	513	483	504	465	507	469	471	484	481
Total*	785	765	820	765	767	701	704	718	714

* The total is the rounded sum of actual values.

Source: FAO.

7.3 Aquaculture

Brazil's history of aquaculture began in the early twentieth century, with a total production of 30.000 tonnes at the beginning of the 1990s¹⁴⁰. Although shrimp farming can be traced to the 1980s, the introduction of *Penaeus vannamei* in 1995 led to a rapid growth in the industry¹⁴¹. The aquaculture production of shrimps generates around 3,5 jobs per hectare, higher than irrigated fruit culture, providing unskilled workers with employment¹⁴². It is estimated that 50.000 people are currently employed on shrimp farms¹⁴³. About 90% of Brazil's mussel production is conducted by artisanal fishermen who began their production as a side endeavour until its profitability exceeded that of fishing. However, there is no official information reporting the number of people working in mussel aquaculture¹⁴⁴. Since 2010, there has been a 47% increase in terms of farmed volume.

¹³⁹ https://www.scielo.br/scielo.php?script=sci_arttext&pid=50034-73292019000200201#:~:text=ICCAT%20is%20responsible%20for%20the,in%20the%20past%20ten%20years.

¹⁴⁰ http://www.fao.org/fishery/countrysector/naso_brazil/en

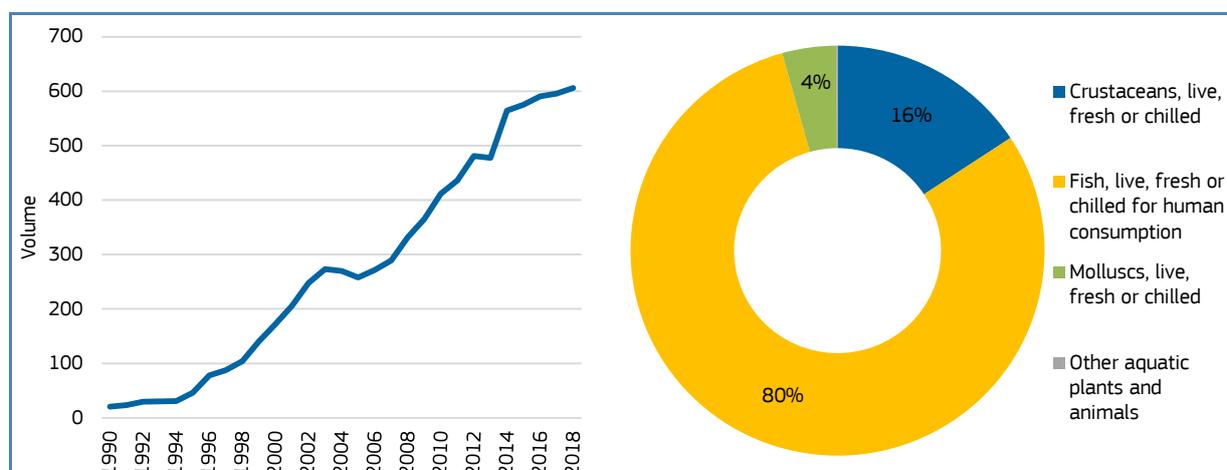
¹⁴¹ Ibidem.

¹⁴² <http://www.fao.org/fishery/facp/BRA/en>

¹⁴³ Ibidem.

¹⁴⁴ Ibidem.

Figure 34. AQUACULTURE PRODUCTION IN BRAZIL (LEFT, volume in 1.000 tonnes) AND AQUACULTURE PRODUCTION IN 2018 BY FAO COMMODITY GROUP (RIGHT)



Source: FAO.

In 2018, Nile tilapia production was 104% higher than in 2010, and accounted for 52,3% of total aquaculture production in terms of volume. The three main freshwater species farmed (Nile tilapia, cachama and tambacu (hybrid)) covered 75% of total production. In terms of value, Nile tilapia accounted for 36% of the total, while whiteleg shrimp, the second-most valuable farmed species, contributed to 30% of the total value. It is worth noting that Brazil is the fourth largest producer of tilapia in the world¹⁴⁵.

Table 37. MAIN SPECIES IN BRAZIL'S AQUACULTURE PRODUCTION (volumes in tonnes, values in 1.000 EUR)

Species	2013		2014		2015		2016		2017		2018	
	Volume	Value										
Nile tilapia*	169	356	200	408	219	356	241	387	290	509	317	486
Cachama	89	222	140	320	136	261	137	251	105	227	103	197
Whiteleg shrimp	65	355	65	337	70	271	60	291	60	408	62	407
Tambacu, hybrid	47	106	32	85	30	64	37	77	36	75	35	64
Cyprinids nei	19	47	21	51	21	40	20	40	19	41	18	38
Freshwater siluroids nei	16	59	20	79	18	59	16	48	16	50	14	40
Other	73	178	86	250	81	169	80	157	70	151	57	114
Total**	478	1.322	564	1.530	575	1.220	591	1.251	596	1.461	606	1.346

Source: FAO.

*Classified as "Tilapia nei" until 2016.

** The total is the rounded sum of actual values.

¹⁴⁵ <https://www.peixebr.com.br/anoario-2020/>

7.4 Trade

Total export from Brazil

Fishmeal dominates Brazil's fisheries and aquaculture product (FAP) exports: in 2019 it represented 27% of total FAP export volume and it is the principal contributor to the 83% total increase in FAP exports recorded since 2015. On the other hand, skipjack tuna exports, which is the second most exported species (5% of total exports) dropped by 51% in 2019 compared with 2015. About 73% of tuna is exported as frozen, with skipjack and yellowfin tuna being the main tuna species sent abroad. 92% of swordfish is exported as live/fresh, and the rest as frozen.

Table 38. EXPORT FROM BRAZIL BY MAIN COMMERCIAL SPECIES¹⁴⁶ (volume in 1.000 tonnes, value in million EUR)

Main Commercial Species	2015		2016		2017		2018		2019	
	Volume	Value								
Fishmeal	3	2	9	6	8	5	12	10	19	16
Tuna, skipjack	7	12	6	9	6	11	4	6	3	4
Rock lobster and sea crawfish	2	59	2	54	3	64	2	61	3	83
Tuna, yellowfin	0	2	1	3	2	5	2	7	3	8
Swordfish	1	5	1	7	1	7	2	8	2	8
Tuna, bigeye	1	4	1	5	1	5	1	7	1	7
Fish oil	0	0	0	0	1	1	2	2	1	1
Ray	1	4	1	3	1	2	1	3	1	4
Other	23	112	28	132	29	123	30	133	37	164
Total*	39	200	50	221	51	223	57	237	71	295

Source: EUMOFA elaboration of IHS Markit data (Global Trade Atlas).

* The total is the rounded sum of actual values.

Since 2000, the USA has been the main destination country for Brazil's FAP exports, although export volume has decreased by 11,4 % over the past 20 years. Spain and Argentina used to be the main export destinations (18,7% and 9% of total exports in 2000, respectively), but from 2000 to 2019 exports to these two countries reduced by 98,2% and 71,2% (in terms of volume), respectively. The large reduction in exports to Spain from 2017 onwards is explained by the EU ban on imports of seafood from Brazil destined for human consumption (see section on EU imports from Brazil below). Today, China and Ecuador are the second and third most significant export destinations, destinations in terms of volume, covering 14,1% and 5,1% of Brazil's total FAP exports. In terms of value, the USA covers 48% of Brazil's FAP exports, while China and Taiwan cover 12% and 5% respectively. Data collected so far for 2020 show that this trend is set to continue.

¹⁴⁶ EUMOFA aggregation for species (Metadata 2, Annex 3: <https://eumofa.eu/supply-balance-and-other-methodologies>).

Table 39. EXPORTS FROM BRAZIL BY DESTINATION COUNTRY (volume in 1.000 tonnes, value in million EUR)

Trade Partner	2015		2016		2017		2018		2019	
	Volume	Value								
United States	10	92	13	90	13	95	18	121	21	142
China	2	8	2	8	2	9	5	21	10	36
Ecuador	0	0	0	0	0	0	4	6	4	5
Taiwan	0	5	1	8	3	11	5	16	3	15
Chile	0	0	2	1	2	2	5	6	3	6
Bangladesh	2	1	5	3	2	2	1	1	3	3
Other	25	94	27	110	30	105	20	67	26	89
Total*	39	200	50	221	51	223	57	237	71	295

Source: EUMOFA elaboration of IHS Markit data (Global Trade Atlas).

* The total is the rounded sum of actual values.

Total imports in Brazil

Brazil is the main importing country of fisheries and aquaculture products in the Latin American region. In 2018, 28,3% of all imported seafood was salmon, mostly from Chile. Miscellaneous small pelagics, principally sardines¹⁴⁷, account for 23% of import volume, but only 5% of value. In terms of value, salmon covers 46% of total imports, while cod accounts for 10%. Most imported seafood is frozen, although salmon is mostly imported as fresh or live, and cod is predominantly imported as salted.

Table 40. IMPORTS IN BRAZIL BY MAIN COMMERCIAL SPECIES (volume in 1.000 tonnes)

Main Commercial Species	2015		2016		2017		2018		2019	
	Volume	Value								
Salmon	97	445	83	490	85	538	87	488	97	534
Miscellaneous small pelagics	19	14	73	53	93	66	90	70	77	63
Hake	26	72	25	62	35	91	31	79	33	92
Freshwater catfish	31	51	34	47	43	85	28	71	22	57
Cod	20	130	17	106	18	123	15	114	13	117
Alaska pollock	35	68	20	35	20	43	16	36	10	29
Other	115	320	111	288	117	315	101	302	90	272
Total*	341	1.099	364	1.080	411	1.260	367	1.161	343	1.164

Source: EUMOFA elaboration of IHS Markit data (Global Trade Atlas)

* The total is the rounded sum of actual values.

EU imports from Brazil

Today, the European Union has a ban on imports of fishery products intended for human consumption from Brazil. This decision began as a self-imposed temporary ban by Brazil from the 3rd of January 2018 on exports of seafood to the EU, following a lack of clarity regarding sanitary inspection checks on factory vessels and the landing of raw material into ports and processing plants. There was also uncertainty concerning the failure to distinguish between wild caught and farmed fish¹⁴⁸. As the issues were not satisfactorily resolved, the EU imposed the import ban on 11th of July 2018¹⁴⁹. There is currently no official end date for this restriction.

¹⁴⁷ Norwegian Seafood Council, 2019, The Brazilian Bacalhau Consumer.

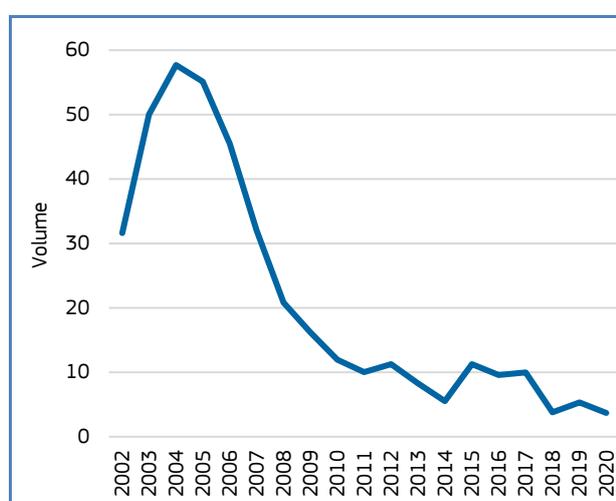
¹⁴⁸ Ibidem.

¹⁴⁹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1531832169197&uri=CELEX:32018R0981>

EU FAP imports from Brazil have historically been relatively low. EU imports from Brazil are now principally other non-food use products, primarily seaweeds and other algae¹⁵⁰, which in 2019 accounted for 67%, of import volume, but only 10%, of value. Other products (extracts and juices of meat, fish, crustaceans, molluscs and other aquatic invertebrates)¹⁵¹ accounted for 87% of value. This is the result of the ban on imports of products for human consumption as mentioned above.

In 2018, skipjack tuna was the main species imported by the EU from Brazil destined for human consumption, but this was only for the first few months in 2018 and by 2019 the EU was not importing any tuna from Brazil. This suggests some delay between the establishment of the EU import ban and its implementation. Looking away from the recent import ban, this followed a downward trend of EU imports from Brazil since a peak in 2004, when a total of 57.700 tonnes of FAP was recorded.

Figure 35. EU IMPORTS OF SEAFOOD FROM BRAZIL (volume in 1.000 tonnes)



Source: EUMOFA elaboration of EUROSTAT-COMEXT data.

Table 41. EU FAP IMPORTS FROM BRAZIL (volume in tonnes, value in 1.000 EUR)

Main Commercial Species	2015		2016		2017		2018		2019	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Other products	1.828	22.677	1.663	20.326	1.597	19.761	1.568	20.308	1.643	22.689
Other non-food use	497	1.782	819	2.013	1.566	2.669	1.124	1.973	3.589	2.635
Tuna, skipjack	6.711	12.871	3.234	5.107	3.830	7.083	464	927	0	0
Tuna, yellowfin	232	486	201	522	710	1.672	201	498	0	0
Monk	468	2.789	914	5.265	604	3.605	96	550	0	0
Swordfish	257	1.906	265	1.762	282	1.919	40	245	0	0
Other	1.247	10.644	2.458	19.272	1.384	10.289	303	1.662	97	638
Total	11.240	53.155	9.554	54.267	9.972	46.999	3.795	26.163	5.329	25.962

Source: EUMOFA elaboration of EUROSTAT-COMEXT data.

* The total is the rounded sum of actual values.

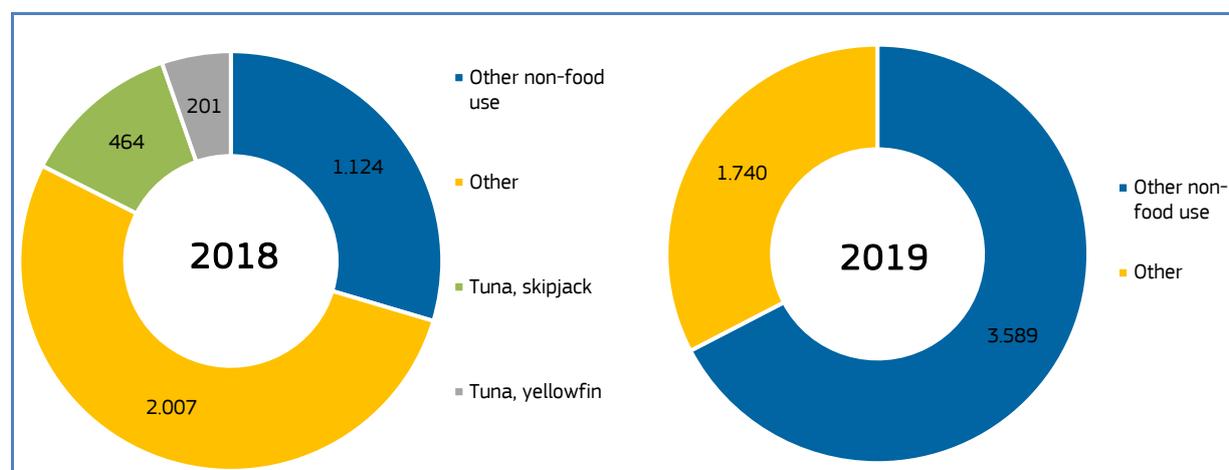
As shown in Table 41, EU imports of main commercial species originating from Brazil plummeted in 2018-2019 compared with previous years. However, despite the ban on exports of seafood products for human consumption to the EU, the total import volume is slightly higher in 2019 than in 2018. This can be attributed to a 127% growth in EU imports of products classified as "other non-food use", mainly seaweeds and other algae¹⁵².

¹⁵⁰ Product number 12122900.

¹⁵¹ Product number 16030080.

¹⁵² Product number 12122900.

Figure 36. EU FAP IMPORTS FROM BRAZIL IN 2018 (LEFT) AND 2019 (RIGHT) BY MAIN COMMERCIAL SPECIES (volume in tonnes)



Source: EUMOFA elaboration of EUROSTAT-COMEXT data.

The EU predominantly imports FAP as prepared or preserved, frozen and unspecified.

Table 42. IMPORTS BY PRESERVATION STATE (volume in tonnes, value in 1.000 EUR)

Preservation	2015		2016		2017		2018		2019	
	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Prepared/Preserved	1.829	22.683	1.663	20.327	1.570	19.694	1.569	20.310	1.664	22.775
Frozen	8.694	27.166	6.826	30.102	6.440	22.674	1.098	3.827	73	494
Unspecified	466	354	787	619	1.756	1.772	1.093	567	3.553	1.013
Live/Fresh	250	2.952	279	3.219	207	2.859	35	1.459	40	1.679
Total*	11.240	53.155	9.554	54.267	9.972	46.999	3.795	26.163	5.329	25.962

Source: EUMOFA elaboration of EUROSTAT-COMEXT data.

* The total is the rounded sum of actual values.

EU export to Brazil

Brazil is part of the EU-Mercosur trade agreement, alongside Argentina, Paraguay, and Uruguay. The EU is Mercosur's second largest trade partner in goods after China, and Mercosur is the 11th largest trade partner in goods for the EU¹⁵³. The Mercosur and EU trade agreement was announced on the 28th of June 2019, but details are still being negotiated. Currently, fisheries exports from Mercosur members face tariffs ranging from 8%-15%, but these are set to gradually be reduced to zero over a seven-year period¹⁵⁴.

The main species exported from the EU to Brazil is cod, which in 2019 covered 42% of total exports in volume and 71% of total exports in value. Cod is mainly exported as frozen or dried (61% and 30%), while sardines are mostly exported as frozen (97%).

¹⁵³ <https://ec.europa.eu/trade/policy/countries-and-regions/regions/mercosur/>

¹⁵⁴ <https://en.mercopress.com/2019/07/03/hake-squid-and-scallops-will-access-eu-free-of-tariffs-as-soon-as-deal-with-mercosur-becomes-effective>

Table 43. EU EXPORTS TO BRAZIL (volume in tonnes, value in 1.000 EUR)

Main Commercial Species	2015		2016		2017		2018		2019	
	Volume	Value								
Cod	6.655	49.678	6.727	47.137	7.901	59.589	6.660	54.614	6.898	61.054
Sardine	193	616	3.105	2.186	4.549	3.432	108	351	1.910	1.509
Saithe (Coalfish)	300	1.484	102	423	440	2.187	423	1.845	598	2.595
Fishmeal	0	2	40	59	12	34	181	308	291	494
Octopus	221	1.646	138	911	470	3.909	362	3.483	228	2.111
Alaska pollock	1	4	1	4	117	430	249	925	191	783
Other	6.223	14.086	6.967	15.826	8.127	18.179	8.333	22.775	6.214	17.626
Total*	13.594	67.518	17.080	66.545	21.616	87.762	16.316	84.302	16.329	86.170

Source: EUMOFA elaboration of EUROSTAT-COMEXT data.

* The total is the rounded sum of actual values.

7.5 Consumption

Yearly per capita consumption of seafood in Brazil was around 10,5 kg in 2018, much lower than the world average of 20,2 kg¹⁵⁵. Although Brazilians value seafood's health benefits and good taste, it is still a relatively expensive source of protein¹⁵⁶ and the percentage of household income spent on fresh fish is low compared to other sources of protein¹⁵⁷. Consumption of fish also varies depending on the region. Southern parts of Brazil are major meat production regions and have a strong meat culture¹⁵⁸. In these areas, fewer individuals see fish as "extremely important" compared to other areas¹⁵⁹. It is estimated that per capita consumption of fish is three times higher in the Amazon basin compared to larger cities¹⁶⁰. An estimated 1/3 of current seafood consumption is of farmed fish from Brazil, while the rest is imported or saltwater catch¹⁶¹.

Consumption of fish has been steadily increasing over recent years due to intensive promotion campaigns. Sardines and tilapia are reported to be the most regularly consumed fish, followed by prawn/shrimp and salmon¹⁶². The last five years have seen an increase in seafood consumption of 4,1% per capita¹⁶³. Although the growth rate of seafood consumption is positive each year, growth was at its lowest in 2015 and 2016, during the worst years of Brazil's economic crisis¹⁶⁴.

¹⁵⁵ Ibidem.

¹⁵⁶ Ibidem.

¹⁵⁷ <https://www.ibge.gov.br/en/statistics/social/health/25610-pof-2017-2018-pof-en.html?=&t=resultados>

¹⁵⁸ Norwegian Seafood Council, 2019, The Brazilian Bacalhau Consumer.

¹⁵⁹ Ibidem.

¹⁶⁰ <https://seafood-tip.com/sourcing-intelligence/countries/brazil/#:~:text=In%20coastal%20areas%20and%20in,at%20about%2012kg%20in%202014.>

¹⁶¹ <https://www.peixebr.com.br/anuario-2020/> page 112.

¹⁶² Norwegian Seafood Council, 2019, The Brazilian Bacalhau Consumer.

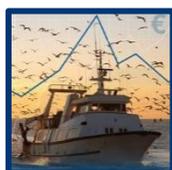
¹⁶³ Ibidem.

¹⁶⁴ Ibidem.

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