



PRODUCTION: Annual output exceeds 2 million tonnes



TRADE: Sales of main species continue to rise



FUTURE: Significant growth expected

Aquaculture highlights from the Mediterranean and the Black Sea



Overview

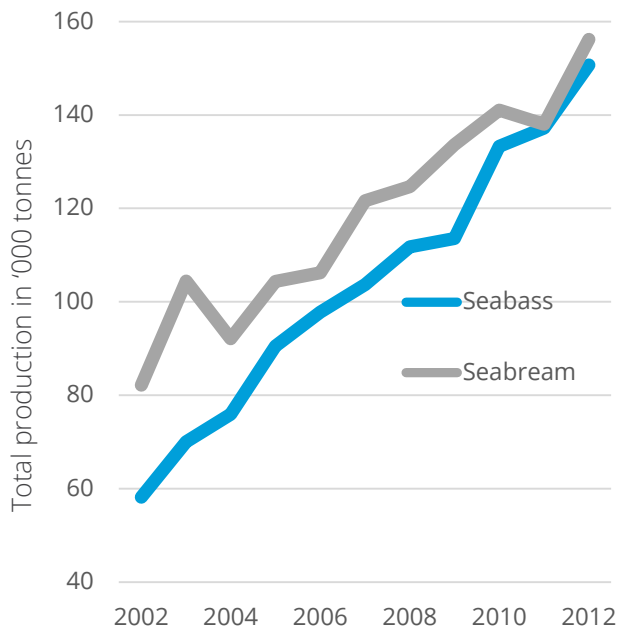
Aquaculture in the Mediterranean and Black Sea countries is essential, both socially and economically. The industry is large and dynamic and has grown substantially in past decades, helping meet the rising demand for fish and fishery products. Approximately 70 different species, comprising fish, molluscs, and crustaceans, are currently farmed in freshwater, marine, and brackish environments, with molluscs and finfish dominating. From 2002 to 2012 total aquaculture production for direct food consumption grew by more than 50% from about 1.3 million to more than 2 million tonnes. New technologies, diversification of farmed species, increased trade, and emerging markets have all contributed to the growth of the aquaculture sector in the region.

In recent years, trade has been heavily influenced by rising consumer demand, increased production, and economic growth. Finfish species are among the most traded in the region and are exported mostly by countries with substantial production. As a result, high-value finfish species, such as European seabass, gilthead seabream, and rainbow trout, have gained popularity as incomes rise in many Mediterranean and Black Sea countries. Bivalves are imported in large volumes to these regions, with most production consumed domestically. Because of their high consumption levels, many countries with sizable production continue to import farmed fish, relying on foreign production to accommodate growing demand.

**All data refers to Mediterranean and Black Sea countries that are members of the GFCM*

SEABASS and SEABREAM

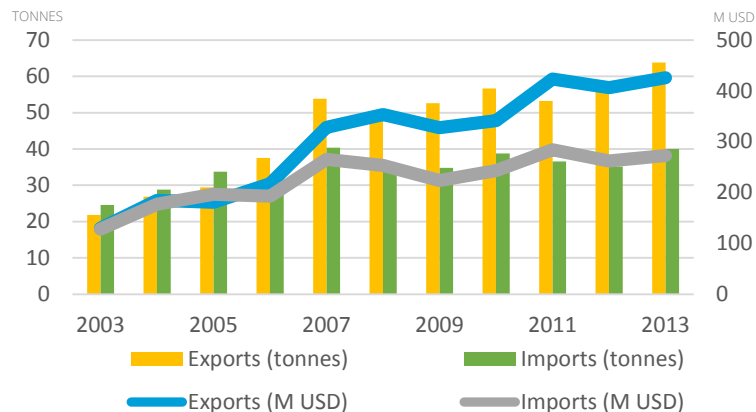
Production trends



Seabass and seabream production is popular in the region, but it is most prevalent in Greece, Turkey, Spain, Egypt, and Italy. Seabass production made significant strides between 2002 and 2012, catching up with seabream production in 2011. From 2002 to 2012, seabass production increased to a high of 151,000 tonnes, an increase of 160% over 2002, the result of increased production in Turkey, where seabass production increased 51,000 tonnes during the ten-year period.

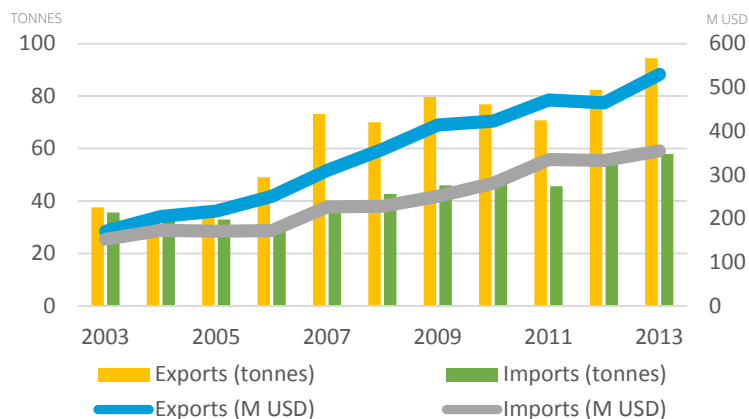
Total seabream production reached 156,000 tonnes in 2012. This is a 90% increase in volume over 2002. A small decrease in production between 2010 and 2011 brought seabream production in line with seabass production. Seabream is the main marine finfish species farmed in Mediterranean and Black Sea countries, the result of increased production in Greece, where seabream production increased by around 43,000 tonnes during the ten-year period.

Trade - Seabass



Because seabass and seabream make up the majority of trade revenues, they are among the most important species for trade in the Mediterranean and Black Sea countries. Export value of seabass and seabream has surged from USD 300 million in 2003 to USD 956 million in 2013, accounting for a large proportion of regional exports. Greece was the largest exporter of seabass and seabream with USD 509 million, followed by Turkey, Spain, France, and Italy.

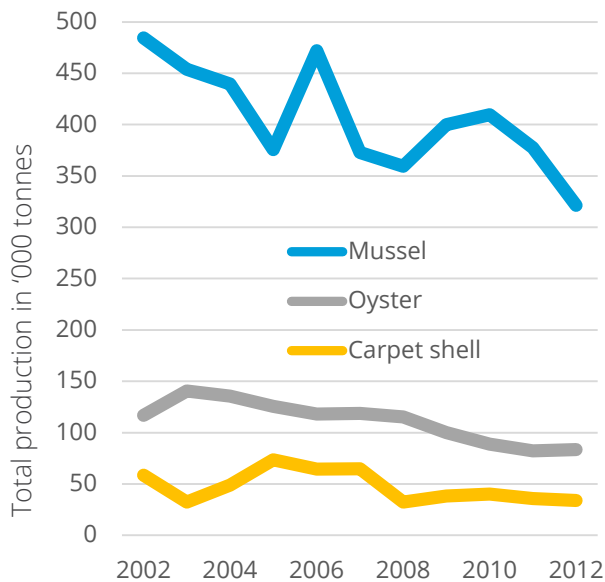
Trade - Seabream



The import value of seabass and seabream increased in the past decade from USD 280 million to USD 627 million. The main importing countries were Italy, Spain, and France. Exports of seabream and seabass have outpaced imports, resulting in an increasing trade surplus over the last decade. Turkey and Greece, the region's two largest markets, are almost entirely export oriented. Historically, seabream and seabass were seasonal offerings, but with increased exports and production, they have become a year-round offering.

MUSSEL and OYSTER

Production trends



Mussel farming has one of the highest production rate of any farmed fish or shellfish in the Mediterranean countries. Mussel production has remained relatively high but decreased slightly between 2002 and 2012, falling from 484,000 tonnes in 2002 to 321,000 tonnes in 2012. That year, mussel production accounted for 15% by volume of all aquaculture production in the region. Spain, Italy, France, and Greece are the largest producers of mussel, focusing mostly on blue mussel and Mediterranean mussel. The production of France and Spain is mainly based on the Atlantic coast.

Production of oyster has slowed over the past decade but not substantially, falling from 117,000 tonnes in 2002 to 84,000 tonnes in 2012, when it accounted for 4% of the region's total aquaculture production. Pacific cupped oyster and European flat oyster are most commonly produced in the Mediterranean. France, the largest producer of oyster, delivered 82,000 tonnes in 2012, 98% of the region's production. Spain and Morocco also produce oyster.

Trade - Mussel



Over the past decade, the trade in mussel has continued to grow in the Mediterranean and Black Sea countries, with imports surpassing exports in value. Since 2003, mussel import value increased 45%, while export value increased at a slower pace of 32%. Spain led exporting countries, followed by Italy, France, and Greece, and the main importing countries include France, Spain, and Italy. Although production of mussel has slowed, import and export markets for mussel have remained relatively constant for the past ten years.

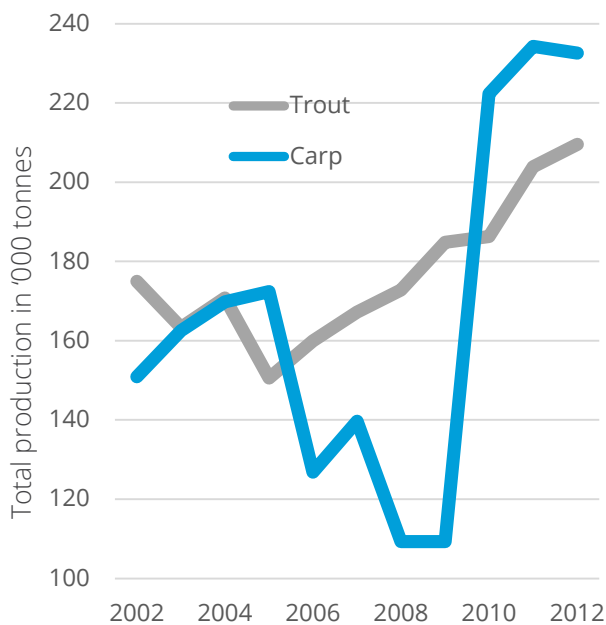
Trade - Oyster

Oyster trade in the Mediterranean and Black Sea countries has remained limited. Although the export value of oyster in the region has increased substantially, from USD 26 million to USD 85 million during the past decade, it accounted for only a small fraction of exported species in the region. France is the chief oyster-exporting country, owing to its large production, followed by Italy and Spain. In the same period, the import value of oyster grew from USD 33 million to USD 76 million. Italy and France were the largest importing countries, followed by Spain. In 2013, oyster exports surpassed imports even though production remained near the same level. The value of oyster in the region has increased over the past decade, with less oyster being traded for more money.



CARP and TROUT

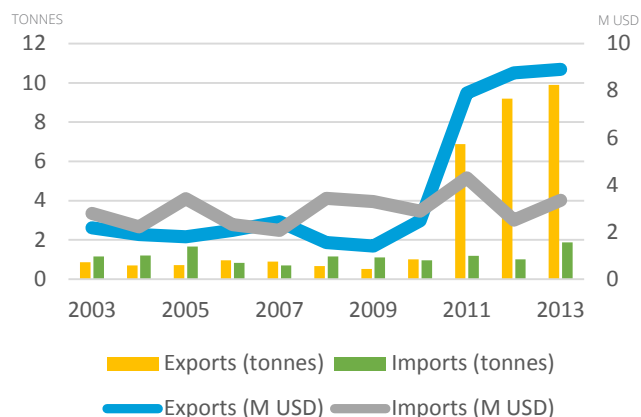
Production trends



Different cyprinids such as common carp, silver carp, and bighead carp are widely produced in the region. Carp production has fluctuated over the past decade, with a sharp 104% increase in production between 2009 and 2011, the result of a 160% increase in Egypt's carp production. In all, 233,000 tonnes of carp accounted for 11% of total aquaculture production in 2012, with Egypt producing 87.5% of all carp that year.

Between 2002 and 2012, farmed trout production remained relatively constant. In 2012, trout production made up 10% of all aquaculture production. While most countries experienced steady growth in the trout sector, Turkey led production by 180% over the preceding decade alone, thanks to the country's growing export markets for trout products. Since 2004, Turkey is the main producer of trout in the region.

Trade - Carp



Although most carp in the Mediterranean region is consumed domestically, trade plays an important role for carp producing countries. The export value of carp species has grown by USD 7 million in the past decade, a small proportion of the region's total exports. Turkey, Croatia, and France are the main carp-exporting countries. Import value increased from USD 2.8 million in 2003 to USD 4.4 million in 2013. France and Italy are the two largest importers of carp, followed by Croatia. Since 2010, carp exports have surpassed imports, owing to substantial increases in exports and production by Turkey.

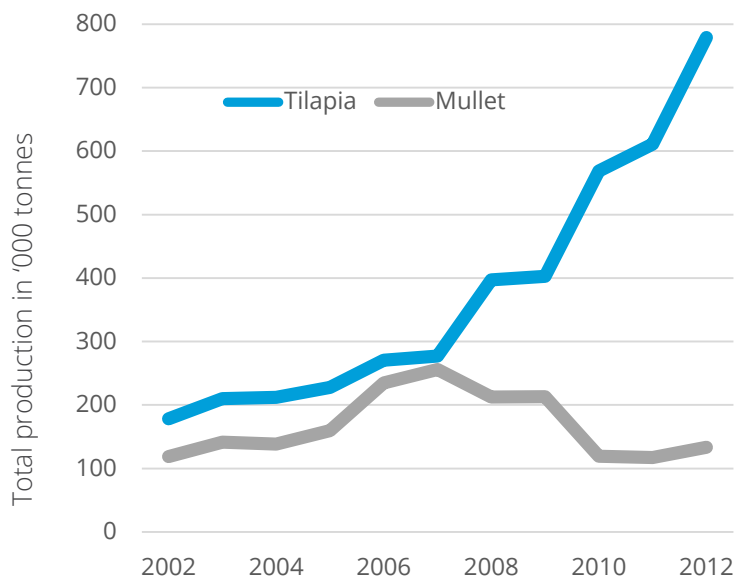
Trade - Trout

After a couple of stable years in the beginning of the 2000s, the export value of traded trout species has grown continuously, from USD 53 million in 2003 to USD 223 million in 2013, and now trout makes up a large proportion of the region's exported species. Turkey is the leading trout-exporting country, followed by Italy, Spain, and France. Trout import value developed at a lower level but at a growth rate even higher than the export value, increasing by nearly USD 45 million in the past decade. Spain and France are the major importing countries, followed by Italy. Over the past decade, the trout trade has changed considerably in the region with Turkey, once a small trader, emerging as a regional trout exporter.



OTHER SPECIES

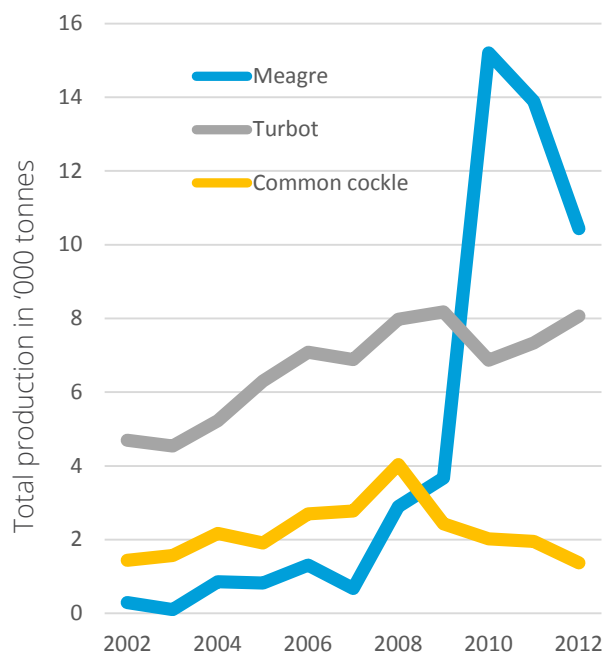
Production - Top species



Aquaculture production is expanding constantly in many parts of the region. Rising consumer demands, innovation, and the development of new farming technologies have led, among others, to diversification of farmed species. Some markets have developed considerably making substantial contributions to the overall increase in production. Currently, tilapia and mullet are the two main species by volume, although they have not been sufficiently explored in the whole region. Recent growth in the region's aquaculture production can be attributed largely to Egypt's tilapia output, which saw huge growth between 2006 and 2012. All Egypt's mullet and tilapia production is consumed domestically.



Production - Other species



New farmed species have been introduced over the last decade. Meagre and turbot are among the most popular species to be farmed in the Mediterranean and Black Sea countries. Meagre production has grown to more than 10,000 tonnes over the last decade. It is mainly produced in Egypt, where it has been farmed for the last five years. Meanwhile, the production of turbot has increased by 72% over the same period to more than 8,000 tonnes in 2012. A predictable supply, and evenly-sized fish are two of the farmed turbot industry's greatest strengths. Spain is the largest producer of turbot followed by France and production is mainly on the Atlantic coast. Many countries during the last decades have started to farm high value fish like Atlantic bluefin tuna, a product which is shipped mainly to Japan or other parts of Asia mostly for use in high end sushi restaurants. Although small, niche species, such as the common cockle mainly produced in the north of France, are important both to a region's farmed fish markets and for their contribution to growth in the aquaculture sector.



Aquaculture and employment

Aquaculture is a major economic activity in many Mediterranean and Black Sea countries. It delivers vital employment and secures the livelihoods of people in rural and coastal communities. It provides a wide variety of full-time, part-time, and seasonal employment in production units as well as support activities (feed production, product processing, equipment manufacture, and installation), distribution (transport, wholesale, and retail), research, and technical and administrative support.

Regional employment directly related to aquaculture is estimated at nearly 150,000 jobs. Part-time employment plays an important part in freshwater and shellfish aquaculture, because shellfish farming is a labour-intensive method in small, family-owned enterprises and cooperatives. It provides an important source of income to local communities. Generally, on-site work is done by men, whereas women work as technical and administrative support personnel, except in shellfish culture, where women participate in the production and harvest work. In most countries, the number of women in full-time employment does not exceed 30%.

In light of the growing importance of aquaculture and the development of new markets, employment in both the primary industry and downstream industries will increase, thus contributing to seafood supply and food security in the region, and producing safe, nutritious, and high-quality products.



Nutrition and the Mediterranean diet

Inspired by the traditional dietary patterns of Mediterranean countries, the Mediterranean diet, with its wealth of olive oil, fruits, vegetables, and wines, and its abundance of fish and fishery products, has evolved from a nutritional recommendation to a way of life with global reach. It was endorsed by UNESCO, when it recognised the Mediterranean diet as an Intangible Cultural Heritage in 2013.

According to FAO, fish products play an important role in food and nutritional security. Eating fish provides unique nutritional and health benefits and is considered a key element in a healthy diet. Fish provides the vitamins B and A, E and D. It has been recognised as a source of essential nutrients, not only high-value proteins, but more importantly, as a unique source of micronutrients, and long-chain omega-3 fatty acids, eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA), some of which are not found in non-aquatic foods. These are associated with a lower risk of coronary heart disease mortality and cancer, and birth defects related to suboptimal development of the brain and neural system and improved cardiovascular health.



Blue Growth

Based on forecasts that global aquaculture production will grow, Blue Growth aims to support sustainable growth of the aquaculture sector as a whole, and so support the development of sustainable jobs and the growth of Mediterranean and Black Sea aquaculture, with limited degradation of the environment. Blue Growth identifies and tackles economic, environmental, and social challenges. It highlights synergies between sectoral policies and study the interactions between the different activities and their impact on the marine environment and biodiversity. Among the key goals of the Blue Growth strategy are reducing administrative burden, improving access to water and space through coordinated spatial planning, increasing competitiveness, and maintaining exemplary standards of quality. Aquaculture in the Mediterranean and Black Sea countries has a high potential to provide sustainable jobs and growth alongside other economic sectors.

Fish utilisation and trade are integrated into government policies and the social-responsibility policies of industry, encompassing sustainability and protection for society and the environment. Blue Growth provides a framework for the development of policies by governments and sectoral organisations supporting value addition and trade promotion, which integrate economic performance, food security, sustainability, and social protection.



The future

Aquaculture production in the Mediterranean and Black Sea countries has increased on average by 4.2% each year between 1982 and 2012. This growth is a response to the rising demand for fishery products within these countries. Average apparent per capita fish consumption in the region increased from 13.9 kg in 1982 to 19.4 kg in 2011, although rates vary substantially between and within countries.

Population and income growth, together with urbanisation and dietary diversification, are expected to create additional demand for fishery products. Recent projections indicate that, surging global demand for fishery products will mainly be met from aquaculture production, while output from capture fisheries remains relatively stable. According to the International Food Policy Research Institute (IFPRI), World Bank, FAO publication “Fish to 2030: prospects for fisheries and aquaculture”, by 2030, capture fisheries and aquaculture will contribute equally to world fish production. Thereafter aquaculture is projected to supply more than 60% of fish and fishery products destined for direct human consumption.



***“The best way to predict
the future, is to create it.”***

Abraham Lincoln

The latest OECD-FAO Agricultural Outlook projects a 38% increase in aquaculture production over the next decade, an annual growth rate of 2.5%, which is significantly lower than a decade before. This slowdown will, among others, be due to restrictions caused by environmental impacts on production, competition from other users of water and coastal spaces, and the high costs of fishmeal, fish oil, and other feed inputs. Despite the slower growth rate, aquaculture will remain one of the fastest growing food-producing sectors.

Reflections of these world trends are expected in the Mediterranean and Black Sea countries, however, the specificities of each country will determine the aquaculture sector's future growth. Better governance and supportive policies, innovative companies, investments in research, and close collaboration between stakeholders are among the factors that will influence the growth of the industry, and countries that get it right will be richly rewarded.

A photograph of several wind turbines against a sky with soft, orange-tinted clouds from a sunset or sunrise. The turbines are white with red and yellow accents. A blue rectangular box is overlaid on the left side of the image, containing the title text.

Successful integration with the environment

Developing effective responses to climate change in the aquaculture sector and mainstreaming climate-responsive approaches are significant strategic and operational challenges. The impacts of climate change can be reduced through climate-smart processes and actions, so improving the sector's ability to mitigate damage to the environment.

Most bivalve farming is carbon friendly and comparatively energy efficient. Mussel farming generally takes place in floating or underwater systems to facilitate the mussels' permanent filtration of phytoplankton from the water. However, these systems are sensitive to climate variability and climate change. Common threats include changes in water quality (temperature and salinity) and the increased frequency of red tides, also known as algal blooms.

Mussel culture in the regions of Veneto and Emilia Romagna, which are among Italy's most industrialised, provides an encouraging example. In 2011, mussel production totaled 32,421 tonnes, and 50 farms generated 600 jobs and more than 20 million euro in the region. Mussel farming has been tested there for its effects on the marine environment, and changes have been successfully implemented. A credit carbon system, certificated to the ISO 14064 standard, ensures that carbon credits generated from mussel farming will be sold on the market to offset the CO₂ emissions generated by other sectors. A true success story for Mediterranean aquaculture.

The region

Albania

During the past decade, Albania's aquaculture production has expanded, mainly as a result of an upsurge in marine, brackish water, and freshwater aquaculture production. About ten species are cultivated, of which the main ones are rainbow trout, mussel, and cyprinids, which are grown in water reservoirs, artificial and natural lakes, and coastal lagoons.

Algeria

Algeria has experienced a fivefold increase in production over the past five years. Twelve species are cultivated, many of them in dam reservoirs and barrages. Most farming is based on cyprinids, which are reared in freshwater inland ponds and retention dams. The production of seabass and seabream has also increased over the same period.

Bosnia and Herzegovina

Farming salmonid and cyprinid species is a tradition more than a century old. Apart from these freshwater species the most important marine species are European seabass, gilthead seabream, common dentex and molluscs (Mediterranean mussel and European flat oyster).*

Bulgaria

Aquaculture is mostly land-based and freshwater, consisting mainly of cyprinids and rainbow trout. Thirty-one species are cultivated in cages, raceways and tanks, all in freshwater with the exception of mussel. Areas of considerable growth are new sturgeon farms. Production in the Black Sea region is dominated by Mediterranean mussel.

Croatia

Croatia pioneered commercial marine aquaculture with one of the first and largest hatcheries for European seabass in the early 1980s. Production has diversified over the past decade and today twenty-one species are cultivated. Production focuses mostly on European seabass, cyprinids, and Atlantic bluefin tuna ranching. Shellfish production comprises Mediterranean mussel and European flat oyster.

Cyprus

For a decade aquaculture has been one of the fastest growing food-production sectors in Cyprus. A total of ten species are cultivated of which sturgeon and rainbow trout are farmed in freshwater. Marine species, mostly gilthead seabream and European seabass, lead Cyprus' aquaculture production. Recently, the culture of meagre has increased in importance.

Egypt

Aquaculture has grown impressively over the last decade and currently accounts for more than half the farmed fish and seafood produced in the region. More than eleven species are cultivated, led by tilapia, mullet, and cyprinids. Marine and brackish production includes gilthead seabream, European seabass, and meagre. Most aquaculture takes place in the Nile delta and production is generally traded on the domestic market.

France

The aquaculture sector is largely dominated by bivalve farming, namely blue and Mediterranean mussel, Pacific cupped oyster and European flat oyster. A total of nineteen species are farmed. Marine fish aquaculture is led by European seabass, followed by gilthead seabream and turbot. France's efforts in aquaculture research and technology development have contributed to the industry's growth.

**Production and trade data not included in the statistical analysis*

The region

Georgia

Current production is limited to rainbow trout culture in flow-through systems on small-scale farms and culture-based inland cyprinid fisheries in ponds, lakes and reservoirs. Aquaculture is in its infancy, but has the potential to increase production from a diverse range of species in both inland waters and the marine environment.*

Greece

Since the early 80's Greek marine aquaculture has grown impressively making it a leading producer of gilthead seabream and the region's largest exporter of finfish. Greece farms mainly nine species. Marine aquaculture includes the production of European seabass and Mediterranean mussel, while rainbow trout is the main freshwater farmed species.

Israel

Aquaculture includes tilapia, cyprinids, and mullet farmed in polyculture systems. Marine aquaculture encompasses European seabass and gilthead seabream. Israel's aquaculture sector has grown steadily for the past two decades.

Italy

Italian aquaculture is based on a long tradition and history. It is characterized by a high level of specialisation and large-scale production. Of the thirty species farmed, production is dominated by Mediterranean mussel, Japanese carpet shell, and rainbow trout. Italy is the main producer of Japanese carpet shell in Europe. European seabass and gilthead seabream are the major marine farmed finfish species.

Lebanon

The aquaculture sector is relatively small, but has grown in recent years, mainly based on the production of rainbow trout. During the last decade aquaculture production has included limited volumes of whiteleg shrimp.

Libya

The aquaculture sector is relatively new and has been facilitated by the availability of clean water and favorable climatic conditions. The main species include gilthead seabream, European seabass, cyprinids, and tilapia.

Malta

The main farmed species are gilthead seabream, followed by meagre, and European seabass, all produced in marine cages. The aquaculture sector in Malta also includes Atlantic bluefin tuna ranching.

Montenegro

Aquaculture encompasses the production of rainbow trout, Mediterranean mussel, European seabass, and gilthead seabream. Since 2004, annual aquaculture production has steadily increased.

Morocco

A diversified aquaculture industry produces marine, brackish and freshwater fish and shellfish. Production comprises six main species. Shellfish production includes Pacific cupped oyster, while European seabass is the most important marine finfish and freshwater production of cyprinids is also significant. Other farmed species include European eel, rainbow trout, and tilapia.

The region

Romania

The aquaculture sector represents an important volume within the fishery production. Some twenty-five species are farmed in freshwater including cyprinids, rainbow trout, and sturgeon. A small production of Mediterranean mussel and oyster has also been initiated recently.

Russian Federation

Freshwater aquaculture is a steadily growing sector in the Black Sea area. Cyprinids, produced in ponds, are the main farmed species here. Production in the “Europe inland waters” area is mostly focused on cyprinids and salmonids, while mussel is the most cultured species in the Black Sea. *

Slovenia

The aquaculture sector comprises freshwater farming of salmonids and cyprinids, as well as marine finfish and shellfish. Rainbow trout, Mediterranean mussel, and common carp makes up the bulk of aquaculture production. European seabass is the main marine farmed species.

Spain

The aquaculture sector is widely diversified in terms of species and farming technologies. About thirty species are cultivated. Species leading in volume include blue mussel, rainbow trout, gilthead seabream, and European seabass. Although the trend has been towards consolidation in recent years, the industry is still dominated by small- to medium-sized farms.

Syrian Arab Republic

Aquaculture production grew considerably in the 90s, and has remained steady for the past decade. Cyprinids and tilapia constitute nearly two-fifths of Syria's aquaculture production, most of which is in inland waters.

Tunisia

Aquaculture production has increased significantly over the past decade, especially in marine and brackish water and for European seabass and gilthead seabream. A total of eleven species are farmed in the country including European seabass, gilthead seabream, Mediterranean mussel, Pacific cupped oyster, mullet, common carp, and tilapia.

Turkey

The rapid growth of the aquaculture sector has made Turkey a leading producer in the Mediterranean. Currently, it produces large quantities of European seabass, gilthead seabream, and rainbow trout. Turkish production extends also to the Black Sea, where sea-raised trout and European seabass are cultivated.

Ukraine

The aquaculture traditions of Ukraine go back several centuries. Traditionally lake fishing facilities in Ukraine have focused on the cultivation of common carp, but over the past years significant structural changes have been made. The main cultured species are cyprinids in freshwater, mullet in brackish water and Mediterranean mussel in the sea.*

**Production and trade data not included in the statistical analysis*



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