

# FISHERIES DEVELOPMENT AND THE FORMATION OF THE FISH PRODUCTS MARKET IN UKRAINE AND IN THE CENTRAL AND EASTERN EUROPEAN COUNTRIES

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**Abstract.** The fishing industry is an important component of the economy not only in Ukraine, but also in all Central and Eastern European countries at the present stage of development. Developing and implementing the innovative technologies in fish farming and fish processing require mandatory and constant analysis of the fish market infrastructure. In the fishing industry, trade plays an important role as an employment center, a food supplier, a source of income, a contribution to economic growth and development, and also for food security and nutrition. For many countries and numerous coastal, river, island and inland regions, fish exports are critically important to the economy. *The purpose* of the study is to find out a current state of the fishing industry in Ukraine and in the Central and Eastern European countries, the prospects for its development and to conduct a research of fish and fish products import-export. The problem of the fisheries economic development in Ukraine and in the Central and Eastern European countries has been considered in the works of many domestic scientists and is reflected in a number of Laws of Ukraine, state programs and legislative acts, but many issues remain unsolved.

*Methodology.* The state of fisheries in Ukraine has been researched, the amount of edible fish and fish products per capita by the population of Ukraine over the past 10 years has been carried out, and the volume of fish and fish products imports and exports in recent years in Ukraine has been analyzed. The catch volumes of fish and fish products in Europe in marine areas, inland waters, and the total volume of aquaculture production in the period from 2000 to 2018 in the Central and Eastern Europe countries have been studied.

*Result.* Since the beginning of the 21st century, Ukraine has lost its potential and fishing opportunities in the marine economic zones of other countries, as a result of which the production of aquatic biological resources was reduced to 220 000-250 000 tons per year from 2007 to 2013. As a result of the annexation of the Crimean Peninsula by the Russian Federation in 2014, the production of aquatic bioresources in Ukraine has further decreased from 225 000 tons in 2013 to 90 000 tons in 2014-2019. All this shows that the Ukrainian fishing industry market is not provided at the expense of its own resources. Therefore, Ukraine constantly imports products from the non-resident partners. Today, Ukraine imports about 90% of fish. This situation is due to the lack of a specialized fleet, processing industry, quotas in the neutral waters and poaching. In addition, the cost of the Ukrainian fish is higher than imported ones, so the products lose their competitiveness. Despite significant imports of fish and fish products to Ukraine, the country continues to increase its domestic products export. In 2019, export of fish products increased by almost 10% compared to 2018, and the Ukrainian producing companies continue to open new sales markets for their products in different countries of the world. Due to limited access to the open sea and a relatively small coastline, almost all Eastern and Central European countries are not among the leaders in fish industry and seafood production. To provide the population with fish and fish products in the countries of Central and Eastern Europe, fish are caught intensively in inland waters, as well as, this region is actively restoring its traditional aquaculture systems. In Central and Eastern Europe, the fish processing industry has made great strides in the quality of fishery products, sanitation, transport and supply chain traceability.

*Practical implications.* Currently, fish industry in almost all countries of Central and Eastern Europe is going through a problematic time that has developed due to a number of difficulties in the states, namely: financial ones, a breach of economic ties, the deterioration of the ecological status of the inland waters, an insufficient amount

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of work to restore fish stocks. This significantly affects the reduction in cultivating and catching the commercial fish in inland waters and in general. The results of the analysis of the economic situation of Ukraine in the fishing industry and the tendencies of possible changes indicate that negative patterns in its development will not be overcome in the absence of state support for the industry. To ensure the development of the fishing industry, the state must restructure the tax and customs policy, and its financing should be carried out at the expense of the state budget. Funding should also be provided for the organizations engaged in the fish stocks study, conservation and reproduction, as well as for the research organizations that carry out the thematic work of national importance. Many transition economies in Central and Eastern Europe have experienced declining in production intensity due to reduced fish farming costs. But in spite of everything, the fisheries of this region continue to grow and develop intensively.

**Key words:** fish industry, economic situation, catch, consumption, imports, exports, fish, aquatic bioresources.

**JEL Classification:** D24, E23, Q22

## 1. Introduction

One of the most important problems of our time is a problem of providing the planet's population with protein foods, the most balanced of which is fish protein. The development of world aquaculture objectively indicates an increase in its share in the overall balance of food production.

To provide the population in Central and Eastern Europe, including Ukraine, with fish and fish products fish are caught intensively in inland waters, as well as, this region is actively restoring its traditional aquaculture systems.

Aquaculture in almost all Eastern and Central European countries is characterized by four production systems: pond, hot water, industrial (caged fish farming in heated waters of power plants with closed water supply systems) and fish farming in natural and artificial reservoirs (pasture fish farming).

Analyzing the total volume of aquaculture production in some countries of Eastern and Central Europe, we can see that all of them have a little but stable production growth.

In the fishing industry, trade plays an important role as an employment center, a food supplier, a source of income, a contribution to economic growth and development, and also for food security and nutrition. For many countries and numerous coastal, river, island and inland regions, fish exports are critically important to the economy.

Fish trade has grown significantly in recent decades, and the fisheries sector is operating in an increasingly globalized environment. Fish can be grown in one country, processed in another, and consumed in the third.

The fishing industry is an important component of the economy in Ukraine, and in the Central and Eastern European countries at the present stage of the development. Developing and implementing the innovative technologies in fish farming and fish processing require mandatory and constant analysis of the fish market infrastructure.

## 2. Fish industry in Ukraine

Industrial fisheries, fishing industry use the world's natural resources of the oceans, seas, lakes, rivers, reservoirs: various species of fish, marine mammals, shellfish, crustaceans, aquatic vegetation (Kolesnikova, 2011). Fisheries can be considered as one of the types of nature management, which consists in the production of fish and other seafood. There are industrial, amateur and sport fishing (Burhaz, 2019).

Fisheries are of major social and geopolitical importance to the country (especially in coastal areas, where up to 70% of the industry's production potential is concentrated).

In recent years, the fisheries sector of Ukraine has undergone changes, namely the volumes of fish and fish products catch are decreasing every year, the annexation of the territory of the Autonomous Republic of Crimea has been the main reason for this.

The state of fisheries in Ukraine for the period from 2010 to 2018 is shown in Table 1.

The data in Table 1 show that the greatest increase in catching fish has been observed in the period of 2010-2013. A significant decline in the total catch of aquatic biological resources has been seen since 2014.

The data in Table 1 also show that although a little but inland fishing is steadily increasing.

Thus, in 2018, Ukraine caught and produced 86222.5 tons of fish and other aquatic living resources, which was about 2.05 kg per inhabitant.

According to international medical standards, the annual consumption of fish and seafood should be 20 kg per person. At the same time, in Ukraine, according to the State Statistics Committee, on January 1, 2019 there were only 14.5 kg of fish and seafood for one person (Derzhavna sluzhba statystyky Ukrainy). In turn, in recent years, there has been an increase in consumption of fish and fishery products (Figure 1) (Derzhavna sluzhba statystyky Ukrainy).

According to data of the State Statistics Committee of Ukraine for catching fish, only 2 kg of the Ukrainian fish is per person, therefore, about 86% of

Table 1

**The state of fisheries in Ukraine for the period from 2010 to 2018**  
(according to the State Statistics Committee of Ukraine)

Years	Extraction of aquatic bioresources					
	Total		Including the in-land water bodies		Including fish catching	
	t	% till the previous year	t	% till the previous year	t	% till the previous year
2010	218681	85.1	38364	90.9	215017	90.1
2011	211182	96.6	37574	97.9	205285	95.5
2012	203926	96.6	41569	110.6	195490	95.2
2013	225802	110.7	45695	109.9	216354	110.7
2014 <sup>1</sup>	91252	109.3	39612	88.3	80958	98.3
2015 <sup>1</sup>	88552	97	38507	97.2	73963	91.4
2016 <sup>1</sup>	88443	99.9	40754	105.8	78490	106.1
2017 <sup>1</sup>	92645	104.7	42176	103.5	81875	104.3
2018 <sup>1</sup>	86222.5	93.1	k	k	64737.9	79.1

1 – The data are given without taking into account the temporarily occupied territories of the Autonomous Republic of Crimea, the city of Sevastopol and a part of the temporarily occupied territories in the Donetsk and Luhansk regions.

Symbol (k) – Data are not disclosed to ensure compliance with the requirements of the Law of Ukraine “On State Statistics” on the statistical information confidentiality.

fish consumed by the Ukrainians are imported from abroad.

According to the State Statistics Committee, in 2018 compared with 2010 the catch of fish decreased by 39%. This is due to various reasons, the main ones are: the annexation of the Autonomous Republic of Crimea, an unstable political and economic situation in the country, reorientation of the budgetary financial resources into other spheres of the national economy rather than into the fishing industry, etc.

Compared to 2016, the catch of fish in 2017 increased by 4.3% and the volume of other aquatic living resources extraction amounted to 92645 tons, which was 4.7% more than last year. In 2018, the catch of fish and the production of other aquatic living resources amounted

to 86222.5 tons and 64737.9 tons respectively, which was 6.9% and 20.9% less than last year.

Since the beginning of the 21st century, Ukraine has lost its potential and fishing opportunities in the maritime economic zones of other countries, resulting in reducing the production of aquatic bioresources to 220 000 – 250 000 tons per year from 2007 to 2013 (Derzhavne ahentstvo rybnoho hospodarstva Ukrainy).

As a result of the annexation of the Crimean peninsula by the Russian Federation in 2014, in Ukraine the production of aquatic bioresources has further decreased from 225 000 tons in 2013 to 90 000 tons in 2014-2019 (Derzhavne ahentstvo rybnoho hospodarstva Ukrainy).

In 2019, the total catch of fish and other aquatic bioresources by the Ukrainian fisheries enterprises

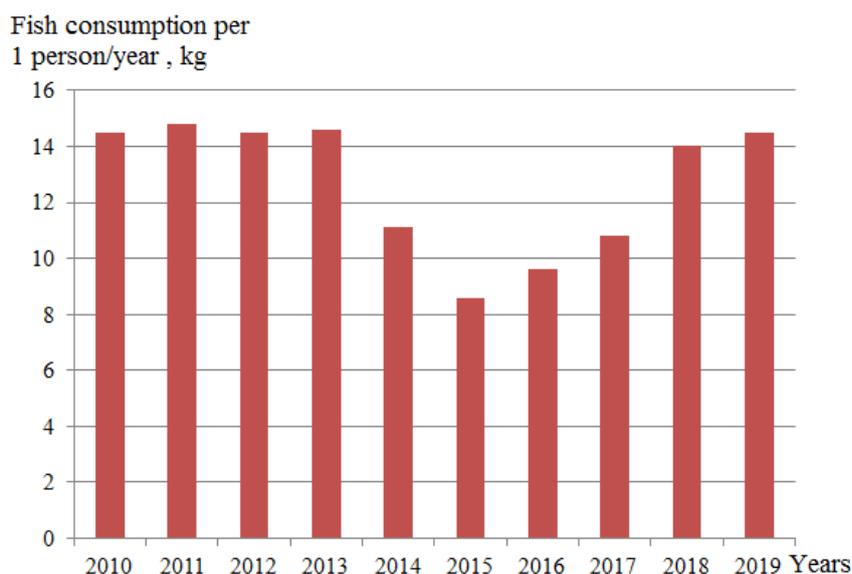
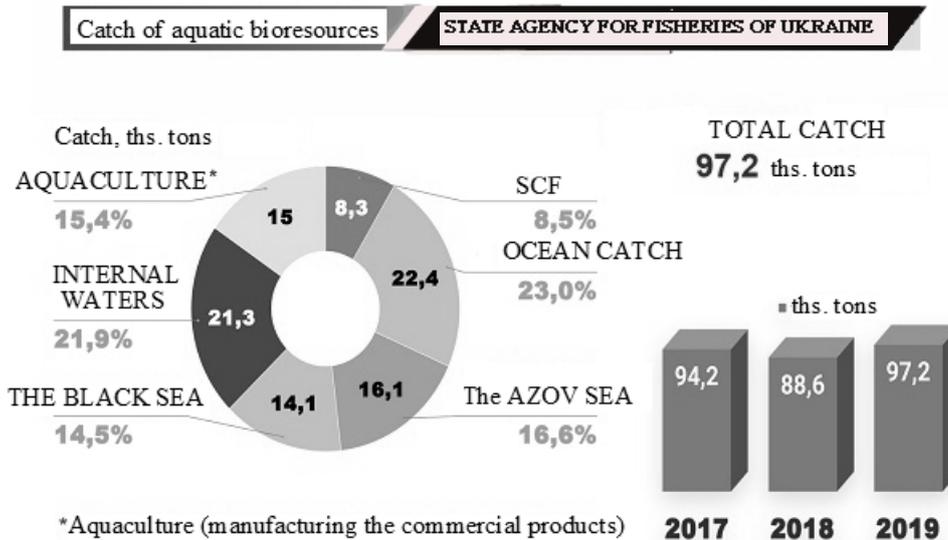


Figure 1. Consumption of fish and fishery products per year, kg (according to the State Statistics Committee of Ukraine)



**Figure 2. Volumes of catching aquatic bioresources in Ukraine for 2019 (according to the State Agency for Fisheries of Ukraine)**

increased by 9.6% compared to 2018. Thus, during 2019, the Ukrainian fishermen caught 97.2 thousand tons of fish and other aquatic bioresources. In 2018, the figure was 88.6 thousand tons (Figure 2).

Also, in 2019, 14959 tons of aquaculture products were caught: 13544 tons in ponds, 21.4 tons in fishponds, 527.5 tons in pools, 117.3 tons in aquariums, 749.6 tons in other water bodies (Derzhavne ahentstvo rybnoho hospodarstva Ukrayiny).

In addition, special commodity fisheries, combining elements of aquaculture and industrial fishing (SCF), are operating on the lakes and water bodies (parts of them) of Ukraine. In 2019, over 8.2 thousand tons of aquatic bioresources were produced, which is 14.7% more than in 2018 (Derzhavne ahentstvo rybnoho hospodarstva Ukrayiny).

It should be noted that poaching and the so-called IUU-fishing (illegal, unreported, unregulated) persist in Ukraine and therefore some of the products remain in the shadow without being included into the official statistics. According to various estimates, it could be from 45 000 to 90 000 tons, which could also enter the market. Almost every day the State Agency for Fisheries of Ukraine reports about the detention of fish products poachers in the waters of Ukraine (Derzhavne ahentstvo rybnoho hospodarstva Ukrayiny).

Thus, the real volume of the Ukrainian fishery products entering the country's food market may be around 135 000 – 180 000 tons (Derzhavne ahentstvo rybnoho hospodarstva Ukrayiny).

All this shows that the Ukrainian fishing industry market is not provided at the expense of its own resources. Therefore, Ukraine constantly imports products from the non-resident partners.

### 3. Import and export of fish in Ukraine in recent years

In 2019, 394 000 tons of fish and seafood were imported by the Ukrainian importing companies, totaling 750 million USD. The volumes of fish imports are given in Table. 2.

Comparing the total indicators of imports in tons, compared with 2018, in 2019, imports did not increase significantly by 5% (it was 375 000 tonnes, it became 394 000 tons), but in monetary terms, the increase was much more significant (it was 630 million USD, it became 745 million USD).

It should be noted that fish consumption in Ukraine is strongly influenced by two key components: the value of the national currency against the dollar and the real income of the population.

The relative stability of the hryvnia over the past 3 years and its strengthening at the end of 2019 affected the increase in the consumption of fish products in Ukraine, 80% of which were imported.

In January-September 2019, the nominal incomes of the population, according to the estimates of the Ministry of Economy, based on the quarterly state statistics, increased by 15% compared to the corresponding period of 2018. At the same time, the nominal average monthly wage of full-time employees increased by 18.4% to 10 497 UAH in 2019, while real wages increased by 9.8%. The increase in an average monthly wage occurred primarily due to the high competition with foreign employers for skilled labor and the high economic activity of business entities as well as in the context of increasing the state social standards, including a minimum wage.

To date, Ukraine imports about 90% of fish. This situation is due to the lack of a specialized fleet,

Table 2

**Volumes of fish imports for 2018-2019**  
(according to the Association of Ukrainian Fish and Seafood Importers)

Name of goods	Import 2018		Import 2019		% Changes	
	Cost, million	Weight, t	Cost, million	Weight, t	Cost, million	Weight, t
Live fish	265	5	267	7	1	40
Fresh or chilled fish	107350	15414	140531	22537	31	46
Frozen fish	351589	290601	376626	285285	7	-2
Fish fillets and other fish meat	44248	24637	65195	32294	47	31
Dried, salted, smoked fish	7708	5749	10313	6965	34	21
Shellfish	27039	4847	38565	7333	43	51
Clams	11305	3175	13023	3604	15	14
Water invertebrates	39	1	38	1	-3	0
Prepared or pre-served fish; caviar	53832	23777	71747	28045	33	18
Prepared or pre-served crustaceans, molluscs	25863	7198	29149	7958	13	11
<b>Total</b>	<b>629238</b>	<b>375404</b>	<b>745454</b>	<b>394029</b>	<b>18</b>	<b>5</b>

processing industry, quotas in the neutral waters and poaching. In addition, the cost of Ukrainian fish is higher than the imported one, so the products lose their competitiveness (Demchuk & Dracheva, 2013; Shevchenko, 2014; Kleshchivskij et al., 2017).

In total, Ukraine imports fish and seafood from 60 countries.

Norway is the traditional leader in fish imports in Ukraine. Iceland occupies the second place and the USA is in the third place. They are followed by Estonia, Latvia, Spain, Canada, United Kingdom, China, Vietnam and Argentina.

The range of fish in Ukraine is represented by both domestic and imported products:

- Domestic products: carp, pike, capelin, mackerel, sprat;
- Imported products: flounder, perch, pangasius, salmon, oily fish, hake, pollock, capelin, notothenia, herring, mackerel, cod, tuna, tilapia, sea trout, etc. (But, 2017).

Considering the import by fish species, it should be noted that the oceanic herring accounts for 56%; mackerel – 13%; sardine species – 10%; pollock – 5%. The other 16% of imports are fish species such as salmon,

capelin, whiting, hake and others. Atlantic herring and mackerel are imported to Ukraine from Norway. Sardines are also imported from Norway, the USA, Canada, Spain and Argentina. Sprats are mostly Baltic. Pollock and salmon are imported from Russia and Norway. The main importers of delicate fish species are France, Italy and China (Stets, 2017).

Despite significant imports of fish and fish products to Ukraine, the state continues to increase the growth of domestic products exports (V Ukraine vyroslo rybnoe proizvodstvo, 2019). The Ukrainian fish export volumes are presented in Table 3.

Thus, in 2019, fishery exports have increased by almost 10% compared to 2018 (Ukrainskaya ryba zavoevyvaet Evropu: komu i skolko prodaem, 2018), and the Ukrainian producing companies continue to open new sales markets for their products in different countries of the world (Burhaz, 2020).

#### 4. Survey methodology

The problem of economic development of fisheries in Ukraine was considered in the works of many domestic

Table 3

**The Ukrainian fish and fish products exports**  
(according to the Association of Ukrainian Fish and Seafood Importers)

Name of goods	Export 2018		Export 2019		Changes %	
	Cost, million	Weight, t	Cost, million	Weight, t	Cost, million	Weight, t
Live fish	468	383	422	328	-10	-14
Fresh or chilled fish	282	65	398	158	41	143
Frozen fish	1523	668	1078	398	-29	-40
Fish fillets and other fish meat	17333	2722	23148	3707	34	36
Dried, salted, smoked Fish	3678	467	4234	496	15	6
Shellfish	103	14	840	122	716	771
Clams	1593	568	3518	1089	121	92
Water invertebrates	2	1	1	1	-50	0
Prepared or pre-served fish; caviar	9086	4929	7506	3849	-17	-22
Prepared or pre-served crustaceans, molluscs	3004	698	5028	1394	67	100
<b>Total</b>	<b>37072</b>	<b>10515</b>	<b>46173</b>	<b>11542</b>	<b>25</b>	<b>10</b>

scientists, such as S.I. Alimova, P.P. Borshchevskyi, M.S. Stasichena, M.A. Hvesika, N.M. Yarkina and others. It was also reflected in the relevant Laws of Ukraine, State Programs and Legislative Acts, namely “On Fish, Other Living Water Resources and Food Products Thereof”; “On Aquaculture”; “On Fishery, Industrial Fishing and the Protection of Water Bioresources”; “On the Concept of Fisheries Development in Ukraine”, etc. However, despite the fact that the problems of fisheries development are the subject of much scientific researches, many questions remain unsolved.

The purpose of the work is to find out the current state of the Ukrainian fishing industry, the prospects for its development and to conduct fish and fish products import-export study.

The state of fisheries in Ukraine has been researched, the amount of edible fish and fishery products per capita by the population of Ukraine over the past 10 years has been carried out, and the volume of imports and exports of fish and fishery products in recent years in Ukraine has been analyzed.

## 5. Fisheries and fish market in Central and Eastern Europe

Due to limited access to the open sea and a relatively small coastline, almost all Eastern and Central European countries are not among the leaders in the fishing industry and seafood production.

To provide the population with fish and fish products in the countries of Central and Eastern Europe, fishing is intensive in inland waters, and, also, this region is actively restoring its traditional aquaculture systems.

Considering European fishing in marine areas as a whole, it can be noted that in 2011, the catch was 12 988 688 tons, and in 2017 this figure increased to 14 401 435 tons (Figure 3).

As well as the sea catch, the European catch of fish and fish products in inland waters in the period from 2011 to 2017 increased and amounted to 421 385 tons (Figure 4).

Inland fish farming is a unique activity in the field of fisheries. Its main task is to meet people’s needs for fish and fish products which are essential products in the human diet.

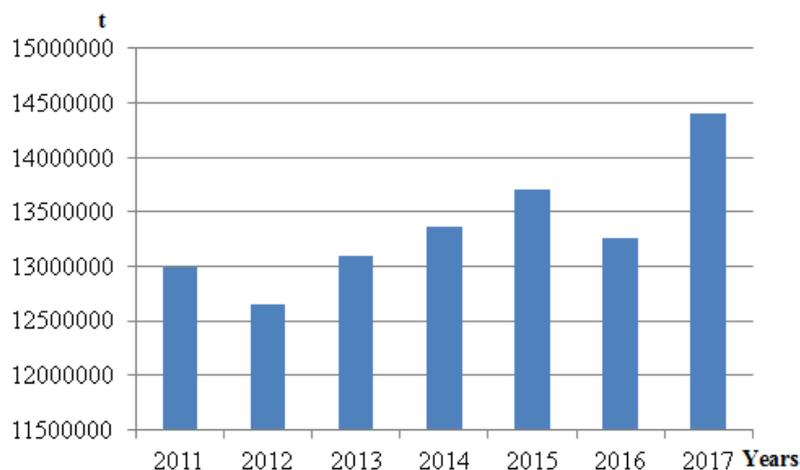


Figure 3. The European fishing in marine areas (according to FAO)

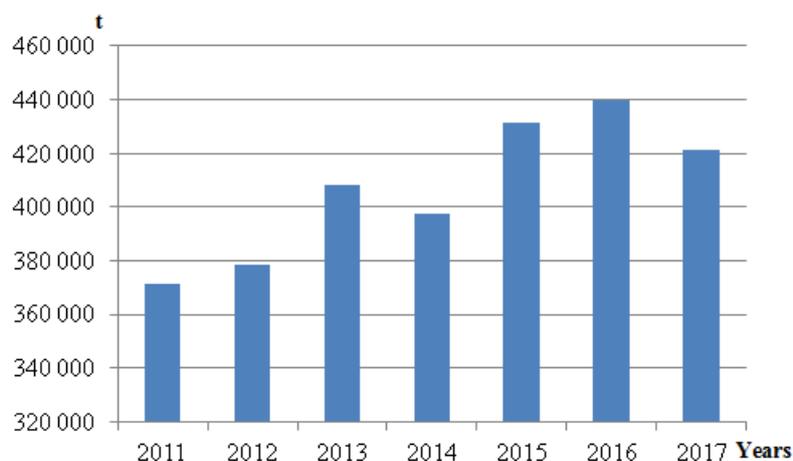


Figure 4. The European catch of fish and fish products in inland waters (according to FAO)

Aquaculture in almost all countries of Eastern and Central Europe is characterized by four production systems: pond, hot water, industrial (caged fish farming in heated waters of power plants with closed water supply systems), as well as fish farming in natural and artificial reservoirs (pasture fish farming) (Aps, 2004).

Analyzing the total volume of aquaculture production in some countries of Eastern and Central Europe, we can see that all of them have a little but stable growth of production. Thus, according to the FAO, in Belarus, the total volume of aquaculture production in 2018 reached 11 580 tons, 43 361 tons in Poland, 3 750 tons in Lithuania, 199 505 tons in Russia (Figure 5) (FAO, 2019).

Although the European Union continues to be the largest importer of fish and fish products in the world, a share of the countries in fish imports is growing steadily. According to FAO, there has been a significant increase in fish consumption in Central and Eastern Europe due to the growth of purchasing power in the region.

Regional integration and globalization are challenging the countries of Eastern Europe. The states need to meet high quality standards for fish products to increase a share of fish exports in the new markets such as the EU. In Central and Eastern Europe, a fish processing

industry has made great strides in the quality of fish products, sanitation, transport and supply chain traceability.

Export-oriented aquaculture plays an important role in the economies of some Western European countries, while in the countries of Central and Eastern Europe the main goal of aquaculture production is to meet the demand of local markets. The general picture of fishery products export and import is determined by regulatory documents that operate inside and outside the borders of different countries of Central and Eastern Europe. The situation becomes even more complicated if we take into account the differences between the countries of the region, which are the members and the non-members of the EU. Fish produced in Central and Eastern Europe is exported mainly in live, chilled, quick-frozen, canned, salted and smoked forms.

The Czech Republic, as the largest exporter of carp in Europe, exports mainly live fish to the German market (about 40-50%) and to Slovakia (about 20%).

Hungarian live carp export is gradually declining, primarily due to the dominant role of the Czech carp aquaculture. The most competitive Hungarian products on the European carp market are high-quality repair and breeding herds, and in the field of live fish export it is a silver carp, that is sold to Poland for further processing.

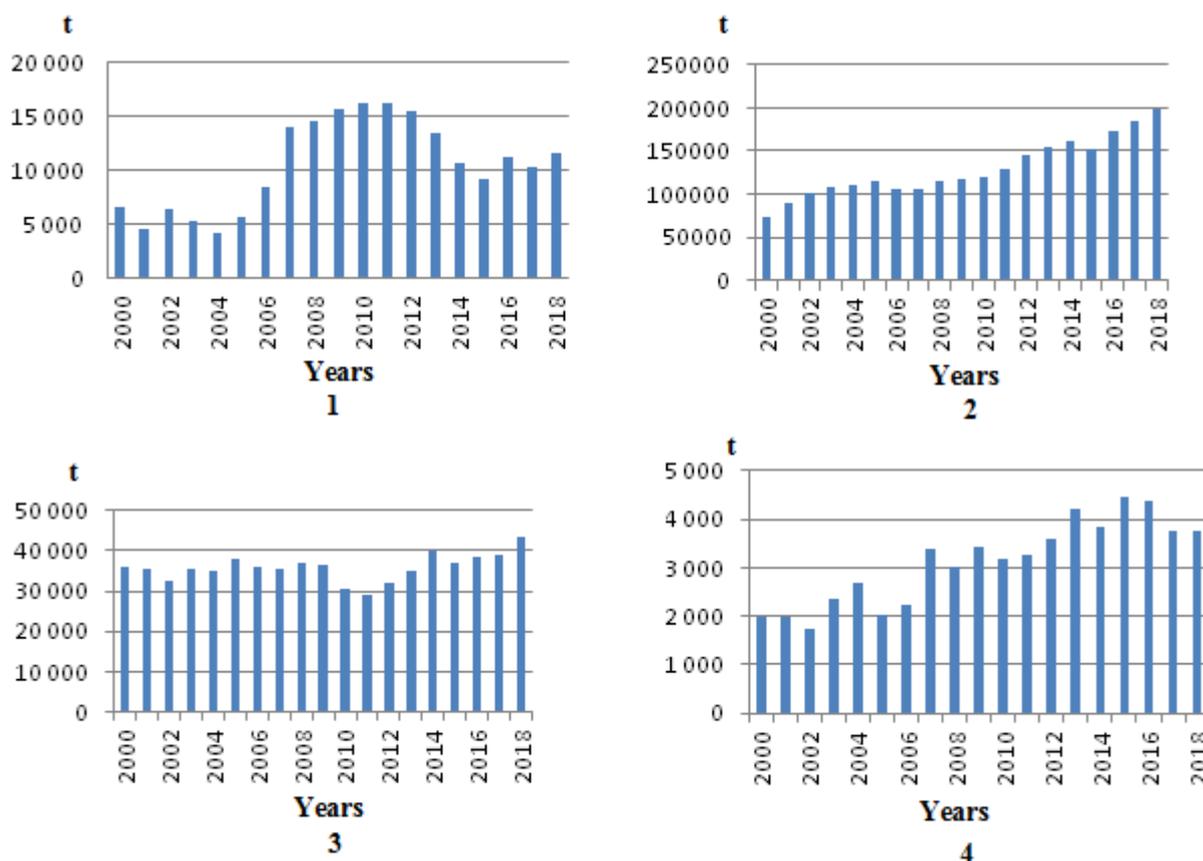


Figure 5. A total volume of aquaculture production in the period from 2000 to 2018  
 1 – Belarus, 2 – Russia, 3 – Poland, 4 – Lithuania

In Poland, the main export aquaculture product is rainbow trout. About 25% of trout produced in Poland is mainly exported to the German market. Most of the exported trout is sold in a processed (smoked) form.

Despite Russia's huge aquaculture production, the only product of the Russian aquaculture sold for export is sturgeon and trout caviar. The main importers of the Russian sturgeon caviar are China, Greece, Germany, the United States and Bulgaria, while trout caviar is exported to Armenia, Belarus, Georgia and Ukraine.

Bulgaria also exports significant volumes of aquaculture products, mainly shellfish (46%) and frozen fish (54%) to Romania, Serbia, Montenegro, Germany, Greece, Turkey and Japan. Imports of aquaculture products are growing in the most Central and Eastern European countries, especially Hungary, Bulgaria and Romania, where a gap between the number of fish and seafood produced and consumed in the country is filled with imported products.

Many transition economies in the countries of Central and Eastern Europe have experienced declining production intensity due to reduced fish farming costs. But in spite of everything, the fishing industry of this region continues to grow and develop intensively, and the intensive development of aquaculture and freshwater fisheries, improving the quality of fishery products, including guaranteeing food safety for consumers and the development of science and new technologies will bring a significant progress to the countries of Central and Eastern Europe.

## 6. Conclusions

Currently, fish industry is going through a problematic time that has developed due to a number of difficulties

in the country, namely: financial ones, a breach of economic ties, the deterioration of the ecological status of the inland waters, an insufficient amount of work to restore fish stocks. This significantly affects the reduction in the cultivation and catch of commercial fish in the inland waters and in general.

In addition, the following can be distinguished from a wide range of priority tasks that impede the further development of fisheries: the status of reproduction and protection of aquatic bioresources; restoration of functioning of the country's existing inland waters for their efficient intended use; a state regulation and maintenance of the industry.

The annexation of Crimea also caused a negative impact on the state of the fishery complex, because of this, Ukraine lost fish catches. In particular, after annexation of the Crimea, Ukraine lost about 2/3 of all fish catches.

Specific features of the fishing industry require urgent government support to create favorable conditions for lending and investment. The results of the analysis of the economic situation in the fish industry in Ukraine, which has developed in the fisheries of the inland water bodies, as well as the tendencies of the possible changes, show that negative regularities in the development of fish industry will not be overcome in the absence of the state support for the industry.

To ensure the development of the fishing industry, the state must restructure the tax and customs policy, and its financing should be carried out at the expense of a state budget. Funding should also be provided for the organizations engaged in the fish stocks study, conservation and reproduction, as well as for the research organizations that carry out a thematic work of national importance.

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