Fisheries as a factor of strengthening food security in Russia

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Abstract. The study provides a comprehensive assessment of the role of the fishery complex in ensuring food security. The health and life expectancy of the population largely depend on the amount of fish consumed. The main source of fish intake in the diet of Russians is the industrial catch of aquatic organisms. The catch volumes have been relatively stable in recent years. Aquaculture production in Russia is insignificant, but continues to grow. The analysis revealed a low dependence of food supply on imports and a high degree of self-sufficiency in fish products in Russia. Due to the decrease in the purchasing power of the population's income and price inflation, the physical and economic accessibility of fish and fish products for a significant part of consumers is decreasing. The structure of consumption is dominated by cheap fish products and products with a low processing depth. A tendency towards a decrease in the quality of fish products in the consumer market has been revealed. These factors indirectly threaten the food security of Russia.

1. Introduction
The problem of ensuring food security is becoming one of the most important for modern society. According to forecasts of scientists and experts in the next 30 years, the problem of food shortages will come out on top in the world [1].

Several foreign studies point to the centrality of fish in the food security debate [2, 3, 4, 5]. However, the scientific literature and strategic documents at the state level do not cover the contribution of fisheries to food security.

The value of the global food security index (GFSI) of Russia in 2020 was 73.7 points out of 100. Russia took 24th place in the world ranking among 113 countries [6]. An improvement was noted in the index of Russia in terms of affordability and food availability. The overall indicator of food quality and safety has declined due to the deterioration of the dietary diversity of the population and the poor quality of protein. This makes it necessary to study the place and role of the fishery complex in the food security system. The fish industry acts as a supplier of food products with a high content of easily digestible animal proteins, essential amino acids, unsaturated fats, macronutrients and trace elements, natural vitamins and biologically active substances.

2. Materials and methods
The paper attempts to analyze the state of food security in Russia from a scientific point of view. The purpose of this article is to substantiate the role of fisheries in ensuring the food security of the Russian Federation.

The methodological basis of the conducted research was the scientific works of domestic and foreign scientists in the field of problems of fishing and fish farming and the contribution of fisheries to food
security. The information and empirical base of the study was the data of the Federal State Statistics Service, the Federal Agency for Fisheries, the Ministry of Agriculture, the Federal Customs Service, the Federal Service for Supervision of Consumer Rights Protection and Human Wellbeing of Russia, reference materials, periodicals, the information potential of the network The Internet.

In the process of research, general methods of scientific knowledge were used: observation, comparison, analysis, generalization, as well as special scientific methods: abstract logical, monographic, economic and statistical.

3. Results
In accordance with the Food Security Doctrine of the Russian Federation, two criteria are established: ensuring the country's food independence and ensuring the physical and economic accessibility of safe food for the population [7]. This approach is in line with the World Food Summit Declaration [8]. The Declaration as the fundamentals of food security defines the availability, use, accessibility and stability of food production (supply).

With regard to the fishing industry, physical accessibility involves the supply of a wide range of fish and fish products in sufficient quantities in the domestic market. Physical accessibility directly depends on the volume of catch of aquatic biological resources and their production under aquaculture conditions.

Gross production of aquatic biological resources and aquaculture production in Russia are characterized by a steady growth trend (table 1). In terms of catch, Russia is among the top 5 largest countries in the world and produces 0.2% of world aquaculture production. The main volume of extraction of aquatic biological resources (more than 90%) falls on oceanic fisheries with a predominance of pollock, cod, herring, salmon, haddock. Domestic commercial aquaculture is mainly represented by the cultivation of relatively low-value fish species - carp (about 53% of the total) and herbivorous fish.

Table 1. Characteristics of the Russian fisheries industry from the standpoint of food security.

| Characteristics                                      | 2015  | 2016  | 2017  | 2018  | 2019  | 2020  |
|------------------------------------------------------|-------|-------|-------|-------|-------|-------|
| Industrial fishing, million tons                     | 4.3   | 4.6   | 4.7   | 5.1   | 4.9   | 5.0   |
| Aquaculture, million tons                            | 0.16  | 0.17  | 0.22  | 0.24  | 0.29  | 0.33  |
| Self-sufficiency level, %                            | 132.8 | 140.6 | 138.7 | 158.5 | 152.8 | -     |
| Share of domestic production in total commodity      |       |       |       |       |       |       |
| resources, %                                         | 83.4  | 84.3  | 84.4  | 83.7  | 83.3  | -     |
| Consumption of fish and fish products per capita, kg/person | 22.3  | 22.3  | 22.9  | 20.2  | 21.1  | 21    |
| The purchasing power of the average per capita      |       |       |       |       |       |       |
| monetary income of the population per month, kg of   | 192.5 | 182.8 | 186.3 | 187.5 | 181.9 | 176.2 |
| frozen fish                                         |       |       |       |       |       |       |
| Export of fish, crustaceans and molluscs, thousand     | 1763.8| 1880.1| 2105  | 2201  | 2081  | 2237  |
| tons                                                 |       |       |       |       |       |       |
| Export of fish, crustaceans and molluscs, USD million | 3502  | 3710  | 4351  | 5100  | 5310  | 5201.6|
| Import of fish, crustaceans and molluscs, thousand     | 448.4 | 416.2 | 487.9 | 467.4 | 507.2 | 599   |
| tons                                                 |       |       |       |       |       |       |
| Import of fish, crustaceans and molluscs, USD million | 1356  | 1400  | 1631  | 1805  | 1797  | 1682.4|
| Share of fish and fish products in the total structure| 2.0   | 2.1   | 2.1   | 2.0   | 2.0   | 2.0   |
| of consumer spending, %                               |       |       |       |       |       |       |

Source: Compiled by the authors

The actual level of self-sufficiency in fish and fish products exceeds the criterion of food independence. It is set by the Food Security Doctrine of the Russian Federation at 85% [7]. The share of domestic products in the total volume of commodity resources of fish and fish products is within 83-84%. This indicates a high degree of self-sufficiency in fish products. Russia is food-independent from imports.

However, a significant degree of self-sufficiency is not always associated with the high physical and economic availability of food for citizens. This conclusion is confirmed by the dynamics of the level of
consumption per capita. During 2018-2020 the value of the indicator is below the rational consumption rate of fish and fish products (22 kg / person). Consumption volumes in the constituent entities of the Russian Federation, according to the Federal Statistics Service, in 2019 ranged from 6.4 kg / person (Republic of Tyva) to 39.5 kg / person (Magadan Region). As a result, the average per capita consumption of fish products in Russia lags significantly behind some foreign countries.

The share of fish and fishing on the consumer market is only 1.7%. This confirms the conclusion about the insufficient level of consumption of fish products and the need to develop a system of measures to increase its economic accessibility for the population.

The purchasing power of the population's monetary income in terms of fish has decreased by 8.5 percentage points over the past 6 years (from 192.5 kg to 176.2 kg of frozen fish per month). Consumer price index for fish and seafood for 2018-2019 amounted to 104.9%. At the end of 2019-2020 the figure was 104.1%. According to the consumer price index, fish outstripped meat and poultry. The retail price for the most affordable species - frozen fish - has grown by 21.1 percentage points over four years. (153.5 RUB / kg in March 2018 and 185.9 RUB / kg in March 2021). The main pressure on the growth rate of consumer prices was exerted by the weakening of the ruble exchange rate, the situation on the Russian and world fish markets and changes in the volume of fishing. The solution to the problem of cheap fish is also constrained by the lack of refrigerated cars and refrigerated containers for the delivery of fish from the Far East to Central Russia, and there are not enough refrigerators for storage. Thus, we can talk about a decrease in the economic availability of fish food products for the population of Russia.

Real cash incomes of Russians in 2020 compared to 2019 decreased by 3%, real disposable cash incomes decreased by 3.5%. The consumption pattern of Russians has changed as a result of the pandemic: the share of spending on food has increased markedly [9]. According to the Federal State Statistics Service, in the first quarter of 2020, the share of food products in the total structure of consumer spending of households was 32.2%, the share of fish and fish products was 2.1%. In the second quarter, the indicators were 36.8% and 2.3%, in the third quarter - 32.5% and 2%, respectively. The achieved values of the share of food expenditures indicate the average level of affordability of food. A high level of social inequality remains, depending on the level of available resources. Households of the first and second (least well-off) groups spent on fish and seafood in the first 9 months of 2020 2.4% of the amount of expenses. Households of the tenth group (the most affluent) - only 1.7% of expenses.

The findings are also confirmed by the results of a study by the independent holding Romir. According to them, 28% of Russians, due to a change in the economic situation in the country and a drop in effective demand due to a decrease in real incomes of the population, began to buy fish and seafood less often or to a lesser extent. Refused to buy fish products 5% of respondents [10].

Thus, there is no sustainability of indicators of consumption of fish and fish products with a deterioration in the internal and external economic conditions.

The spread of coronavirus infection and the reduction in incomes of the population in Russia have led to changes in the priorities of Russians in terms of fish demand. Against the background of a general decrease in the consumption of fish products in the country, the priority of buyers shifted towards fish of a lower price category. There is also a switch to canned fish with a long shelf life. The main growth in demand came from the cheapest of the sea fish caught - pollock. This was also facilitated by the drop in wholesale prices for pollock in 2020 (in the Far East it decreased by 33.6%, in Central Russia - by 25.2%).

The physical availability of fish products in certain areas of the country (mainly in rural areas and remote areas) is significantly limited by the low level of development of the local fish industry and distribution network, retail trade, road and warehouse infrastructure. These factors determine high consumer prices for fish and fish products in local markets.

According to the Federal Agency for Fisheries, in 2020 4.97 million tons of aquatic biological resources were caught, 0.33 million tons were grown under aquaculture conditions. The volume of export of fish products, according to the Federal Customs Service, amounted to 2.24 million tons. Imports reached 599 thousand tons. Analysis of the dynamics of production of aquatic organisms and
foreign trade in Russia over the past 5 years indicates an increase in catches and the presence of a steady growth trend in the export of products abroad. There is an increase in the supply of foreign fish products (with the exception of 2018). At the end of 2019, the balance of imports and exports to consumption for fish amounted to minus 60%. Thus, Russia is a net exporter of fish, imports are insignificant, and the volume of exports exceeds the personal consumption of fish by the Russian population [11].

The main share of Russian fish exports (about 80%) and imports (about 49%) in 2020 was frozen fish. According to customs statistics, the average price of 1 ton of exported fish is 1464.3 USD, the cost of imported fish is 2414.9 USD. Similar indicators in 2019 corresponded to the level of 1668.4 USD and 2333.4 USD. As a result, domestic fish was sold in 2020 abroad cheaply, and buying at a higher cost. Many types of imported fish products are significantly inferior in quality to Russian.

Fish raw materials prevail in the structure of Russian exports (about 2/3 of fish sold abroad). The low share of highly processed products creates a factor of instability in the development of the domestic fish industry, affects the reduction in the supply of raw materials to the domestic market and a decrease in the number of jobs in the field of fish processing.

Particular attention is food security should be given to food safety and quality. The Russian food safety and quality control system is based on the certification of food products entering the consumer market. Individual single copies are tested for safety and quality. Based on the results of the assessment of the tested samples for compliance with the established requirements, the company is issued a certificate with a validity period of 1 to 3 years [12]. The efficiency of such a system is low. This conclusion is confirmed by the materials of periodic inspections.

According to the Federal Service for Supervision of Consumer Rights Protection and Human Welfare, 230 tons of fish products were rejected and withdrawn from sale in 2019, 41 tons in 2020. The decrease in the number of unsatisfactory goods is associated with a decrease in the number of mass control and supervisory measures due to restrictive measures in connection with the COVID-19 epidemic. For the first half of 2020, 0.16% of samples (6 out of 3776) did not meet the established requirements in terms of sanitary and chemical indicators, 6.17% (802 out of 13006) in terms of microbiological indicators, 1.2% in terms of parasitological indicators (47 out of 3909), 4.66% in terms of physical and chemical indicators (304 out of 6524). For comparison, similar indicators at the end of 2019 were 0.05%, 4.79%, 1.6% and 5.44%. The main violations were non-compliance with the shelf life and storage conditions of products, non-compliance with the requirements for the content of glaze, the lack of labeling on products. There were also some cases of issuing cheaper and more accessible types of fish for rare and expensive, sales of fish with spawning changes, violations of the schemes of permissible cutting of fish and packaging of illiquid parts, sales of thawed fish under the guise of chilled fish, falsification with the type and size of fish, deviations in terms of nutritional and energy value of canned fish.

The decline in the quality of food products with a simultaneous rise in prices indirectly threatens the food security of the country. At the same time, quality food is an integral part of a healthy nation [13, 14].

4. Discussion
World practice indicates a significant increase in the value of fishery industry in addressing food security and good nutrition [15, 16, 17]. Fish is one of the most popular food items in the world. Growth in world fish consumption has outpaced the growth in demand for beef, pork and poultry. According to the Food and Agriculture Organization of the United Nations, 88% of fish caught and produced by aquatic organisms used in food. The population of the planet receives from fish about 17% of animal protein and 7% of all consumed protein.

According to scientists, the level of life expectancy is directly related to the structure of nutrition and a high proportion of consumption of fish products. The fish has high nutritional and medicinal properties, as well as ecological purity. Therefore, fish and fishery products need to be more prominently featured in national, regional and global food security and nutrition strategies. Fish products have an important role to play in transforming food systems. It can help eliminate hunger and malnutrition [18].
At the same time, fisheries and related industries provide employment and are a source of income for a large part of the population, contributing to food security [15, 19, 20, 21].

5. Conclusion
The study of the place and role of fisheries in the system of ensuring food security in Russia, conducted within the framework of this article, allows us to formulate the following conclusions:

- the development of fisheries and aquaculture provides significant opportunities for solving the problem of ensuring food security in qualitative and quantitative aspects;
- the fishery complex should occupy one of the leading places in providing the population with proteins of animal origin;
- the production of fish products is characterized by a stable growth in the production of aquatic biological resources and the cultivation of commercial aquaculture objects. The value of domestic production for most types of fish products is growing. Export volumes are increasing, the share of imported products is insignificant. This indicates the availability and sufficiency of fish products and the high potential of the fish industry to achieve the planned level of self-sufficiency (85%), subject to the creation and modernization of fish processing facilities on a highly technological basis;
- in order to increase the availability of fish and fish products for the population, it is necessary to increase the consumption of fish by various segments of the population. Further development of the logistics, road and warehouse infrastructure will optimize the costs of the subjects of the fishery complex for the transportation, storage and overload of fish products. As a result, this will make it possible to reduce retail prices and increase the economic availability of fish products for the population. The main direction of the developed marketing strategy for the development of fisheries should be the popularization of domestically produced fish products in the domestic market as a source of protein and healthy nutrition.

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