

Assessment of the Russia's Fisheries Management Impact on its Food Security

O. V. Korneiko

Department of Economics
Vladivostok State University of Economics and Service
Vladivostok, Russia
Olga30300@mail.ru

Abstract—The research object is the Russian Federation fisheries management as the basic source of resource supply to its food market. The research subject is the network of socio-economic relations concerning food security between the entities of fisheries management and the society. The authors examine in detail the Russia's fisheries management influence on national food security within a systemic, multicomponent approach, based on indicators of the fisheries management products availability (production volumes, bioresource potential, anthropogenic threats), fish products affordability and fish products consumption (quality and safety). The research information base includes the official conceptual documents and regulatory legal acts of the Ministry of Agriculture and the Federal Agency for Fisheries of the Russian Federation; the Federal State Statistics Service materials; expert assessments and Russian and foreign scientists calculations published in the scientific literature. Traditional methods of scientific analysis, economic and mathematical statistics, technical, economic and logical analysis, graphic modeling, etc. were used as a methodological background. The authors show a high degree of the country's self-sufficiency in fish products and independence of food supply from import deliveries. There are three aspects of threats to food security: quantitative (the export orientation of Russian fish producers, the production decline of some fish products, anthropogenic threats to the resource base, low level of fish farming), socio-economic (deterioration in the food affordability conditions for the population due to rising prices and falling real incomes of the population with the simultaneous new consumer habits formation in our society) and qualitative-certification (fish products of questionable quality and counterfeit products penetration to the Russian market). The authors proposed measures to ensure Russia's food security concerning fish and seafood.

Keywords— Russia, food security, fisheries management, fish value, fish products availability and affordability, threats to food security.

I. INTRODUCTION

Food security is the pacing factor contributing to the safe existence of society and the basic construction of economic security. Fish, seafood, and fish canning industry are important production systems of the food complex as the main producer of vital food products (Fig. 1). Fish remains one of the most popular food product in the world and gives 20% of the daily animal protein to three billion people (Fig. 2) [1]. It is rich in various vitamins (D, A and B), minerals (including

calcium, iodine, zinc, iron and selenium), as well as unsaturated fats (especially omega-3). Consumption of fish has a beneficial effect on the diet, brings health benefits preventing cardiovascular diseases. Experts agree that the positive impact of increased fish consumption far exceeds the possible negative consequences associated with pollution and safety risks [2].

Production of agricultural equipment for the production of food products (combines, tractors, seeders, mowers, etc.)	Farming sector (agriculture) Production of agricultural products and raw materials for the food industry	Food industry
Shipbuilding industry	Seafood industry	Fish-canning industry
Production of instruments of labor for hunting and gathering	Hunting, gathering of wild plants, berries, mushrooms	forest products processing
Microbiological production (food additives, food supplement, etc.)		

Fig.1. Structural and functional ratio of the food complex production systems

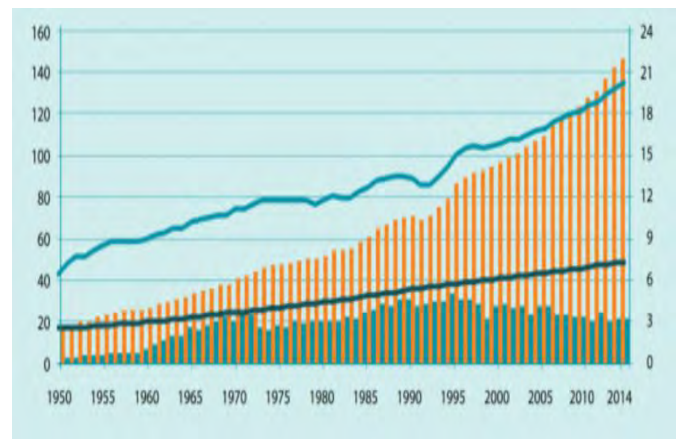


Fig.2. Worldwide use and supply of fish [1]

Thus, fisheries management also known as «fishing and fish farming (production and aquaculture)» is not only an important source of income for hundreds of millions of people around the world, but also a significant producer of vital agricultural food products. Therefore the fisheries management efficiency has a direct impact on food security.

II. RESEARCH PROBLEM STATEMENT

The importance of examining the problems of economic and food security in all the diversity of their modern interpretations is well perceived by politicians, practitioners and researchers. Fig. 3 showing the number of references in the Russian media to the term "food security" indicates a significant increase in the political and strategic demand for research in this area recently. The concept of food security implemented in Russia has already been studied by sociologists and economists from different perspectives: economic indicators have been measured [3], a semantic difference in the Russian and foreign understanding of food security has been revealed [4], and the «quiet food sovereignty» signs transformation in rural communities in Russia have been shown.

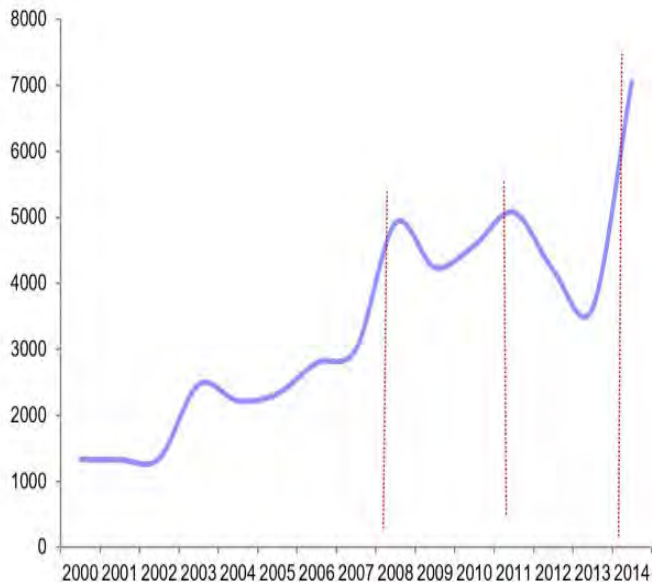


Fig.3. Number of references to the term "food security" in the Russian press. Source: [6]

However it should be noted that the scientific literature of the country mainly studies food supply and consumption of non-fish food products (bread products, potatoes, vegetables and melons, fruit and berries, meat and meat products, milk, eggs, etc.). Meanwhile, Russia, being the world's largest producer and exporter of fish products, has a low level (15 kg by the end of 2016) of providing fish products to the entire population living on its territory, which is 5 kg less than the level recommended by the Ministry of Health for a healthy diet (Fig. 4) [5]. For comparison, in Japan the per capita consumption of hydrobionts is over 60 kg per person [5]. The lowest level of fish consumption, lagging behind the average Russian indicator by 10-15%, is observed in the Volga,

Southern and Siberian federal districts, as well as in the Crimea and Sevastopol [5]. What are the negative structural changes in the diet of Russians associated with? What is the state of the fisheries management and whether there are threats to national food security? How does the efficiency of the Russian fisheries management and food security correlate? What is the actual level of ensuring quality, stable, uninterrupted and sufficient supply of fish products to the entire population of the Russian Federation? These questions predetermined the choice of the research topic, goals and objectives.

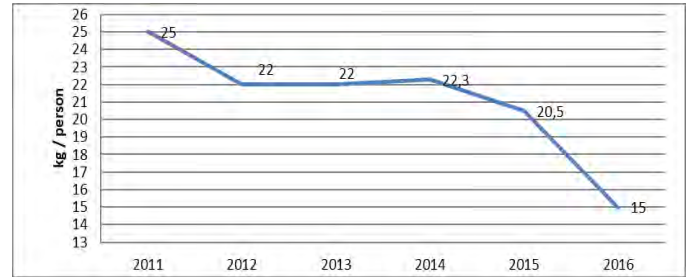


Fig.4. Fish consumption in the Russian Federation, (kg/ person) [7]

The purpose of the article is to consider the national food security in the context of the economic development of the Russian fisheries management and identify possible threats.

III. RESEARCH METHODS

As stated in the Doctrine of Food Security of the Russian Federation, approved by Presidential Decree No. 120 of January 30, 2010, "food security is one of the main directions of ensuring the country national security in the medium term, a factor of preserving the country statehood and sovereignty, an essential component of the demographic policy, a prerequisite for the strategic national priority implementation - improving the Russian citizens life quality by means of guaranteeing high standards of life support" [8, 9].

At the state level it is recognized that "the strategic goal of food security is to provide the population of the country with safe agricultural products, fish and other products from aquatic biological resources and food. The guarantee for its achievement is the stability of domestic production, as well as the availability of the necessary reserves and resources" [8].

To assess the state of food security the Doctrine determines as a criterion the share of domestic agricultural, fishery products and food in the total volume of commodity resources (taking into account the carryover stocks) of the domestic market of corresponding products, which has threshold values. In particular, with respect to fish products the threshold value is defined as "not less than 80%" [8].

In accordance with the methodology for calculating the share of domestic and imported fish products in the total volume of its commodity resources approved by the order of the Ministry of Agriculture of the Russian Federation of December 28, 2016 No. 601, the indicator of the share of domestic fish products (annual value) in the total volume of commodity resources (taking into account carryover stocks) of

the domestic market of fish products (OP) is calculated by the formula:

$$OP = \frac{P+S(op)}{R} * 100\% \quad (1),$$

where: P - the volume of domestic production of fish products in live weight (weight of raw materials); S(op) - the volume of domestic fish products in stocks at the beginning of the year; R - the total volume of fishery resources (includes stocks of fish products at the beginning of the year, the volume of domestic production of fish products in live weight (weight of raw materials) and the volume of imported fish products).

Following this method we revealed that the share of domestic fish products in the total volume of commodity resources (taking into account the carryover stocks) of the domestic market of fish products in 2016 was 82.7%, which is higher than the threshold value of the indicator and characterizes the high degree of the country's self-sufficiency in fish products and independence of food supply from imports; that is, the absence of import dependence on this product in Russia.

However, it should be noted that such an interpretation of "food security" attests to Russia's protectionist position linking security not with the availability of food for the population of the country, but with self-sufficiency, with the country's food independence. This approach is well integrated into the rhetoric of import substitution, which strengthens our country's orientation toward self-isolation. On the contrary, the Food and Agriculture Organization of the United Nations (FAO) does not link food security to food self-sufficiency and points to the need to import it to meet the needs of its citizens but does not deny the importance of the country's desire to produce enough products for their needs, if there are comparative advantages [10].

In order to achieve the objectives of our study, we will consider the influence of the Russian fisheries management on the national food security in the framework of a systemic, multicomponent approach based on the following indicators:

- 1) availability of fisheries management products (physical output indicators, bioresource potential, anthropogenic threats to target fisheries);
- 2) affordability of fish products (an economic opportunity to purchase the necessary volumes of fish for current incomes, changes in prices);
- 3) consumption of fish products (quality and safety of consumption).

IV. RESULTS AND DISCUSSION

Availability of fisheries management products

As already mentioned above Russia is the world's largest producer and exporter of fish products, ranking fourth among world fish producers, catching more than 4 million tons

annually, behind China, Indonesia and the United States (table 1).

TABLE I. PRODUCTION OF HYDROBIONTS IN RUSSIA AND THE WORLD, 10⁴ TONS.

Country	1980	1990	2000	2010	2013	2014
Russia	0.00	760.41	404.77	419.03	450.33	438.68
Global output	7193.83	9774.09	12594.69	14810.28	16292.99	16722.90

Source: compiled by the author on the basis of [11].

The main positive factors of the development of the Russian fisheries management which have a significant positive impact on the state of food security include:

- the emerging dynamics of aquatic biological resources production growth from 2014 (Fig. 5). According to the Federal Fisheries Agency the volume of aquatic biological resources production (catch) by all Russian users in all regions of the World Ocean, as well as in inland freshwater objects, was 4,657.6 thousand tons, which is 200.6 thousand tons (or 4, 5%) higher than the level of 2015 [12]. At the same time the volume of production (catch) in 2016 was 377.6 thousand tons (or 8.8%) higher than the volume of production (catch) determined by the Russian Federation state program "Development of the fishery complex" in the amount of 4 280.0 thousand tons [12]. The main share of production (about 70%) falls on the Far Eastern fisheries basin [12];

- availability of biological diversity of aquatic biological resources and a strong raw material base. For example, in the Far Eastern fisheries basin raw materials are represented by such numerous species as pollock (1,891,0 thousand tons, or 44,6%), Pacific herring, saury, squid, salmon, mackerel, laminaria, Pacific cod, keta, flounder, etc., as well as less numerous species (goby, Pacific sardine, greenling, navaga, sockeye) [12];

- growth in the production of crustaceans, fish fillets, frozen fish (table 2).

Negative factors [13, 14]:

- catch volumes of hydrobionts are currently only 57% of the 1991 level;

- the export orientation of Russian fish producers creates a deficit of some products from fish raw materials in certain regions of the Russian Federation. The decision of manufacturers to put fish products in the central regions of Russia is constrained by the inadequacy of railroad refrigerator facilities, the high cost of services, the duration of transportation;

- insufficiently effective management and control system for fisheries;

- anthropogenic threats: the spread of illegal, unreported and unregulated (IUU) fishing, especially on spawning rivers, drift-net fishing in the exclusive economic zone of Russia and its negative impact on marine ecosystems, excessive industrial pressure on aquatic biological resources, reduction and deterioration of the environment habitats quality (for example, the spread of pollutants such as petroleum products and

phenols, and in a number of cases, excess concentrations of copper and lead compounds, iron and other harmful substances);

- climate variability and migration of valuable and productive species of Russian fishery - salmon to the north of the Pacific basin, which has a negative impact on the economy of salmon fishing;

- low volumes of fish farming (about 0.2% of world aquaculture production);

- low investment attractiveness of fisheries management, especially domestic aquaculture, dependence on imports of gear, transport equipment, fodder base, and technological backwardness of the entire industry. The data in Table 2 confirm the low and unstable nature of investment activity in the industry. The processes of technological re-equipment of fishery enterprises are developing with a delay and not in the

same extent as in advanced and dynamically developing countries. This leads to the formation of groups of stagnant enterprises. We add that in the fishing industry the innovative type of reproduction is not realized, many enterprises are stagnating, working on local non-competitive markets. The unresolved issue of lifting sanctions from the Russian economy complicate the situation of fish-producing business entities, so foreign channels for financing investments in the renovation of the fishing fleet remain, as before, closed; and the ruble appreciation reduces the financial stability of export-oriented enterprises in the industry;

- negative conditions for food safety are indicators of a decrease in the production of fish ice cream fillets, fish dried, salted, as well as live fish, fresh and chilled (Table 3).

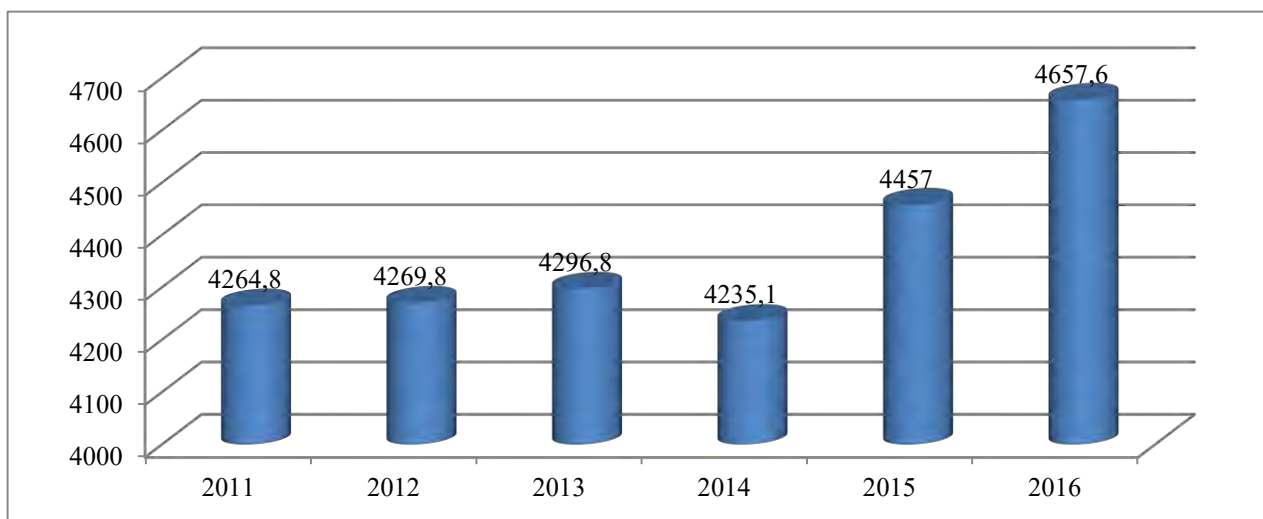


Fig.5. The volume of production (catch) of aquatic biological resources in 2011-2016. (thousand tons) [7]

TABLE II. INDICATORS OF FISHERIES MANAGEMENT OF THE RUSSIAN FEDERATION

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Degree of fixed assets depreciation, %	58,1	60,7	60,6	59,4	56,7	54,5	48,4	47,2	47,5
Index of labour productivity, % over the previous year	95,4	106,3	97,0	103,5	109,4	105,6	96,1	99,5	н/д
Coefficient of fixed assets renewal, % over the previous year	1,8	1,5	2,0	2,2	3,2	3,2	3,9	2,8	4,1
Consumer price indices for seafood, % over the previous year	-	-	104,6	111,3	102,8	107,0	118,0	122,9	108,6
Consumer price indices for meat, % over the previous year	-	-	105,5	109,3	107,6	100,3	119,3	107,8	102,6
Consumer price indices for chickens, % over the previous year	-	-	102,8	99,6	114,8	92,2	127,6	98,0	105,0

TABLE III. INDICATORS OF FISHERIES MANAGEMENT OF THE RUSSIAN FEDERATION

	January-September 2017	January-September 2017, % over January-September 2016
Live sea fish, not a product of fish farming	119	84,9
Sea fish fresh or chilled, not a product of fish farming	483	95,3
Nonfrozen crustaceans, not being products of fish farming	62,3	111,4
Fish fillets, other fish flesh (including minced fish), fresh or chilled	25,3	131,3
Frozen fish	2556	104,8
Frozen fish fillets	121	97,8
Naturally dried fish, salt fish, unsalted fish, fish in brine	85,3	97,7
Smoked fish, including fish fillets	49,4	101,2
Frozen crustaceans	55,3	118,6

Affordability of fish products

The strategic problems of ensuring food security lie in the study of effective demand for fish products. Since the population of our country for the past few years has grown symbolically only from 2013 to 2015, and according to experts' forecasts the natural decline in the population of Russia by 2035 with the most positive forecast can reach 400 thousand people [15], then the demand for fishery products and fish farming in the domestic market of the country will only decline. In addition, the turbulent economic situation gradually leads to a fall in real incomes of the population with the simultaneous formation in our society of new consumer habits. Obviously, we should expect a drop in demand for high-quality products, reducing the consumption of delicacies from valuable fish species, shrimp, crabs, caviar.

The affordability of fish products also depends on the price of fish and alternative foods. The data in Table 2 show that from 2010 to 2016 the consumer price index for fish and seafood grew significantly more than for alternative sources of animal protein.

As a result of all the above negative factors, the share of fish consumption decreased significantly from 25 kg in 2011 to 15 kg in 2016 (Fig. 4), despite a large number of data confirming the health benefits of eating fish. We have to state that the availability of fish products is declining, and the food traditions and habits of Russians for compulsory fish consumption at least once a week ("fishy Thursday") are disappearing, tastes are changing, and the new food regimens are obviously becoming less diverse with a tendency to move away from basic foods with a high protein content.

Thus, with a high probability, we should expect further decline in the domestic market demand for fish products, both in the lowest and the highest price segment. The shift in

demand to the lower price segment due to a drop in the purchasing power of the population, in turn, will facilitate fish products of questionable quality and counterfeit products penetration to the Russian market.

Consumption of fish products

To restore demand for fish products, a transition to a consumer-oriented development model is needed. To open, create, protect the true value of Russian fish and bring it to domestic consumers is the main task of the Russian fisheries management. At the same time, Russians should be sure that the products they consume are of acceptable quality and are safe for health.

The issue of ensuring valeological safety and quality of fish products makes it necessary to increase the effectiveness of state control and supervision and establish certain requirements for the safety of fish products, as well as fish-based food products. In developed countries, food policy is built on well-tested principles developed over the decades, on the great experience of a developed, socially-oriented market economy functioning. This policy concerns, above all, the quality and safety of food, but also affects technical standards and labeling, and more recently also voluntary certification of biological sustainability, social and labor conditions in the industry and its suppliers. Traceability by supply chain, availability of reliable and up-to-date information on the quality and origin of food products based on fish raw materials is becoming increasingly important to meet food safety requirements and standards and the stability of fisheries management. These requirements, as a rule, are of a legislative nature and therefore are binding.

In recent years there has been an objective increase in the scale of the immediate danger to the life and health of the consumer associated with the introduction of poor-quality fish

products to the market. Some experts attribute this to counter-sanctions imposed by the Russian authorities, which "bared" the market bringing about falsifications and products of questionable quality [4].

So, only in the first half of the year 2017, out of 20,000 samples of fish and products from aquatic biological resources, investigated by Rospotrebnadzor (Russian Agency for Health and Consumer Rights), 6.5% of samples did not meet the sanitary and epidemiological requirements [4]. One of the mechanisms for limiting the access of poor-quality fish products to commodity markets is the adoption of the Technical Regulations of the Eurasian Economic Union 040/2016 "On the Safety of Fish and Fishery Products," which entered into force on September 1, 2017. The purpose of this document is to provide consumers with safe and high-quality products that meet quantitative and qualitative parameters and standards [16]. It is assumed that after the Technical Regulations system and implementing, monitoring and control mechanisms have been developed, the prices for low-quality goods will fall and the prices for quality fish products of deep processing will stabilize.

The implementation of the technical regulations by fishing and fish-farming organizations can be difficult due to the high degree of both fishing vessels and coastal facilities fixed assets depreciation. And morally and physically obsolete lines and technologies do not contribute to the production of quality products that comply with all standards [17-20].

V. CONCLUSION

The important role of fish as a source of nutrition and commodity exchange in Russia is beyond doubt. In this research, on the basis of statistical analysis, the state of the Russian fisheries management is characterized in the context of its impact on food security. It shows a high degree of the country's self-sufficiency with fish products and the independence of food supply from import. The biological diversity of the aquatic biological resources, a strong raw material base, an increase in the indicators of the total catch of wild target fishery make it possible to state that the physical availability of fish products is now provided in sufficient volume. Threats to food security lie in three aspects: quantitative (the export orientation of Russian fish producers, the production decline of some fish products, anthropogenic threats to the resource base, low level of fish farming), socio-economic (deterioration in the food affordability conditions for the population due to rising prices and falling real incomes with the simultaneous new consumer habits formation in our society) and qualitative-certification (fish products of questionable quality and counterfeit products penetration to the Russian market).

In our opinion, in the current crisis conditions, a systematic approach is proposed to ensure Russia's food security with regard to fish and seafood, which should include:

- support to economic entities of the fisheries complex: increasing the availability of short-term and long-term loans, especially for fish processing organizations; measures to improve financial sustainability of small forms of

management; instrumentation of technical and technological modernization of the fish industry; and etc.;

- an effective mechanism of state guarantees of affordability to fish products for persons in the zone of greatest social risk, etc.);

- adjustment of the income redistribution mechanism in the system of "taxation - social benefits" toward rational restriction of income growth of the most highly-advantaged population groups and incomes increase of the population of the lower poverty group to reduce social differentiation;

- creation of a logistic network of food streams that allows commodity producers to supply Far Eastern fish products to other regions without intermediaries, timely, with quality guarantees and payment at contract prices;

- stimulation and control in the sphere of ensuring the food products quality and safety, including through the promotion of the Technical Regulations "On the Safety of Fish and Fishery Products."

References

- [1] The state of world fisheries and aquaculture. Rome, 2016 ISBN 978-92-5-109185-2, 204 p.
- [2] World Bank Group. Global Economic Prospects, January 2016: Spillovers amid Weak Growth, Washington DC, 2016. Retrieved from <http://www.worldbank.org/content/dam/Worldbank/GEP/GEP2016a/GlobalEconomic-Prospects-January-2016-Spillovers-amid-weak-growth.pdf>
- [3] N.Shagaida, V.Uzun, "Food Security in Russia: Monitoring, Trends and Threats", Publishing House "Delo", Russian Academy of National Economy and Public Service, 2015.
- [4] S.Barsukova, K.Dyufi, "Food security: the history of the concept, the Russian context", Politia: Analysis. Chronicle. Forecast (Journal of Political Philosophy and Sociology of Politics), 2016.
- [5] O.V. Korneiko, "Scenario options for the development of fishery activities in the Primorsky Territory as the basis for national food security. Territory of new opportunities", Bulletin of the Vladivostok State University of Economics and Service, Vol. 8, No. 4 (35), 2016, pp. 110-116.
- [6] S.Yu.Barsukova, "Russian media: from the three "images" of the WTO to a single concept of "food security"", In the collection: Institutional transformation of the economy: the Russian vector of the new industrialization materials of the IV International Scientific Conference in 2 parts, Responsible editors: E.A. Kapoguzov, G.M. Samoshilov, 2015, pp. 70-87.
- [7] Federal Statistical Service of the Russian Federation. Retrieved from http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/leading_indicators
- [8] Decree of the President of the Russian Federation of January 30, 2010 N 120 "On Approving the Doctrine of Food Security of the Russian Federation". Retrieved from <http://base.garant.ru/12172719/#friends>
- [9] Decree of the Government of the Russian Federation of July 14, 2012 N 717 "On the State Program for the Development of Agriculture and Regulation of Agricultural Products, Raw Materials and Foodstuffs for 2013-2020" (as amended). Retrieved from <http://ivo.garant.ru/>
- [10] G.Kurbanova, "Development of Eurasian integration and trade in order to ensure sustainability of agriculture and food security", Issues of economics, No.4, 2013, pp.4-16.
- [11] Global statistics Aquaculture Production database updated to 2013, Summary information. Retrieved from <http://www.fao.org/fishery/collection/global-production/en>.
- [12] Results of the activities of the Federal Agency for Fisheries in 2016 and tasks for 2017. Retrieved from

http://fish.gov.ru/files/documents/ob_agentstve/kollegiya/itogi_2016_zadachi_2017-1.pdf

- [13] O.V.Korneiko, F.Li, “The Future of Salmon Fishing”, Vector of Science of Togliatti State University, Series: Economics and Management, No. 4 (31), 2017.
- [14] M.D.Pokormenyuk, O.V.Korneiko, “Aquaculture in Russia: the state and problems of development”, Azimuth of scientific research: economics and management, T. 6, No. 4 (21), 2017.
- [15] Demographic challenges of Russia. Report of the Center for Strategic Research. Retrieved from <https://www.csr.ru/news/demograficheskie-vyzovy-rossii/>
- [16] Technical Regulations of the Eurasian Economic Union On the Safety of Fish and Fishery Products (TR EAEU 040/2016), Portal of the Eurasian Economic Commission. Retrieved from
- [20] T.V. Terenteva, O.V. Korneiko, “New approaches to interpretation of entrepreneurship in context of modern development of the Russian economy”, *Espacios*, No 62 (38), 2017, P. 33.
- <http://www.eurasiancommission.org/ru/act/teknreg/deptexreg/tr/Documents/%D0%A2%D0%A0%20%D0%95%D0%90%D0%AD%D0%A1%20040-2016.pdf>
- [17] O.V. Korneiko, “Free port of Vladivostok as an instrument of investment policy in the region's fish logistics”, *National interests: priorities and security*, No.9 (342), 2016, pp.89-99.
- [18] O.V. Korneiko, “Integration of fishery business structures into the economy of the region: theoretical and practical aspects”, *Bulletin of Perm University, Series: The Economy*,. No. 1 (24), 2015, pp. 46-54.
- [19] O.V. Korneiko, B.I.K Alizhonova, “Feature of trade policy instruments application for ensuring food security in Russia”, *Russian Journal of Agricultural and Socio-Economic Sciences* , No 12 (72), 2017, pp. 246-248.