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FEATURES OF THE DEVELOPMENT OF INTENSIVE FISH FARMING: FOREIGN EXPERIENCE

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Abstract

Development of intensive fisheries and aquaculture is absolutely important in improvement of food providing of population in the globe. Importance of fisheries and aquaculture products in conditions of food security; world fisheries and aquaculture production and utilization indicators; main factors constraining the development of the fisheries are analyzed in this article. In addition, suggestions and conclusions on the application of some world fishery experiences in our country are presented.

Key words: *fishery products, aquaculture, intensive fisheries, extensive or semi-intensive methods, economic efficiency, fish consumption, feed and raw materials, fish stocks, etc.*

Introduction. Food security is an integral part of the economic well-being and national security of any country. Food security reflects the market situation and the position of consumers, determines the level of participation in the global food market [3, 306., 4].

Just a few years ago, very little attention was paid to fishery products as a key element of food security. Discussions among fisheries experts place more emphasis on the biological sustainability and economic efficiency of the fishing industry than on the contribution of fisheries to food security.

Also, increasing fish consumption and including it in the diet is an important tool for increasing food security and improving nutrition. This is explained by the presence of high levels of biological protein and essential microelements in fish.

Fisheries and aquaculture are an important source of food, consumption, income and vital to the livelihoods of millions of people around the world.

As a result of the development of fisheries and aquaculture in countries around the world, aquaculture production has increased sharply, and it can be recognized that as of 2017, the global population has an average of 20.3 kg per year [5].

In addition, fish is one of the fastest growing food products in the world, with developing countries accounting for more than half of fish exports.

Since ancient times, fish has been a nutritious food source for humans, and fishing has been a source of employment and economic support. In the world, fish are grown mainly in two ways: natural reservoirs (ocean, sea, lake, river, etc.) and aquaculture, that is, under controlled conditions.

According to the experience of the World Fisheries Network, fish are mainly grown in small reservoirs using aquaculture. If fish farming is launched in Uzbekistan using this system, then 1000-2000 hectares of land will be required to grow 100 thousand tons of fish. To do this, it is advisable to develop aquaculture in fisheries - dig ponds on the ground, use convenient locations of large reservoirs, arrange reservoirs, and build pools of different sizes [7].

The position of aquaculture in the world market and its particular importance for developing countries was explained by Arnie M., Assistant Director General for Fisheries and Aquaculture of the Food and Agriculture Organization of the United Nations. Matheson explains: “With the world population estimated to reach approximately 9.5 billion by 2050, especially in areas where there is a shortage of food for safe consumption, aquaculture is a safe source of food. economic growth" [6].

Aquaculture is a completely new area, little known to many residents of our country. Currently, aquaculture is carried out mainly in artificial lakes, and the level of productivity is not very high: 10-20 c/ha or 100-200 grams/m3. On the world market, the indicator of this industry, based on new technologies, is 40-200 kg/m3. The main reason for this is that our fisheries use extensive or semi-intensive methods [6].

Materials and methods. The volume of fish caught in natural waters around the world is decreasing every year. The main reason for this is the decrease in fish stocks. This, in turn, limits the catch of fish from natural bodies of water. In recent years, aquaculture fish farming has been developing in world fisheries. This statistic shows the total world fish production from 2007 to 2023, by fishing (capture) and aquaculture (Figure 1). In 2023, approximately 90.6 million metric tons of fish were captured, while 96 million metric tons were raised in aquaculture [9].

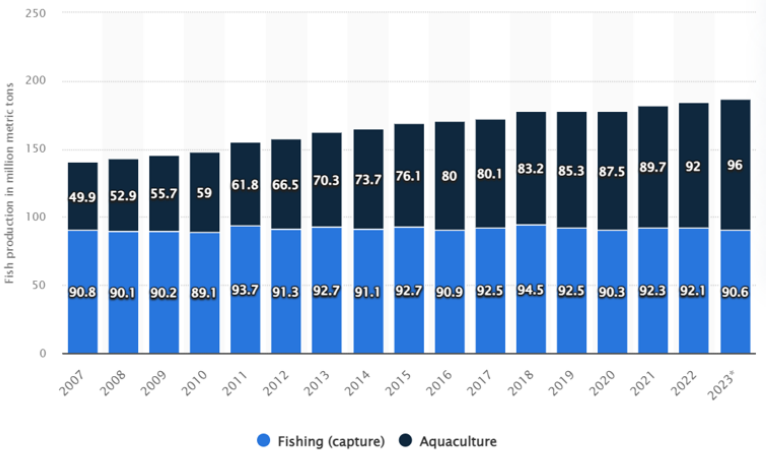

Figure 1. World fish production from 2007 to 2023, by fishing and aquaculture (in million metric tons) [9].

World trade in fish and fisheries products in 2023 is estimated at 65 million tonnes, a 4.3 percent decline over 2022 levels. Similarly, the global export value of aquatic products dropped to USD 175 billion, compared to USD 178 billion in 2022 (table 1).

The contraction in trade of fishery products in 2023 was mainly due to lower exports from China, which nevertheless continued to be the main fish exporting country. Total Chinese exports were valued at USD 19.8 billion in 2023, as compared to USD 22.3 billion in 2022. The main reason for this drop was the fact that less Alaska pollack was available for processing in the first half of 2023, alongside strong domestic demand which had diverted supplies to the local market. Norway remained the second major exporter of edible fish, mainly cultured Atlantic salmon; this country reported stable exports in 2023, valued at USD 16 billion.

Ecuador jumped to the third position in the ranking of seafood exporting nations, exclusively due to high shrimp exports. Ecuadorian exports of seafood in 2023 were worth USD 9.1 billion, a noteworthy USD 1 billion more than in 2022 [8].

Table 1. **Exports of fishery products (in million USD) [8]**

Name of the country	2016	2017	2018	2019	2020	2021	2022	2023	2023 compared to 2022, %
China	20 003	20 408	21 544	20 082	18 487	21 100	22 350	19 800	88,6
Norway	10 563	11 119	11 757	11 719	10 770	13 400	15 900	16 000	100,6
Ecuador	3 754	4 468	4 805	5 450	5 359	6 800	8 100	9 100	112,3
Chile	4 709	5 606	6 261	6 136	5 318	6 800	7 200	8 600	119,4
Viet Nam	7 400	7 700	8 900	9 200	8 700	9 800	10 000	7 800	78,0
India	5 517	7 069	6 786	6 761	5 736	7 300	7 700	7 700	100,0
Canada	5 007	5 310	5 382	5 644	4 833	6 200	6 600	5 700	86,4
Others	73 310	79 681	84 817	82 111	76 786	101 900	100 250	100 400	100,1
Total	**130 263**	**141 361**	**150 252**	**147 103**	**135 989**	**173 300**	**178 100**	**175 100**	**98,3**

Discussion and results. The existence of problems, factors and contradictory situations that impede the development of fisheries and aquaculture at the global level can have a significant negative impact on the sustainable development of the industry and the level of food supply for the population. In our opinion, it is advisable to divide these factors into three groups. Production-economic, marketing and organizational-state factors of the regulatory system.

High dependence on imported feed and raw materials for production and economic factors, which ultimately leads to higher prices for fish products due to imported feed and other costs; the low level of technological production process negatively affects the volume of fish farming; low efficiency in the use of water resources, mechanization and the use of modern technologies, in turn, has a direct impact on the disruption of the ecological balance and the efficiency of fish farming; low efficiency of processing of fish products can certainly lead to a decrease in economic efficiency in the fishing industry.

Lack of adaptation to the demand and needs of the market in terms of marketing and organizational factors, i.e. lack of a supply system for fish products based on market supply and demand, lack of a marketing strategy; the fact that logistics is not established also explains the fact that high-quality products are not delivered to the consumer in full and on time; the lack of qualified specialists in this field is considered one of the main problems, and to solve this problem, consistent reforms are being carried out in our country; cases of untimely and high-quality implementation of veterinary measures cause an increase in fish morbidity.

Lack of improvement of the network management and control system due to the factor of the state regulatory system; Problems such as shortcomings and low efficiency of the state support system can affect the development and increase in the efficiency of the fishing industry, and also lead to incomplete satisfaction of the population's demand for fish and fish products (Figure 2).

In this regard, a lot of work has been done in our country, important regulatory documents have been adopted aimed at developing the fishing industry as a mechanism for state support, strategic programs have been developed, and customs and tax benefits have been introduced. was determined. Untimely resolution of problems related to production, economic, marketing and organizational, as well as government regulation, creates the basis for a decrease in the level of industry development and deterioration in food safety.

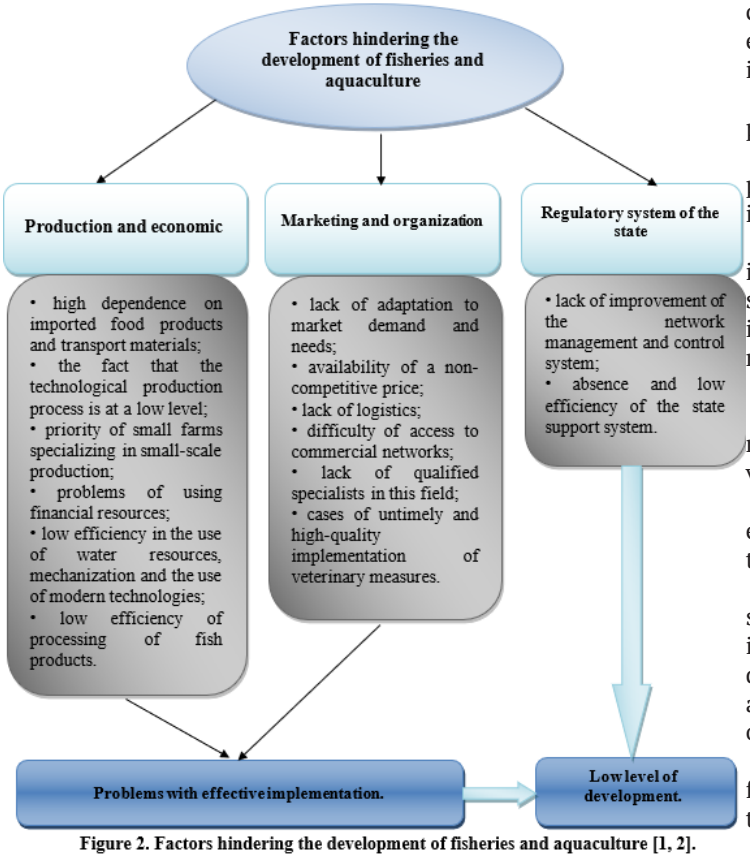

Figure 2. Factors hindering the development of fisheries and aquaculture [1, 2].

Conclusion and recommendations. Based on the problems analyzed above and world experience, we can conclude that in order to develop and improve the efficiency of fisheries and aquaculture in our country, it is advisable to pay attention to the following:

- proper organization and development of production, i.e. intensification;
- increasing and improving the efficiency of practical and innovative projects and scientific work in the development of the industry;
- in order to increase the volume of fish production, increase the species of fish and acclimatize new species of fish in the regions, the widespread use of intensive technologies (widespread use of the cage method in reservoirs, seas and rivers);
- creation of an effective veterinary control system;
- proper organization and coordination of the marketing system, as well as the formation of a vertical integration structure;
- development of strategic programs to improve the efficiency of fish production and attract investment in the development of the processing system;
- pay great attention to training qualified specialists who are well versed in the industry, improving their experience and qualifications, in-depth study of the experience of foreign countries, and attracting them to participate in the development of the country's fishing industry;
- ensure that issues of optimal placement of fish farms and land allocation are carried out in the prescribed manner on the basis of regulatory

documents;

• high-quality and timely delivery of fish products grown as a result of the development of aquaculture to consumers; systematic development of logistics is desirable.

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