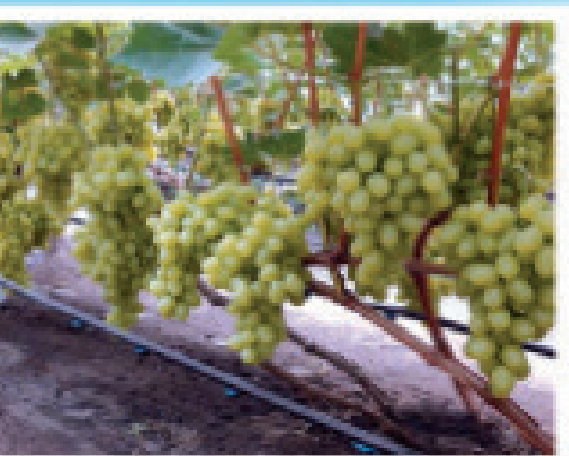


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CONCEPTUAL DIRECTIONS FOR THE DEVELOPMENT OF FISHERIES

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Abstract

This article highlights the conceptual foundations for the development of fisheries in conditions of limited water resources, and also substantiates the importance of developing conceptual approaches to the development and improvement of the efficiency of fisheries in the regions. Also, as a result of the study, a conceptual framework for the development and improvement of the efficiency of the fish farming industry was proposed, that is, the purpose of this conceptual approach was to focus on creating conditions for fisheries and increasing its economic efficiency; as a result, conclusions and proposals were developed.

Keywords: *conceptual foundations, fish farming industry, efficiency, state support, fish production, fish species, biological potential of water bodies, fish material, etc.*

Introduction. As a result of the great attention paid to the fishing industry in ensuring the food security of our republic, economic reforms are being carried out aimed at establishing market relations in the industry. As a result, the economic, organizational and legal conditions for managing business and organizing production online have radically changed, and a new system based on market relations has emerged. Ultimately, economic reforms carried out in the industry made it possible to conduct fisheries with various forms of ownership on a competitive basis.

The development of fish farming, along with the creation of new jobs, provides the population with products rich in protein, minerals and vitamins that people need to ensure food security, improve the health and standard of living of the population.

It is known that reforms implemented in the fisheries sector, structural changes characteristic of a market economy, despite the fact that the main priority in fish production in the fishing industry is given to enterprises and farms based on private property, it is necessary to develop a comprehensive system of measures based on state support for industry development.

The fishing industry occupies an important place in Uzbekistan, and the importance of the industry is evidenced by the adoption of a number of government programs to increase fish production.

The decision of the President of the Republic of Uzbekistan Sh. Mirziyoyev dated May 1, 2017 "On measures to improve the management system of the fishing industry" is extremely important. We can increase the production of fish and fish products by studying the current state of reservoirs on the territory of our republic, conducting comprehensive scientific research and organizing work in accordance with the recommendations given on their basis [2].

According to the decision, providing support to fishery network organizations in establishing the breeding of valuable fish species for fishing in natural and artificial reservoirs in order to improve the cultivation of fish fry; creation of new hatchery workshops for the production of larvae, increasing the volume of growing juvenile fish, modernizing and expanding existing ponds for growing juvenile fish; ensure effective interaction with the relevant local executive authorities in matters of land allocation for the creation of water bodies for the rational use of resources of natural and artificial water bodies; increase the volume of fish farming through the widespread introduction of modern fish farming technologies, including cage farming, and increasing the productivity of natural and artificial reservoirs; The most basic tasks have been identified, such

as strengthening the feed base of the fisheries network through the creation of new and modernization of existing production facilities for the production of complete high-protein fish feed [1].

Materials and analysis. Today our researchers are well aware of problems such as the rearing of fish fry, fishing ponds, lakes and reservoirs with them, and although fishermen follow their recommendations in this area, they are faced with problems such as ecological fundamentals and climatic periodicity. As a result, in the first links of the food chain (from the most productive fish) we cannot get more than three tons of fish per hectare, and even developed fish farms cannot catch more than 40-50 kg of fish per hectare from lakes and reservoirs.

We can increase fish productivity by 100-200 times (40 kg per cubic meter of water) through the development of new fish farming technologies, the development of new theories of intensive aquaculture, feeding fish with new types of feed units, feeding them in a new system. Such technologies do not occupy a large part of the water basin (less than 1% of the water basin), the main thing is that they do not require changes in the water regime, fish farms do not pollute the water quality, all work is carried out on the principle of integrated water use.

In this regard, scientists from the Fisheries Research Institute, based on comprehensive practical research on growing African carp, carp and other fish using advanced technologies, have developed reliable developments for the next three years.

Systematic organization of organizational and technological processes of fish production, reproduction of juvenile fish and strengthening of the food supply, rational use of resources of natural reservoirs and artificial lakes, as well as the introduction of scientifically based methods and intensive technologies of fish farming into the process are the main priorities for the development of the fishing industry.

All water basins in our country are used mainly for agriculture, i.e. for irrigation system. Fisheries need to find their place in this system as water users, not water consumers. To do this, it is necessary to create a procedure for the passage of water through fishery ponds to the water consumer. For example, it will be necessary to establish a system of running water passing through fishing ponds and returning to the riverbed (to consumers) without deteriorating in quality.

In our country, reservoirs with concentrated inland water resources are adapted for irrigation needs. Moreover, all water bodies - drainage, drainage and collector - are used primarily in irrigated agriculture. Of great importance in the production of food products is the organization of

artificial cultivation of fish and other aquatic organisms. Establishing local fish feed systems in sustainable systems will ensure food security for the population and create new jobs in rural areas.

The oxygen regime available in the canal, septic tank and collector system is favorable for the life of native fish (bioremediators), since all of them are inhabited by upper-water plants in the summer. Herbaceous fish, which directly manage primary production, serve as the main resource for increasing fish productivity in our region and as a means of reclamation of drainage and collector reservoirs. This also makes it possible to create a very convenient ecological system from a bioenergy and economic point of view. Taking into account the climatic conditions of our country, especially the need to flush saline areas, it is effective to grow fish in a system that discharges saline wastewater into natural reservoirs through drains and collectors.

However, there are a number of factors that prevent the use of irrigation canals, drains and sewers for fishing. One of these factors is a biological deficiency in the existing system as a result of a drop in water levels during the growing season of agricultural crops and the flooding of water bodies by higher aquatic plants.

Diversified farms make it possible to catch additional fish products from drains and collectors on the outskirts of cotton and grain fields due to the fact that the water level in the drains and collectors is sufficiently stable so as not to harm the cultivation of crops and the drainage systems are fished with grass fish. It is necessary to transplant herbivorous fish in the fall to large drains and collectors with constant water flow, and to small drains and collectors with constant water flow in early spring before thickets of aquatic plants appear. Destruction of thickets of aquatic plants can be achieved after fishing activities [3].

Based on the results of monographic observations of existing fisheries in Namangan, Surkhandarya regions and the Republic of Karakalpakstan, when developing a conceptual framework for the development of a fisheries network, it is necessary to take into account the following areas [5]:

- development of fishing clusters on the principles of public-private partnership in order to further develop the system of processing and storage of fish products;
- increase the volume of fish production based on the use of resource-saving intensive technologies with the rational use of available land and water resources in fish farming;
- modernization of existing fixed production assets of the industry;
- further development of production, market and institutional infrastructure serving fish farming;
- improving the system of providing veterinary services and medicines in the fisheries sector;
- development of standards and norms to ensure the safety of fish consumption;
- creation of biological laboratories at Fisheries Association LLC in each region and implementation of a fish quality certification system;
- application of incentives (subsidies, tax and duty breaks, etc.) to fisheries based on intensive technologies;
- it is desirable to create consulting centers in this area together with the Fisheries Research Institute;
- it is advisable to develop and further develop an insurance mechanism in the field of compensation for losses caused by the death of fish fry or various natural

disasters, as well as to conduct scientific research in this direction.

Discussion and results. The objectives of developing and increasing the efficiency of the fishing industry are divided into economic, social and environmental. These goals are interrelated and complement each other. The following general goals can be defined:

- 1) Economic: increasing the profits of producers; obtaining income from exports;
- 2) Social: improving the living standards of low-income families and eliminating the problems of food shortages; increasing economic opportunities and employment in rural areas, improving nutrition of the population;
- 3) Environmental: conservation, maintenance and improvement of the efficiency of land, water and genetic resources.

To improve the qualifications of scientists, specialists and technologists, their professional and technical skills for conducting scientific research and managing the fish farming industry (aquaculture, pasture aquaculture, fisheries). For this [5]:

- development and implementation of a large-scale national program for the development of human factors and the expansion of scientific research for people involved in aquaculture and fisheries, and the service sector.
- organizing and conducting courses for the purpose of training and exchange of experience on various technologies of fish farming and management of fishery enterprises.

Development of technical support services for rearing and extension of services, control, prevention and control of diseases, credit, transportation, processing, marketing and trade of larvae and fry, as well as feed. For this:

- development of appropriate programs to improve existing breeding farms and produce high-quality broodstock and juveniles for aquaculture, lakes, rivers and reservoirs;
- providing technical and financial support to the private sector to create incentives for the establishment and operation of fish hatcheries;
- strengthen compliance with the rules governing quarantine measures and acclimatization of new fish species;
- development and implementation of a national fish feed production program focusing on fish species that can be produced by the private sector, are affordable and can be produced in large quantities.

Enhance knowledge and technology in all aspects of aquaculture, rangeland aquaculture, fisheries, aquaculture and management development. For this:

- development and demonstration of diverse and multifunctional aquaculture and rangeland aquaculture models;
- improving the mechanism for exchanging information and technologies in the field of aquaculture and fisheries;
- strengthening collaboration between research and educational institutions and the private sector to develop solutions to various network problems.

Development of appropriate economic incentives for producers, enterprises, processors, wholesale and retail organizations in the fishing industry. For this:

- development and implementation of a national program to improve market conditions, freezing, processing of products, as well as diversification, improvement of the shape and quality of products;
- simplifying access to sources of microfinance, lending,

savings, subsidy schemes, insurance and investment;
 - revise and expand licensing, leasing and tax rules as necessary to encourage investment in aquaculture, livestock aquaculture, fisheries, fish processing and marketing.

Develop and implement national legislation, implement national fisheries codes, strengthen management skills to conserve biodiversity, and improve management practices to conserve the diversity of fish and aquatic ecosystems. For this:

- unification of the fish control system, quarantine and control of acclimatization of species or their transportation with the Uzbalksanoat Association, which is one of the main institutions of the network.

- development and dissemination of an improved manual for effective management and solving various problems; training of fishing staff through their implementation.

- improvement of the statistical information system of fisheries.

In our opinion, it is important to develop conceptual approaches to the development and improvement of the efficiency of fisheries in the regions. As a result of our research, we proposed a conceptual framework for the development and improvement of the efficiency of the fishing industry, that is, the goal of this conceptual approach is to create conditions for fisheries and help improve its economic efficiency. Based on this goal, improve the efficiency of fish production; breeding and acclimatization of fish species; compliance of fish consumption with medical standards; maintaining employment in rural areas; The tasks of ensuring the environmental cleanliness of products and production were highlighted. Levers for implementing the conceptual approach were also proposed (Figure 1): fisheries operate on the basis of principles; government support policy; fish farming in polyculture.

Conclusion and suggestions. We believe that with the help of the assigned tasks and implementation levers, the following results can be achieved:

1. Naturally: maintaining the fish productivity of a reservoir by maintaining a balance between various aquatic inhabitants; growth of the food supply due to the consumption of waste, an increase in the growth rate of fish in the conditions of growing various types of fish, the extinction of small fish at the expense of wild fish, etc.

2. Economic results: increasing the efficiency of water use; additional income from the sale of additional types of fish; increasing the competitiveness of organizations by attracting additional buyers for various types of fish; reducing the risk of financial losses; increasing the efficiency of reproduction, maintaining employment in rural areas, developing small businesses, etc.

Also ensure the protection and management of fisheries resources:

- establishing a scheme for the joint use of lakes, reservoirs and other objects by various users, including fishing.

- combating illegal, uncontrolled and unreported fishing in lakes, rivers and reservoirs.

- take measures to increase public awareness on environmental issues.

In general, developing a concept for the development of the fishing industry and defining priorities will help to maximally satisfy the population's needs for fish and fish products, raise living standards, create new jobs, and solve problems of processing and storage of fish products.

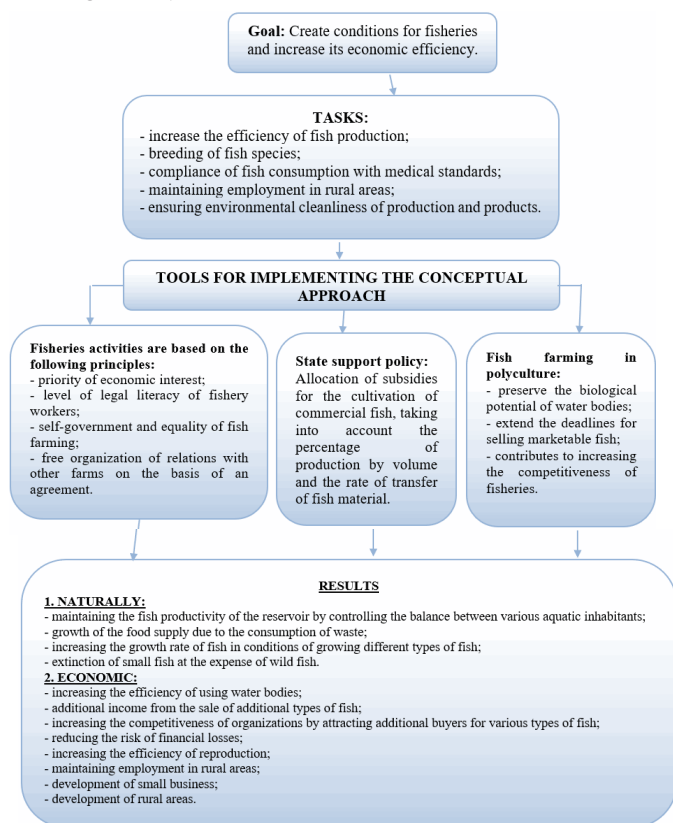


Figure 1. Conceptual basis for the development and improvement of the efficiency of the fish farming industry [5]. Made by the author based on research.

References:

1. Resolution of the President of the Republic of Uzbekistan PR-3657 dated April 6, 2018 “On additional measures for the accelerated development of the fishing industry.” National database of legal documents, 07/04/2018, № 18.07.3657/1027; 07/09/2020, № 20.06.6021/1047; National database of legislative information, 04/30/2021, № 21/06/6218/0398; 02.12.2022, № 22.06.67/0128. <https://lex.uz/docs/3642735>.
2. M. Yuldashev Fishery perspective. <http://agro.uz/uz/data>.
3. R. Kurbanov. The role of native herbivorous fish in fish farming. - J.: Agriculture of Uzbekistan. – 2013. № 12. – p. 13.
4. Aquaculture and fish farming in Uzbekistan, current state and development concept, Tashkent, 2008.
5. Research work on the topic “Improving the economic foundations of the fish farming industry in improving the country’s food supply” Final Report (2018-2020), TIAME, Tashkent, 2020. P. 355.