

## Intensive Fish Farming: The Main Goals and Benefits

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**Abstract.** *In this article, the main goals of intensive development of fisheries, efficient use of fish resources, the importance of intensive development of the fishing industry as well as use of scientifically based resource-saving methods and intensive fish farming technologies are considered. Therefore, this article is devoted to major goals and economic, social and environmental benefits of the sector in conditions of food security.*

**Keywords** – fisheries productivity, intensive fisheries, fish and fish production, goals, rational use, state support, research and innovation

### I. INTRODUCTION

Increased fisheries productivity and industry modernization, intensified production, and expanded opportunities for economic and geographical use of water resources are expected to increase the positive impact of the industry on livelihoods and employment. By 2030, food production from aquatic products is projected to increase by 15 percent (OECD and FAO, 2021), and it is assumed that this growth can be driven primarily by aquaculture development. However, this increase should not come at the expense of the health of the aquatic ecosystem, increased pollution, or a decrease in fauna, biodiversity, and social equity. Modern, intensive technologies and sustainable strategies for the development of fisheries and aquaculture are needed to prevent such negative consequences [1].

As scientific and practical experience shows, in the context of global climate change, fisheries and aquaculture make a significant contribution to economic growth by producing safe food products. According to FAO estimates, “...by 2050, the world’s population will reach approximately 9.5 billion people” and “there will be a shortage of safe consumer goods” [2]. Therefore, it is natural to increase fish consumption by intensifying fish production, and the inclusion of fish and fish products in the diet is an important means of ensuring food security and improving the nutrition process. From this point of view, one of the important parts of the study is to know the main goals of intensive development of the fishing industry.

The main goals of intensive development of fisheries are:

- The main objective of intensive development of fisheries is to increase the production of fish and other seafood. This is necessary to meet the demand for fish and fish products in connection with population growth and changes in consumer preferences;
- In order to ensure food security, the development of intensive fisheries is aimed at providing the population with high-quality and affordable fish products. This is especially important in regions with a shortage of protein and lack of food security;
- the development of intensive fishing contributes to the creation of new jobs and economic development in rural areas. This will bring income to local producers through employment in the fisheries industry and the expansion of distribution channels for products;
- In terms of improving product quality, intensive fishing improves product quality through controlled fish keeping conditions and the use of modern technologies. This includes improving the taste and nutritional properties of fish, increasing its competitiveness in the market;
- development of intensive fisheries for the purpose of social development and sustainable use of resources will help improve the lifestyle of local populations, increase access to education and health services. At the same time, it helps rational use of natural resources, minimizing negative impact on the environment;
- in the area of research and innovation, the development of intensive fisheries promotes the development of scientific research and innovation in aquaculture. This includes the introduction of new technologies, the development of efficient resource management methods and the improvement of the conservation characteristics of the genetic pool of fish species;
- The goals of intensive development of fisheries are explained by the fact that they are aimed at forming a sustainable and developed fishing network that will allow us to meet the needs of modern society for food resources, taking into account economic, environmental and social aspects [6, 11].

## II. RESULT AND DISCUSSION

The goals of intensive development of fisheries can be divided into several types, focusing on aspects of efficient use of fish resources (Figure 1):

Economic goals:

- the main goal of intensive development of fisheries is to increase catch or production to meet market demand;
- the introduction of effective technologies and management methods to improve the economic efficiency of fish farming.

Social goals:

- development of fisheries is aimed at producing high-quality and safe fish and fish products for public consumption;
- fishing contributes to the creation of new jobs in rural areas and contributes to the socio-economic development of these territories.

Environmental goals:

- development of sustainable fish farming methods that are resilient to natural impacts and contribute to the conservation of biodiversity;
- implementation of practices aimed at improving water quality and preventing pollution.

Technological goals:

- development of new technologies and methods of fish breeding to improve fish keeping conditions;

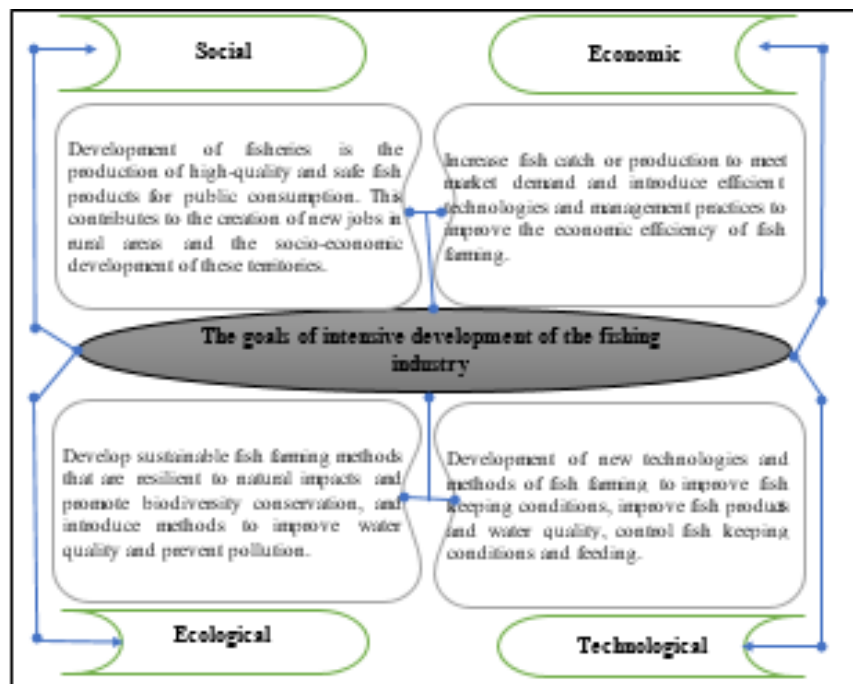


Figure 1. The main goals of intensive development of the fishing industry.  
(Based on the author's scientific research.)

- includes improving the quality of fish products and water, monitoring fish keeping and feeding conditions.

Each of these goals has its own characteristics and requires an integrated approach to planning and developing a strategy for the development of fisheries.

Intensive fishing has a number of important advantages for the development of our country. The main ones are:

- ▶ Intensive fishing creates new jobs in rural areas, on private plots, where alternative sources of employment are often lacking. This helps reduce unemployment and increase household incomes;
- ▶ intensive development of fish farming allows countries to increase exports of seafood, which helps improve the foreign trade balance and increase foreign exchange earnings;
- ▶ increasing the volume of fish farming based on intensive methods will contribute to improving the food and protein nutrition of the population, which is especially important in areas where there is a problem of protein deficiency;

► The intensive development of fisheries stimulates the emergence of new technologies and approaches. This includes the development of new water control systems, the development of ways to use biotechnology to improve the sustainability and growth of fish;

► intensive fisheries can be managed sustainably, reducing negative impacts on the environment and reducing pressure on wild fish populations;

► the development of intensive fisheries helps improve the quality of life of local populations, especially in rural areas, by creating new jobs, increasing incomes and providing affordable food;

► intensive development of fisheries serves to strengthen international ties and cooperation through the exchange of technologies, experience and knowledge in the field of aquaculture;

► Intensive fishing not only serves economic development, but also plays an important role in the socio-ecological sustainable development of our country, increasing its competitiveness, and improving the well-being of the population.

The benefits of intensive fisheries include increased productivity, improved product quality, reduced production costs, resilience to climate change, and sustainable development of the fishing industry. However, such systems require significant investment in technology and training to effectively manage fish resources and provide fish products to the population.

It is desirable to develop fisheries in the following areas with rational use of available water resources:

1. Development of "pasture" aquaculture in natural reservoirs;
2. Organization of cage fish farming in natural reservoirs;
3. Organization of fish breeding in pools with water at natural temperature.
4. Construction of closed system pool farms.

In our opinion, the main areas of possibilities for intensifying fish farming in small and medium-sized lakes are provided by:

- organizing the cultivation of commercial fish and young fish on large pastures and in cages based on proven biotechnology;

- using complex methods of increasing the amount of nutrients in lakes and improving their hydrochemical regime (acclimatization of food organisms, use of artificial nutrients and fertilizers);

- reducing the invaluable native ichthyofauna before releasing fish into the lake for breeding (fishing);

- intensive hunting on small lakes;

- technical equipment for the complex mechanization of fish farming and fishing processes.

The main intensification of fishing in small and medium-sized lakes is fish farming, based on the replacement of low-value native species that do not grow to a commercial level in the lake with fast-growing, highly productive fish species.

The following fish species with different trophic connections are recommended for breeding in lakes: carp (benthophage), white carp and carp (phytophage), pike perch (bioremediator).

Releasing fish species into lakes that feed on different foods at the same time, or polyculture, can be very effective in fisheries.

There are opportunities for rational and efficient use of water resources by building basin farms. In this case, it is desirable to develop fisheries in two main directions:

- establishment of fish farming at natural temperatures by building pools with running water in the foothills. At present, the water resources of mountain rivers are not used for fishing at all;

- establishment of fish farming by means of a closed water system by building pool farms in closed structures.

In order to develop fisheries based on intensive technologies in basins, it is first necessary to resolve the following issues:

- establishment of breeding of valuable fish species intended for intensive cultivation in swimming pools (carp, channel flounder, tilapia, sturgeon);

- provision of high-protein granulated fish feed for breeding the above-mentioned fish species. The main part of the compound feed used for feeding this type of fish is fish meal, and in the near future, the issue of its import from foreign countries and establishment of production in the republic should be resolved;

- adaptation of advanced foreign technologies for growing valuable fish species to regional conditions.

The solution to the above problems will allow a sharp increase in the volume of fish farming based on intensive technologies, using the water resources available in the regions.

Here, of course, it is appropriate to reveal the economic, social and ecological significance of the intensive development of the fishing industry. That is, the intensive development of fishing has a significant impact on the economy, social sphere and ecology. It is worth considering each of these aspects (see Figure 2):

Economic importance:

- intensive development of fisheries allows to significantly increase the volume of fish and other seafood production. This serves to improve the country's food supply and its export potential;

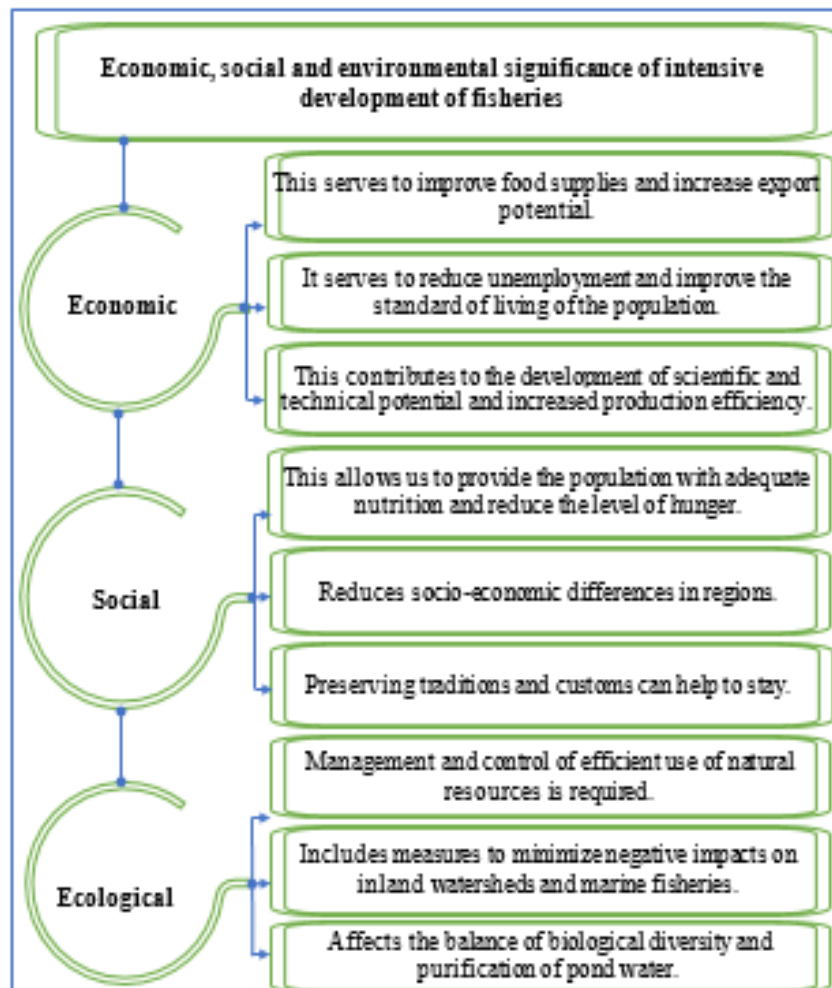


Figure 2. The importance of intensive development of the fishing industry.

(Based on the author's scientific research.)

- creates several new jobs in the value chain of fisheries, from fish farming to fish processing and trade. This, in turn, serves to reduce unemployment and improve the standard of living of the population;

- intensive development of fisheries requires investment in modern technologies, research and infrastructure. This contributes to the development of scientific and technical potential and increased production efficiency.

Social significance:

- fish and fish products are an important source of protein in the diet of the population of the world. Intensive development of fisheries allows to provide the population with adequate nutrition and reduce the level of hunger;

- the fishing net in many cases becomes one of the main elements of the economy of rural and remote areas, makes an important contribution to its development and reduces socio-economic differences in the regions;

- fishing plays an important role in the culture of many peoples and is part of local identity. This can help to preserve such traditions and customs.

Ecological significance:

- requires management and control over the efficient use of natural resources in order to prevent intensive development of fisheries, rapid growth of aquaculture and depletion of resources;

- uncontrolled development of fisheries can lead to pollution of water resources, introduction of invasive (non-native) species and loss of habitat for organisms. Sustainable fish farming includes measures to minimize negative impacts on inland basins and marine fisheries;

- fish farming affects biodiversity and ecosystem services of marine and inland waters, such as water purification and maintenance of ecosystem balance. Sustainable development of fisheries is aimed at maintaining these functions.

It should be noted here that the development of fish farming based on intensive technologies is a complex balance between economic interests, social benefits and environmental issues. Effective management of this process requires consideration of all three aspects to ensure sustainable development and conservation of resources in the future [6, 11].

In conditions of food security, the development of fisheries is an objective necessity, and economic reforms associated with the development of the industry serve to satisfy the demand for fish and fish products of the population and to strengthen its health..

### III. CONCLUSION

We consider it appropriate to implement the following measures in order to further increase the main goals and socio-economic importance of the intensive development of the fishing industry:

- increasing the efficiency of fish and fish products farming;
- improving the logistics of fish production and processing, attracting investment;
- efficient use of natural and artificial reservoirs;
- widespread use of scientifically based resource-saving methods and intensive fish farming technologies;
- expansion of commercial fish farming, as well as paying special attention to the territorial optimal placement of the fishing net;
- systematic organization of organizational and economic relations in the value chain of fish farming;
- stimulation of the system of reproduction of fish fry and supply of fish farms with feed;
- development of mechanisms of state support for the development and improvement of the efficiency of the fishing industry;
- analysis of foreign experience and development of proposals on the possibilities of implementing its essential aspects.

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