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## ИЗВЕСТИЯ

НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК  
РЕСПУБЛИКИ КАЗАХСТАН  
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## NEWS

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**PROSPECTS AND THE CURRENT STATE OF THE LAKE AND  
COMMODITY FISHING OF THE NORTH KAZAKHSTAN REGION**

**Abstract.** According to the authors, increasing the efficiency of fish farming in freshwater bodies is becoming increasingly important. One of the main ways of rational highly efficient use of biological resources of inland waters is the organization on their basis of commercial fish farming, including the use of a wide variety of ways and methods of artificial reproduction and rearing of fish in cages, pools and ponds. The transition to lake-based fisheries is one of the main components of sustainable economic and social development of the agricultural sector and rural areas for the Republic of Kazakhstan.

**Keywords:** fish farming, lakes, fisheries, prospects, ponds.

**Introduction.** In the Republic of Kazakhstan, for the development of the agro-industrial complex, including the commercial fish farming industry, the "Program for the development of the agro-industrial complex in the Republic of Kazakhstan for 2013-2020" AGROBUSINESS - 2020 "was adopted. As a result of its implementation, strategic goals will be achieved [1].

SWOT analysis of the agricultural industry

Strengths	Weak sides
Kazakhstan occupies the ninth place in the world in terms of the area; Kazakhstan occupies the second place in the world in terms of arable land per capita; Kazakhstan is one of the largest exporters of grain and flour; the large rural population (43% of the total population), a high share of the employed (18% of the employed population); high potential demand for food products from the markets of the CIS and Central Asia; constant growth of gross agricultural product; high potential for production and export of organic products	low share in the country's GDP (4.8%); underdevelopment of trade, including export; low level of implementation of research and development work; insufficient level of veterinary and food safety; high capital intensity; long payback period; dependence on climatic conditions; low labor productivity; low profitability of agricultural producers
Opportunities	Threats
the possibility of increasing the volume of all types of agricultural products due to the growing number and change in the nutritional structure of the population; the formation of effective government support for agricultural producers and agricultural cooperatives; expansion of the geography of deliveries and export volumes in promising sectors	adverse changes in natural climatic conditions, instability of weather conditions; spread of animal and plant diseases and environmental pollution; increased competition in international markets for certain types of products in connection with the entry into the WTO; risk of inefficient government regulation of the industry

The prospects for the development of lake-based commodity fisheries were considered by creating a mathematical model to predict its effectiveness on the example of Lake B. Tarangul, North Kazakhstan Region.

Scientific studies show that a significant increase in fish production in lakes can be achieved by performing the necessary complex of fishery activities.

The ubiquitous transition from fisheries to managed industrial fish farming should be the industry's long-term general program. The feasibility of this approach is confirmed by science and practice [7].

Scientists of NKSU named after M. Kozybaev, employees of the public association "Ecosphere" are doing a lot of work to study the current state of lakes in the North Kazakhstan region. Based on this, scientific reports and publications have been prepared which give an analysis of the hydrochemical, hydrobiological, morphometric, and other conditions of aquatic ecosystems of the North Kazakhstan region [2].

The lake content of the territory of Northern Kazakhstan is one of the highest in the Republic of Kazakhstan and averages 4.6%. In the North Kazakhstan region there are more than 2328 lakes with a water mirror area of more than 4,525 km<sup>2</sup>. Water bodies differ in their hydrological and hydrochemical parameters, overgrowth, food supply, and the composition of the ichthyofauna. Despite these differences, all of them are a favorable habitat for fish and food invertebrates. At least 1,500 water bodies have fish resources, mainly crucian carp [5].

Biological justification has been carried out for 263 reservoirs of the North Kazakhstan region today classified as fisheries [4]. According to the results of the scientific analysis, all the water bodies presented were recognized as promising for fisheries. The average productivity of reservoirs was calculated according to the methodology presented by Pismennaya OA, 2005. This technique is widely used in biological and economic calculations of the productivity of reservoirs [6].

It should be noted that a characteristic feature of the presented lakes is their periodic drying out and filling in the year and year, and the filling periods are less long, i.e. they are frost-hazardous. In particular, in 70% of undeveloped frost-hazardous water bodies, a low-value, weedy predatory species, the rotan, which is also an omnivorous ichthyophage, has divorced and increases the population. In 80% of the water bodies of the region, fishing is not carried out for several reasons, one of which is overgrowing, the other is the presence of tall fish, i.e. ubiquitous inbreeding is noted, which emphasizes the need for resettlement, in particular, crucian carp from the reservoir to the reservoir to update the population, to reduce the population of tall fish [3].

All the information presented allows us to speak not only about the possibility, but also the need for fishery reservoirs at OTRH. Moreover, the increase in fish productivity of water bodies can be carried out with small capital investments in the organization of production.

A mathematical model has been developed. Using this model, knowing the basic morphometric characteristics of the reservoir, as well as the results of hydrobiological analyzes, it is easy to determine which annual increase in ichthyomass is capable of providing this or that reservoir. Therefore, according to the state of the predicted data, it is possible to identify not only the species of fish that the reservoir can feed, but also the maximum amount necessary for stocking. Since excessive over-accumulation will lead to undermining of the natural forage base of the reservoir, which will inevitably lead to the formation of tall-growing forms of ichthyofauna, and possibly mass killing.

By the quantitative development of zooplankton, Lake B. Tarangul is medium fodder and is characterized as  $\beta$ -mesosaprobic. Also, according to the quantitative development of zoobenthos, the studied reservoir belongs to - mesotrophic.

According to the condition of the food supply, Bolshoi Tarangul Lake is capable of providing an annual increase in ichthyomass of "peaceful" fish up to 60 tons (or 17.8 kg / ha).

It is recommended that 60.5 tons of ichthyomass of "peaceful" fish be removed annually so as not to undermine the natural forage base. However, it must be taken into account that this value is not the total biomass of "peaceful" fish, but only an annual increase. The generally accepted optimal seizure does not exceed 30%, established by leading ichthyologists and prescribed by law.

Consequently: The total biomass of "peaceful" fish is 200 tons.

Estimation of the growth of predator biomass:

$$Pr e = \frac{(200 - 60,5)}{3}$$

Hence, the annual production of predators of ichthyophages in Lake B. Tarangul may be 47.1 tons.

Total annual increase in ichthyomass in polyculture on Lake B. Tarangul may be 107.6 tons.

Speaking about efficiency, first of all, it is necessary to talk about economic efficiency. The developed model allows you to calculate and economic efficiency. Where the costs depend on the volume of withdrawal and on the area of the reservoir. Income is calculated on the basis of wholesale market prices for raw fish (in the case of processing, revenues may increase significantly).

The average annual growth rate of food production in general does not keep pace with the growth rate of consumption and incomes of the population, as a result of which the free market niche is replenished by imports and its share in domestic consumption remains very significant

Also, the program considers such indicators as profit, profitability and break-even point.

If all the necessary conditions are met in the Republic of Kazakhstan, fish productivity will increase significantly, therefore, not only Kazakhstanis will receive fish products, but it is also possible that exports to neighboring countries will increase, which will contribute to food security.

The main goal is the development of the country's fisheries, the creation of conditions for the conservation of valuable fish species and the rational use of fish stocks.

The topic under consideration is certainly important for Kazakhstan, as its expected results can make a significant contribution to ensuring the country's food security.

The increased economic potential of the country, the problem of food security, the projected population growth and increased requirements for the assortment and quality of fish products determine the need to maximize the use of all potential opportunities of freshwater fisheries.

One way to solve the problem of supplying the population with high-grade foods rich in proteins is fishery products, in particular, the development of commercial fish farming. Kazakhstan has a huge variety of ecologically clean water bodies (the total area of water bodies in Kazakhstan, excluding the Caspian Sea, is about 5 million hectares.) On which it is possible to produce environmentally friendly fish products. It should be noted that in the Republic of Kazakhstan, the export of fish products among agricultural crops ranks third after the export of grain crops (wheat and barley).

One of the main reasons for this situation is the underdeveloped system of harvesting and promotion of agricultural products from agricultural producers to sales markets, including agricultural processing enterprises. The increasing role of intermediaries in the sales network almost completely eliminated the relationship between producers and processors of raw materials. Low purchase prices for agricultural products do not stimulate an increase in their production volumes, which ultimately leads to a low share of processing of agricultural raw materials, underutilization of the capacities of processing enterprises and, ultimately, to a high share of food imports. Products of small and medium-sized domestic agricultural producers noticeably lose in quality and packaging and are not able to successfully compete with foreign suppliers.

However, the volumes of fish catch in reservoirs of fishery importance have their limits limited by the natural fish productivity of reservoirs and the ability of commercial fish species to reproduce. These limits have now been reached; an increase in the fishing load and other anthropogenic factors on water bodies does not lead to an increase in the volume of harvested fish resources. The only solution in this case is the development of commercial fish farming.

At the same time, the fish products produced must be competitive: of various assortments, of high quality, accessible to the mass consumer. Hatcheries should be able to provide fish to the population throughout the year and in the required quantities, preferably in a lively and chilled state. At the same time, the applied commercial fish farming technologies must be cost-effective, i.e., capable of ensuring the return on financial resources invested in reconstruction and technical re-equipment.

One of the factors to ensure the quality of fish products is the use of environmentally friendly technologies, which is reflected in the Concept for the transition of the Republic of Kazakhstan to the Green Economy.

**П. С. Дмитриев, Т. Н. Лысакова, М. М. Тайжанова**

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**СОЛТҮСТІК ҚАЗАҚСТАН ОБЛЫСЫНЫҢ БАЛЫҚ ЖӘНЕ БАЛЫҚ АУЛАУДАҒЫ  
ПЕРСПЕКТИВАЛАРЫ МЕН АҒЫМДАҒЫ ЖАҒДАЙЫ**

**Аннотация.** Авторлардың пікірінше, тұщы су қоймаларында балық өсіру тиімділігін арттыру барған сайын маңызды бола түсуде. Ішкі сулардың биологиялық ресурстарын ұтымды және тиімді пайдаланудың

негізгі әдістерінің бірі балық аулаудың негізін ұйымдастыру, оның ішінде балықтарды торда, бассейнде және тоғандарда жасанды көбейту мен өсіру тәсілдері мен әдістерінің кең қолданылуы. Келге негізделген балық аулауға көшу Қазақстан Республикасы үшін агроөнеркәсіптік кешеннің және ауылдық аймақтардың орнықты экономикалық және әлеуметтік дамуының негізгі компоненттерінің бірі болып табылады.

**Түйін сөздер:** балық шаруашылығы, көлдер, балық шаруашылығы, перспективалар, тоғандар.

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### **ПЕРСПЕКТИВЫ И СОВРЕМЕННОЕ СОСТОЯНИЕ ОЗЕРНО-ТОВАРНО РЫБНОГО ХОЗЯЙСТВА СЕВЕРО-КАЗАХСТАНСКОЙ ОБЛАСТИ**

**Аннотация.** По мнению авторов, повышение эффективности рыбоводства в пресноводных водоемах приобретает все большую значимость. Одним из основных путей рационального высокоэффективного использования биологических ресурсов внутренних водоемов является организация на их базе товарного рыбоводства, включая в него использование самых разнообразных путей и способов искусственного воспроизводства и выращивания рыб в садках, бассейнах и прудах. Переход на озерно-товарное рыбное хозяйство является одной из основных составляющих устойчивого экономического и социального развития агропромышленного комплекса и сельских территорий для Республики Казахстан.

**Ключевые слова:** рыбоводство, озера, рыбное хозяйство, перспективы, водоемы.

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