



## Preliminary Analysis Theoretical Basis Of Implementation Of Intensive Fish Farming In Ensuring Food Security

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### ABSTRACT

This article examines the theoretical basis for the introduction of intensive fish farming to ensure food security. It is scientifically based that the employment of the population is provided through intensive fish farming, as well as the structural changes in the population's diet and lifestyle changes.

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### Introduction

Scientific research over the past 50 years has led to scientific conclusions about the need for efficient use of water resources and their sustainable management. In particular, the sharp increase in the number of the population sharply increases the demand for meat products. Currently, part of the population's demand for beef is being met by imported meat products, but this demand can be met by developing fisheries.

Fish and fish products are not inferior to beef in terms of chemical composition and taste, but are far superior to beef in terms of digestibility. Fresh fish meat contains 15 to 22 percent protein, 0.2 to 30.8 percent fat, and a small amount of carbohydrates.

Fishing from the Aral Sea has been stopped since the 90s of the last century. However, in order to satisfy the population's demand for fish, fish breeding was started in the internal water bodies of the Republic - lakes, reservoirs, and artificial fishing ponds. As a result of the depletion of fish stocks in natural reservoirs, a new industry - aquaculture was formed.

**Aquaculture** is the cultivation of aquatic organisms, i.e. hydrobionts, and involves obtaining high-quality products from aquatic animals, including fisheries.

To date, ponds built on the ground are used for breeding carp fish in Uzbekistan. Such basins are only extensively fished. The fish productivity was on average 10-20 ts/ha. But now other areas of aquaculture - sadok fishing, pool - intensive fishing network are forming. In these reservoirs, carp, carp, white carp, carp, trout, which can be grown in local conditions or are acclimatized, have been cultivated.<sup>1</sup>

Thus, a fish farmer first determines how much fish he can get through natural feed. Then, an additional stabilized mixture is added to the feed. Such a method is **extensive fish farming** .

Feed used in fish farming is **natural and artificial** . **Natural food includes** aquatic organisms - phytoplankton, zooplankton, zoobenthos and higher algae. To stimulate their development, ponds are fertilized with organic and inorganic fertilizers. In such ponds, if fish are raised based on completely natural food, it is called an extensive method. If additional nutrients other than fertilizers are applied to the pond, it is called **semi-intensive** fish feeding. Productivity is much higher if fish are raised in this way. It is called **intensive** fish farming if the farmed fish are fed with complete liquid feed, without the use of natural feed and fertilization .

So, there are 3 ways to grow fish in aquaculture:

1. **Extensive fish farming** is done with natural feed and fertilization.
2. **Semi-intensive method**. In this method, mixed feed is given in addition to natural feed with fertilizer. When natural feed is reduced, additional feeding is done.
3. **Intensive method**. Fish reared in this way are fed only mixed feed. Natural feed pollutes the water and negatively affects fish productivity.

Currently, the technology of extensive fish farming, which can yield 10-20 t/ha, is based on natural feed. If it is necessary to increase the productivity of fish, then additional food is given - mixed feed. If fish is reared on a scientific basis, this task is carried out from an ecological and technological point of view. Currently, 50-80 percent of the cost of fish production is spent on feeding it.

Currently, the use of semi-intensive and intensive methods is being widely implemented in order to rationally use existing artificial water bodies and achieve high efficiency. The decision of the President of the Republic of Uzbekistan dated January 13, 2022 No. PQ-83 "On additional measures for further development of the fishing industry" was adopted. The following state support is being implemented in this regard:

- From February 1, 2022, individuals will be allowed to start fish farming in their household as a self-employed person;
- From February 1, 2022 to January 1, 2025, a benefit for entities that started the production of equipment and technologies (aerator, pool, autofeeder, UZV) and processing equipment necessary for the intensification of fishing, but receive more than 80% of their income from the production of this

<sup>1</sup> D.S. Niyazov. Fish is an inexhaustible wealth. - T.: " Dizayn Press" , 2013. 196 pages.

equipment tax (except interest from funds placed in commercial banks), land tax from legal entities, tax on property of legal entities, and tax rates for using water resources will be reduced by 50 percent;

- The rate of land tax and property tax is set at 50 percent for fish farming households.<sup>2</sup>

In semi-intensive fish farming, 2-4 aerators supplying oxygen are installed per hectare of artificial ponds. In the technology of fish farming based on natural feed, if the yield is on average 1-2 tons of fish from 1 hectare, it is possible to grow 8-10 tons of commercial fish from 1 hectare by fishing with at least 8-10 thousand pieces of carp (carp, carp and white carp).

The essence of semi-intensive fish farming is to increase the amount of oxygen in the water by installing oxygen aerators in artificial ponds and achieve high productivity by stocking fish at high densities. But aerators make the pond water cloudy, and this turbidity settles in the fish's wounds, causing them to die. Then, if there is a power outage, the oxygen supply is cut off and the fish may die from lack of oxygen. Therefore, it is impossible to install aerators that directly supply oxygen to artificial water bodies.

Water and land resources are maximally saved in the case of intensive fish breeding, that is, the use of water and land resources, and in order to use them rationally, water purification equipment and oxygen saturation technologies are installed in a 1-hectare artificial pond. It is possible to grow 40-50 tons of commercial fish by stocking 1 hectare of artificial pond with at least 50-55 thousand carp fish at high density.

In fish farming, there are several limiting factors of traditional, i.e. extensive, fish farming, such as land, water resources and their ecological status. From the first years of our century, it became clear that the economic efficiency of using pond fisheries in fish farming was not high, and at the same time, there was a need to introduce modern, high-yield technologies in order to dramatically increase production. As a result, the aquaculture industry around the world began to develop rapidly. The main focus was on growing fish at high density per cubic meter of water and thereby achieving efficiency. The most advanced of these intensive technologies is the closed circulating water plant (YOASQ). Fish breeding is carried out in the use of YOASQ, regardless of the following conditions: external natural factors, unfavorable climate and seasonality of the year.

The positive side of the intensive method is that in a situation where the fresh water problem is getting worse year by year, the water can be purified and reused by installing water filtering equipment. In this way, water resources are saved to the maximum extent. In addition, artificial swimming pools can be installed on the vacant land of the residents, and thereby provide employment to the residents and increase their additional income.

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<sup>2</sup> Decision of the President of the Republic of Uzbekistan dated January 13, 2022 No. PQ-83 "On additional measures for further development of the fishing industry"

**Table 1**

**Dynamics of fish caught by farms of all categories in Samarkand region in 2016-2021<sup>3</sup>**

*tons*

No	Areas	All category households						2021 y. Change compared to 2016	
		2016	2017	2018	2019	2020	2021	+, -	%
	<b>Total province</b>	<b>2540,3</b>	<b>3435.3</b>	<b>4006.1</b>	<b>8974</b>	<b>12725</b>	<b>21981.8</b>	<b>19441.5</b>	<b>8.6 m</b>
1	Samarkand c.	46.2	40.0	304.0	211.1	109.8	114.0	67.8	2.5 m
2	Kattakurgan c.	0.0	0.0	0.0	0.0	0.0	2.0	2.0	2.0 m
	<i>Districts :</i>								
3	Akdarya	248.7	214.9	237.7	644.7	689.9	716.3	467.6	2.9 m
4	Bulungur	126.5	79.8	137.7	135.2	134.9	142.1	15.6	112.3
5	Jomboy	193.7	177.2	63.3	40.0	107.6	109.2	-84.5	56.4
6	Ishtikhan	257.3	334.4	503.7	504.7	515.3	698.3	441.0	2.7 m
7	Kattakurgan	285.0	440.9	655.8	4450.0	8539.6	10226.8	9941.8	35.9 m
8	Koshrabod	56.0	57.4	30.3	35.0	54.1	77.6	21.6	138.6
9	Narpay	85.0	87.8	60.3	122.6	196.3	1 860.0	1775.0	21.9 m
10	Payarik	348.9	1207.7	830.7	1143.6	953.8	2 475.9	2127.0	7.1 m
11	Pastdargom	308.1	298.6	216.5	502.4	332.3	3 136.8	2828.7	10.2 m
12	Pakhtachi	106.2	170.3	202.9	466.3	538.0	1 068.2	962.0	10.1 m
13	Samarkand	188.4	168.1	631.7	452.5	288.8	983.5	795.1	5.2 m
14	Nurabad	26.0	15.7	55.4	53.3	47.4	55.5	29.5	2.1 m
15	Urgut	215.9	49.7	48.4	200.5	190.7	275.8	59.9	1.3 m
16	Taylak	48.4	92.8	27.7	12.2	26.6	39.8	-8.6	82.2

Analyzing the data in the table, if a total of 2,540.3 tons of fish were caught in Samarkand region in 2016, 21,981.8 tons of fish were caught in 2021, and in 2021, compared to 2016, 19,441.5 tons or 8.6 times more fish was caught. . In Kattakorgan district, which is one of the most fish-producing districts in the region, a total of 285.0 tons of fish were caught in 2016, and 10,226.8 tons of fish were caught in 2021, which is 9,941.8 tons more than in 2016 or 35.9 times more fish in 2021. hunted Also, a sharp increase in 2021 compared to 2016 can be observed in Narpay, Pastdargom and Pakhtachi districts. Therefore, in recent years, more fish are being produced in these districts through the wider use of semi-intensive and intensive methods.

In Jomboy and Toyloq districts, on the contrary, a decrease in this area was observed in 2021 compared to 2016. In Jomboy district, 193.7 tons of fish were caught in 2016, and 109.2 tons of fish were

<sup>3</sup> It was calculated based on the data of the Statistics Department of Samarkand region

caught in 2021, compared to 2016, 84.5 tons or 43.6 percent less fish was caught in 2021. In Toyloq district, 48.4 tons of fish were caught in 2016, and 39.8 tons of fish were caught in 2021, compared to 2016, 8.6 tons or 17.8 percent less fish was caught in 2021. Therefore, since these districts are districts specializing in fruit and vegetable production, there has been a decline in this sector.

It is interesting to note that in recent years, fish are being cultivated in the cities of Samarkand and Kattakorgan. So, it is possible to grow fish not only on the land specialized in agriculture, but also in the households using artificial pools. Through this, self-employment of the population is ensured, structural changes in the diet of the population are created, and it leads to a change in lifestyle.

Currently, a number of scientific researches are being conducted in Uzbekistan to analyze the efficiency indicators of the intensive method. In particular, in the scientific work of the scientific researcher Beglaev Uchkun Khurramovich, the economic efficiency of fish cultivation from 1 ha of water reservoir was analyzed in the fishery farm of "Numana balikchiligi cluster" LLC in the Karshi district of Kashkadarya region.<sup>4</sup>

the author's information, when the costs of traditional and intensive fish farming are calculated, 14 mln. Soums were earned, profitability was 54.6%, and intensive method was 633 mln. soum net income and profitability increased to 237.5 percent. From these calculations, it is clear that in the future, it is an important task to analyze the factors that increase the cost of intensive fish farming and find ways to reduce it. One such opportunity, we believe, is to moderate capital expenditures.

**Summary.** In recent years, ensuring the food security of the population remains one of the urgent issues. In particular, the year-by-year decrease of water resources, unjustified removal of fertile lands from agricultural circulation, i.e., negative transformation, and the fact that everything is allocated mainly for the cultivation of agricultural products, endangers the future of pond fishing. All over the world, there is now a shift from extensive to intensive fish farming. The high cost of intensive fish farming requires a scientific approach to this method.

The following conclusions can be drawn from the above analysis:

- a) intensive fish farming not only increases efficiency, but also has a positive effect on the turnover of fish farming,
- b) self-employment of the population is also ensured;
- c) causes structural changes in the diet of the population and changes the way of life.
- g) additional income will be brought to the family.

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