Theoretical foundations of the level of water resource availability. Factors implemented to save water.

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The use of water resources in large quantities and on a scale has led to a change in existing relationships in nature and the national economic system. These changes affected the interests of many sectors of the national economy and entailed, along with positive consequences, negative consequences. If we consider the entire water management system as a single complex and take into account changes in existing natural conditions, then, based on long-term forecasting of requirements for water management, it is possible to achieve the invisibility of negative consequences, the quantity and quality of water in various sectors of the national economy.

As many of our scientists have noted, the “water management complex” refers to water management facilities, entities providing their services (S.Ch.Dzhalalov)[1], their management system and entities using water (R.A.Abdullakhanov)[2]. However, water management is an economic direction of the state, the goal of which is to maximally satisfy the constantly growing need for water in all sectors of the national economy, as well as the protection and restoration of the effective and rational use of water resources, their management, conservation, it should be understood that it is engaged in the delivery and purification primary and secondary consumers.

Therefore, the effective and rational use of water resources means the use of water and its use in full compliance with all laws and regulations for its protection, it is appropriate to understand that this is an indicator that provides society with the greatest efficiency, not only today, but also in the future, when water is scarce grab.

Stabilization of the socio-economic development of our country in the context of economic liberalization largely depends on the level of effective use of the existing potential of irrigated agriculture and water resources. As the first President of the Republic of Uzbekistan I.A. Karimov noted: “Uzbekistan has long been a country of irrigated agriculture. Irrigated agriculture is the basis of the independence of the republic in the food sector and the source of the main export products.” [3].

So, the water problem is one of the most important problems of sustainable agricultural development associated with economic growth in human history. In the

context of deepening economic reforms in our country, efficient and maximum use of water resources is required to fully provide the population with agricultural food products. Currently, the area of irrigated land in the Central Asian region is 8.5 million hectares. The region continues to build large-scale water management facilities and intensively develop new lands.

If you look at the growth rate of this indicator in Uzbekistan, it amounted to 3.4 million hectares in 1975, 4.1 million hectares in 1985, 4 million 247 thousand hectares in 2000, 4 million 341 thousand hectares in 2009 or 2009 compared to 1975, it can be seen that it increased by 1.3 times. As of January 1, 2022, the total area of the administrative border of the Republic of Uzbekistan is 44 million 892 thousand 400 hectares, irrigated lands are 4 million 331 thousand 700 hectares.[4]

Today, irrigated arable land in our republic amounts to more than 4.3 million hectares, and irrigated agriculture, based on irrigation construction, is having an increasingly positive impact on the balance of agricultural production in our country. Irrigated lands produce cotton, grain, fruits and vegetables, potatoes and other products.

It has been reported that more than half of the irrigated land in Uzbekistan is saline. According to studies conducted in recent years, about 53% of the republic's irrigated lands have varying degrees of salinity. Two years ago, the figure was reported to be 45 percent. As of October 1, 2020, 44.7% of irrigated lands in Uzbekistan have varying degrees of salinity: 31.0% weak, 11.9% moderate and 1.9% severe salinity.

It is noted that dramatic changes nowadays in environmental factors on earth have an impact on the efficient use of land and water resources, as well as on increasing the productivity and quality of agricultural products. This, in turn, requires ensuring food safety and improving food consumption, increasing soil fertility, and their conservation.

It is noted that studies conducted in recent years have shown that about 53% of the republic's irrigated lands have varying degrees of salinity, the amount of humus in the upper layer of about 69% is only 0.5-1%, and 600 thousand hectares of pasture land have been degraded.

Experts from the Eurasian Development Bank (EDB) studied the state of irrigation infrastructure in Central Asia, the problems of agriculture in the region, the importance of irrigated agriculture for this sector of the economy, assessed how irrigated lands are exploited and water resources in Afghanistan affect the Central Asian region.

It is proposed to use international experience in solving existing problems. First of all, it is necessary to modernize the irrigation infrastructure by attracting investments (including through public-private partnerships) and the integrated use of water-saving technologies.

According to EDB experts, all this will allow the countries of Central Asia not only to provide their market with basic food products, but also to expand the export of food products.

Agriculture in Central Asian countries is the main consumer of water. Agricultural lands occupy 73.5% of the region's territory. According to the report, in 2020, 79 percent of water in Central Asia was used for irrigation.

Irrigated agriculture remains not only the basis of agriculture, but also the basis of food security in the region.

Irrigated land accounts for almost 66% of gross agricultural output in value terms: about 100% in Turkmenistan, 87% in Uzbekistan, 85% in Kyrgyzstan, 82% in Tajikistan and 40% in Kazakhstan. According to experts from the Eurasian Development Bank, “a solution to the problem of water shortage in the region and increasing the efficiency of water use should be sought primarily through irrigation.”

At the moment, Central Asia is losing its irrigation potential due to the heavy pressure on water resources.

Mirziyoyev stated this at a meeting of the Council of Heads of Founding States of the International Fund for Saving the Island, held in Dushanbe in September. The head of Uzbekistan noted that by 2040, the pressure on water resources in some regions of Central Asia will triple.

In addition, the economic damage is already being felt: according to the UN, countries in the region lose up to $2 billion annually due to scarcity and inefficient use of water resources.

EDB experts also expressed their conclusions on this matter in the report; – the irrigation infrastructure on irrigated lands in the countries of the region is very old, insufficiently equipped with metering devices, distribution of irrigation water and control of field use. On average, the age of off-farm and on-farm irrigation infrastructure is 50 years, and the main canals are even older.

Other problems include water loss from irrigation canals due to seepage (40%), degradation of irrigated land and salinization. Thus, in the countries of Central Asia, up to 50% of areas are subject to salinization.

The EDB report also cites the following conclusions:

- It is difficult for small farmers to solve this problem, primarily due to a lack of financial resources;

- The post-war economic recovery of northern Afghanistan includes the rapid development of hydropower and irrigation networks, and an increase in the area of irrigated land in the region. According to the World Bank, 385,000 hectares are irrigated in this territory, expansion to 443,000 hectares is expected, including directly from the Amu Darya basin and the anhydrous rivers Kulm , Balkh , Sarykol , Shirintagab - 148,000 hectares;

- It has been established that more than 100 thousand hectares of saline lands in the republic yield 30-45% less per hectare. Average salinity is 15-30 percent, and even low salinity is 5-15 percent less than average.

Among all multilateral development banks, only the World Bank and the Asian Development Bank are involved in sovereign financing of irrigation projects in Central Asia.

One of these projects was the improvement of water resources in Southern Karakalpakstan, which was implemented from June 2014 to July 2023. The project consisted of several components, such as restoration of irrigated land, increasing the economic efficiency of the irrigation network and improving the production of irrigated agriculture.

The total cost of the project was $337.43 million.

As a result, we managed to achieve the following:

- Improving the quality of irrigation services on 87,170 hectares (98% of the project area):

- coverage of 64,420 farms with irrigation systems (compared to the plan - 56,000);

- diversification of crops, increasing the area sown with other crops, except cotton/grains, from 6.5 thousand hectares to 28.72 hectares (in terms of 8 thousand hectares).[5]

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