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WAYS TO IMPROVE THE MANAGEMENT OF WATER SYSTEMS IN THE CONDITIONS OF DIGITALIZATION OF AGRICULTURE

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Abstract: In recent years, in order to mitigate the negative impact of water scarcity as a result of global climate change, large-scale reforms have been carried out in our country in terms of water management, their accounting and reporting, as well as further improvement of water management systems, as well as rational use of water. However, downstream water management, distribution of water to consumers under conditions of water scarcity, water accounting and reporting, and water use efficiency remain low. From this point of view, this article has developed proposals and recommendations aimed at the effective management of water resources, the full maintenance of their accounting and reporting, and the improvement of relationships between water users.

Keywords: global climate change, water scarcity, water resources management, water accounting and reporting, environmental issues, demand for water resources, drip irrigation, drip irrigation technology, land reclamation, water fees, automation of water management processes

INTRODUCTION. One of the acute environmental problems in the modern world is the water problem, which is also very relevant for our region. Water is the main source of food production, health, decent life and human development.

Given that water is a key element of economic development, water should be treated as a natural and unique resource. No resource can replace water for life compared to some other resources. Water is very difficult to keep in its natural state, it tends to absorb and evaporate.

In the next decade, the amount of research carried out on the topic of water has slightly increased, which can be considered the reason for the development of new concepts that will help form a more holistic picture of the situation with water scarcity.

In the late 1920s, after the institutionalization of the world community of ecologists and economists, serious discussions began with the aim of creating a set of collectively accepted principles. This situation is related to the diversity of the first foundations, in which economists and environmentalists simultaneously promoted the development of recommendations and principles necessary for society.

Ecologists argue that one of the unique features of ecological economics is that it must address the historical, social, and political aspects of environmental problems. And in this the importance of documents on the problems and threats of water management can be solved through a more accurate approach to social, economic, environmental economics.

MATERIALS AND METHODS. Comparative and comparative analysis, complex assessment methods were used in the study of the problem.

RESULT AND DISCUSSION.

As a result of global climate change, glaciers in neighboring republics have decreased by 30% over the past 50-60 years. It is estimated that the volume of glaciers will decrease by 50% for a 20°C rise in temperature and by 78% for a 40°C warming. It is estimated that by 2050, water resources in the Syr Darya basin are expected to decrease by 5% and in the Amu Darya basin by 15%.

The total water shortage in Uzbekistan until 2015 was more than 3 billion cubic meters, by 2030 it could reach 7 billion cubic meters, and by 2050 it could reach 15 billion cubic meters.

Analyzes show that climate change will exacerbate water scarcity in Uzbekistan, increase the duration and frequency of droughts, for example, in 2000, 2008, 2011, 2014 and 2018, and may cause serious difficulties in meeting the needs of the economy in water resources.

At the same time, the population of the republic will increase by an average of 650-700 thousand people a year and by 2030 will reach 39 million people, it is expected that their need for quality water will increase from 2.3 billion cubic meters. m to 2.7-3.0 billion cubic meters. m (18-20 percent). This leads to an increase in the demand for water in the domestic sector from year to year.

As a result of the annual deterioration of the water scarcity situation in our region over the past 10 years, the amount of water has decreased from 12 to 15 percent.

For Uzbekistan, water resources are not only a source that ensures the livelihoods of the population, industry and irrigated agriculture, but also an important factor in socio-economic development and maintaining the ecological balance of the entire region.

It's no secret that a huge amount of water today is lost in agricultural irrigation due to seepage, evaporation and excess water consumption. In some cases, this figure is 65-70 percent. Based on this, increasing the coefficient of water use in irrigation to 90-95% is one of the most pressing issues today.

The cost of electricity and water supply for growing cotton and grain is also high. In particular, more than 5,000 pumps are used to irrigate 2.5 million hectares, 8 billion kilowatt-hours of energy and 2.4 trillion soums of budget funds are spent annually. An average of 800,000 soums is spent from the budget to supply water per hectare of land with the help of pumps. About 5-6 billion cubic meters or 20 percent of the water is lost to the fields due to over-irrigation.

In addition, the expansion of the use of drip irrigation technology in the agricultural sector is in demand today. This, in turn, results in several times greater water savings compared to traditional irrigation. When using this technology, leaching and re-salinization of the soil is sharply reduced. It also requires the purification of large volumes of salt water collected in natural depths (Aidar-Arnasoy system of lakes, Dengizkol, etc.) and their use in agriculture. This expands the opportunities for the development of large areas of land and is important for improving land reclamation and, most importantly, ensuring food security.

Since the first days of independence, the countries of Central Asia have been implementing specific and selective reforms in the field of water management and efficient use of water resources in accordance with the chosen agro-economic policy. For example, the Republic of Kazakhstan is one of the first countries in Central Asia to switch to a market economy in terms of agriculture and water management. Since 1993, in the field of water management, payment for water has been made on the basis of an agreement on the supply of water for irrigation. Penalties have been introduced for unauthorized and excessive water intake.

Since 1999, the Kyrgyz Republic has introduced a fee for water supply services for all categories of water users. On its basis, water users switched to a system of distribution and payment for water on the basis of contracts for the supply of water with the district water utility, that is, with the Water Users Union (SOP) created by the government.

In the Republics of Tajikistan and Turkmenistan, the main part of the form of land use is made up of large collective farms, and the water use system has been reformed only in the Republic of Turkmenistan. In this case, the networks within the farm belong to the collective farm, and their maintenance is carried out by state water management organizations at the expense of a 3% discount on the cost of agricultural products of land users.

In general, the management of the water management system and the use of water resources in the countries of Central Asia was organized on the basis of the laws of a market economy. That is, large-scale structural changes were made in the system of agriculture and water management during the formation of a multi-level economy. However, not limited to these activities, today, when water shortages are expected, it is advisable to study the best world experience in the efficient use of water resources and apply opportunities to implement their achievements, suitable for our region and traditions.

In order to reduce water scarcity, Uzbekistan is an initiative among the countries of Central Asia to introduce water-saving technologies and expand the possibilities of using modern technologies in water management. For example, an intergovernmental memorandum was signed with Turkmenistan on the production of water-saving irrigation technologies. Representatives of water-saving technologies operating in Uzbekistan and contractors producing and building their components visited Tajikistan and made presentations.

In total, over the past five years, water-saving irrigation technologies have been introduced in our republic on 891.4 thousand hectares of land. At the same time, in 2021 alone, planners equipped with laser equipment leveled 186.8 thousand hectares of land. Clusters have leveled more than 3,000 hectares of arable land with the help of a laser and saved water consumption by 20-25% and fertilizers by 15%, which led to an increase in yield by at least 10%.

Also, starting from 2019, a new system of state support for the introduction of water-saving technologies and its management - a mechanism for allocating subsidies - is a great incentive for farmers and cluster organizations.

Another problem causing water loss is that today only 2% of more than 3,000 water metering units and 2.5% of 400 large reservoirs have automated control systems. To do this, this year with the help of laser equipment in the region it is planned to level 9800 hectares of land.

To date, the Republic of Uzbekistan ranks 25th out of 164 countries in the water stress rating.

Also, according to the forecast of global climate change, a decrease in the total mass of Uzbekistan's water resources by 7-8 cubic meters is expected. km in the next 10 years, so the rational use of water resources in agriculture, the digitalization of their management processes occupies a special place.

CONCLUSION. To conclude, in recent years, large-scale reforms have been carried out in our country regarding the management of water resources, their accounting and reporting, as well as further improvement of water management systems, as well as the rational use of water, in order to mitigate the negative effects of water shortages as a result of global climate change. However, downstream water management, distribution of water to users in case of water shortage, water accounting and reporting, and water use efficiency remain low.

From this point of view, we would like to propose the following for the effective management of water resources, their accounting and reporting, and the improvement of relations between water users:

As priorities for water management at the lower level:

a) reliable supply of water resources to agricultural producers and the population;

b) maintenance of irrigation systems and irrigation networks, as well as hydraulic structures in them in a constant technical condition;

c) involvement of large producers of agricultural products in the management of water resources and their distribution on their territory;

d) widespread implementation of the principles of public-private partnership in transferring state functions for water supply to the private sector;

e) establish management of water accounting and reporting through automated systems that are minimally dependent on the human factor.

Taking into account the above proposals, it is worth noting that large-scale work is being carried out on this issue today to digitalize water use in our country. A striking example of this is the Decree of the President of the Republic of Uzbekistan No. PQ-5055 “On measures to further improve the activities of the Ministry of Water Resources of the Republic of Uzbekistan”. In accordance with this Decree, the Ministry of Water Resources of the Republic of Uzbekistan, together with the Australian company “Rubicon Water” Pty. Ltd launched a pilot project to automate water management processes.

In order to implement the tasks set in this decision, the Ministry of Agriculture, together with the Ministry of Water Resources, chose the Kamashi-Mirishkor canal of Kashkadarya region as an automation object.

It should be noted that “Rubicon Water” is one of the leading manufacturers of solutions for the automation of open irrigation canals, remote control and monitoring of hydraulic structures, accurate water metering in the canal, digitalization of irrigation farm management, as well as the Farm Connect system for automated irrigation of cultivated fields.

As part of the project being implemented in the Kashkadarya region, hydrometers will be installed at 25 facilities and 3 pumping stations located on the 13.2-kilometer section of the Kamashi-Mirishkor canal, more than 7,000 hectares of irrigated land will be covered.

As a result of the project implementation, full automation of channel management, calculation of water consumption, remote control of the channel, accounting and prevention of water losses in the channel will be achieved.

It is also expected that the overall use of water resources in the canal will decrease to 70%, the efficiency of water use for irrigation will increase from 37% to 90%, and through the rational use of water.

At present, as part of the project implementation, work has been completed on the installation and operation of automatic gates and other hydraulic facilities on the canal.

The integrated automated water management system for the Kamashi-Mirishkor canal is operating in a test mode, and a trial approval of the project has begun.

Based on the successful approval of the project, work is underway to install “Rubicon Water” devices on the Obi-Khayot and Karshi main canals in the Kashkadarya region.

The results of the study showed that the effectiveness of the project for automating water management processes in the Mirishkor-Kamashi canals of the Kasbi district of the Kashkadarya region based on the technologies of the Australian company “Rubicon Water” is marked according to the following indicators:

- Water control processes are fully automated, in the channel 25 water distribution points are controlled remotely.

• Water supply of 5,000 ha of irrigated land will be improved.

• For the 2021 harvest, 42.3 million m3 of water was used from the canal, in 2022, 30.8 million m3 of water and 11.5 million m3 (33 percent) of water is supplied and there will have shown an economy of water.

• If the cost of 1 m3 of water is at 282 soums, the savings will amount to 3.3 billion soums due to saving 11.5 million m3 of water.

• As a result of automated water distribution management, instead of three-time irrigation, 2,450 hectares of grain fields will be watered four times. And then, with an increase in yield by an average of 8 centners, 2,000 tons of grain crops are created.

• Each water consumer is supplied with the same water through sluice gates installed from 25 canal draw-off points.

• In 2021, 10 employees worked in the channel, in 2022 there are 4 employees, as a result, 130 million soums will be saved from salaries.

• Thereafter the localization of Rubicon technologies in Technopark LLC in Tashkent, the cost of the technology will be reduced to 60%.

Therefore, limiting the human factor in water management through the digitalization of the water management system and the use of water-saving irrigation technologies will lead to efficient and rational use of water. Life itself proves that this is the most important measure to ensure the food security of the population in conditions of low water.

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