



THE ROLE OF IRRIGATION IN KHOREZM REGION CLIMATIC CONDITIONS

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Abstract:

The effect of using digital technologies and using the SMART WATER system in preventing the water shortage caused by the drying up of the Aral Sea in Uzbekistan. taking control of water in irrigation canals due to water shortage, carrying out monitoring works based on full principles

Keywords: Smart water, irrigation systems, development, innovation, climate change, salinity, water shortage.

In the 2020-2030 concept of the development of the water industry of the Republic of Uzbekistan, special emphasis is placed on the work in this direction. In addition, due to global climate change, the growth of the population and economic sectors, their demand for water is increasing year by year, the shortage of water resources is increasing year by year, which also requires a more responsible approach to the issue. Based on this, in the concept, the improvement of the water resources management system, the use of "Smart Water" ("Smart Water") and similar digital technologies in the accounting of the environment, the promotion of the introduction of water-saving technologies in the cultivation of crops, the improvement of the melioration of the irrigated land, and the increase of its productivity many tasks have been defined, such as the application of effective technologies for the promotion, reduction of soil salinity and its prevention.



Picture 1. Installing Smart Water device for researching

One of the problems facing the world community today is related to water. Factors such as various environmental conditions and climate change are increasing the value of quality environment. In particular, the demand for fresh water of agriculture is 70 percent of the world. Meeting this demand ensures food security and high crop yields. On the other hand, improper use of water resources, wasteful use will lead to reduced productivity or crop failure. In order to prevent such situations, modern developments in the network, continuous and accurate monitoring of the amount of water used in agriculture with the help of electronic devices are important.

This electronic equipment is distinguished by its compactness, program in Uzbek language, dispatching service, monitoring features and low cost. For this reason, an agreement was reached to install 172 of these devices and start providing services to the region. Today, water monitoring devices are necessary not only for Khorezm region, but also for other regions. In this case, the use of water measuring and control devices, and digital technologies in general, will give good results.

If irrigation water is not strictly controlled, there is a high probability that fresh water will mix with groundwater in years of high water. Therefore, it is necessary to constantly control the amount of water available in each irrigation network. Carrying out this process using traditional methods leads to an increase in the cost of the crop and a large amount of labor is spent on this process. The use of electronic devices in the continuous monitoring of changes in the amount of water in irrigation networks creates an opportunity to obtain accurate information and save water. For this purpose, ultrasonic transmitters (sensors) were used to study the decrease of the amount of water in the irrigation networks as a result of consumption during the flow, and how much water reaches the end of the channel. In this case, the sensors are placed in the middle of the channel, above the water. As a result, the distance between the water levels is determined, and a conclusion is made about how much the amount of water in the channel is decreasing. The data measured by the transmitters are sent directly to the internet server. Through the data, it is possible to determine the amount of water in each irrigation network and whether they can use water pumps or not enough water for this.

The expected results are also significant. In particular, it is planned to increase the efficiency of irrigation systems from 0.63 to 0.73, to reduce irrigated areas with low water supply from 560 thousand hectares to 190 thousand hectares, and to reduce saline land by 226 thousand hectares. Also, the annual electricity consumption of pumping stations in the system of the Ministry of Water Economy will be reduced by 25 percent, and "Smart Water" water measurement and control devices will be installed in all irrigation system facilities. Management processes will be automated in 100 large water management facilities, the total area of land covered by cost-effective technologies will be increased to 2 million hectares.

Based on this, in order to monitor the volume of irrigation water in the conditions of Khorezm region, we tested the water level and consumption measurement equipment developed by our center at the water measuring post 53 of the Kulovot canal belonging to the Amudarya irrigation canals department in Khanka district. This area was not chosen as a test site for nothing. Because farming in Khorezm is done entirely by irrigation. There is no dry land. Also, water reserves in the oasis are not the same every year. Crops such as cotton, rice, and wheat, which require different amounts of water, are grown in the region. This factor also means how important water monitoring is. If water-demanding crops are planted in one area, and less water-demanding crops are planted in another area, it would be easier to monitor the amount of water used to irrigate them.

If irrigation water is not strictly controlled, freshwater is more likely to be added to the runoff during years of high water levels. Therefore, it is necessary to constantly monitor the amount of water available in each irrigation network. This process, which can be carried out using traditional classical methods, leads to an increase in the cost of the product, which in turn consumes a large amount of labor. This allows the use of electronic devices, accurate data and water savings to constantly monitor changes in the amount of water in irrigation networks. To do this, we used ultrasonic sensors to study how much water was flowing towards the end of the canal, as the amount of water in the irrigation network decreased as a result of flow along the canal. These sensors are placed in the middle of the channel above the water. Determining the distance between the sensors and the water level allows us to draw conclusions about how much water is reduced in the canal. The sensors send the measured data directly to the website. Through the website, we can determine the amount of water in each irrigation network and whether they can use water pumps or not have enough water to use. In summary, in the Khorezm region, irrigation networks are very weak.

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