

### The Relevance of Water-Saving Irrigation Technologies

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#### ABSTRACT

*This article describes the natural conditions of the Bukhara oasis, irrigation methods, as well as modern irrigation methods. This article provides a brief overview of the differences between traditional irrigation methods and modern irrigation methods.*

In the Republic of Uzbekistan, much attention is paid to agriculture, the main reason for which is the further development of agriculture, the use of modern technologies in agriculture, increasing the income of the population, and preventing food shortages. At the same time, it should be noted that today a number of decisions and decrees are being adopted to develop agriculture and promote resource-saving irrigation technologies, for example:

- Decree of the President of the Republic of Uzbekistan dated December 11, 2020 No. PP-4919 "On measures to further accelerate the organization of the introduction of water-saving technologies in agriculture" [1].

Thanks to the decisions and decrees of the President of the Republic of Uzbekistan Shavkat Mirziyoyev, we see that all sectors of the country are developing, including agriculture and water management. Thanks to the ongoing reforms, the development of all sectors of the Republic, as well as the foundation for further gains in the future.

Thanks to decisions, decrees and reforms, the use of water-saving irrigation technologies is becoming more and more popular among water users (farmers, landowners and others).

Traditional irrigation methods are also popular in the Bukhara region. The main reason for this is that 86.5% of irrigated lands are saline to some extent and are popular among water users (farmers, landowners, etc.). Although traditional irrigation methods are popular in the region, ongoing reforms and due to the large-scale work on the introduction of modern irrigation technologies, the use of water-saving irrigation technologies is gaining popularity in the region. Today, the selection and implementation of water-saving irrigation technologies suitable for the climatic conditions of the region is being carried out.

Soils are predominantly meadow-alluvial, brownish-gray and desert-sandy. The climate is

continental arid, with precipitation of 114-125 mm per year, no frost for 246-272 days, and an effective effective temperature range of 2430-2690 degrees Celsius. Precipitation is mainly observed in winter and spring.

The regional center is the city of Bukhara. The main source of water for the Bukhara region is the Amudarya basin, and the main waterways that meet the needs of irrigated lands in water are stages I-II of the Amu-Bukhara machine canal and the Amu-Karakul canal.

If I'm talking about the traditional (surface irrigation of the soil) method of irrigation in surface irrigation, the soil is moistened by absorbing water supplied to the surface of the irrigated field in a continuous layer or in the form of separate jets. This method of irrigation has four varieties: by furrows, by stripes, continuous flooding, selective flooding.

The region has been using this irrigation method for several years and the main crops grown in the region are cotton and wheat. These crops require an average of 6200-7500 m<sup>3</sup>/ha for cotton and 3400-4500 m<sup>3</sup>/ha for wheat for irrigation during the growing season using traditional irrigation methods.

If water-saving irrigation technologies proposed today are used instead of traditional irrigation methods, water resources will be economical, since traditional irrigation methods will irrigate crop areas, and not crops. It should be noted that today, for example, the state pays great attention to the following irrigation methods:

- drip irrigation - based on the flow of water into the root zone of plants, and the amount and frequency of water supply are regulated in accordance with the needs of plants in water;







**Figure 1.** Water-saving irrigation technologies [14]

- Sprinkler irrigation is a method of irrigation in which water is distributed over the surface of the field by special machines, installations or units in the form of rain. sprinkling features: the soil, plants and the surface layer of air are moistened; the depth of soil moisture, as a rule, is less than with surface irrigation; frequent watering with small rates is possible, which creates more uniform soil moisture;
- subsoil irrigation - is carried out by introducing water into the arable layer of the soil. it allows to reduce evaporation from the soil surface; preserve the structure of the soil; maintain a certain depth of soil moisture; ensure continuous water supply to plants;
- finely dispersed (aerosol) moisturizing is a new method of irrigation, the essence of which is to spray irrigation water in the form of tiny droplets (aerosols) covering plants. its features: reduction of moisture transpiration by plants; creation of an optimal microclimate around plants; elimination of the influence of atmospheric drought; preservation of soil structure;
- Discrete method of irrigation with laser leveling of land - a method of irrigation of agricultural crops, in which water is supplied through flexible irrigation pipelines in series of pulses, interspersed with pauses, with preliminary leveling of the land by automated leveling units with a laser installation.

These are the most popular irrigation methods in the world today. The most effective of these irrigation methods is drip irrigation. If compare it with the traditional irrigation method, for example, if the traditional irrigation method for cotton requires 6200-7500 m<sup>3</sup>/ha of water, if the drip irrigation method is used, 35-45% of water resources will be saved, and the productivity of the plant will increase, and labor will be saved., fuel, fertilizers and other resources. This shows the effectiveness of drip irrigation. The advantages and disadvantages of drip irrigation are as follows: Advantages of drip irrigation:

- ✓ high level of mechanization and automation;
- ✓ higher productivity with relatively less water consumption per unit of production;
- ✓ the structure of the soil will be well preserved, there will be no erosion;
- ✓ fertilizer can be supplied with water;
- ✓ wind does not affect the distribution of moisture or evaporation;
- ✓ wind does not affect the distribution of moisture or evaporation;

- ✓ slow infiltration of water into the soil and its distribution from a point source prevents outflow even in difficult topographic conditions, etc.

Cons of drip irrigation:

- High construction costs;
- We need professional masters to install the system;
- high requirements for water quality, the need for water purification, filters are needed;
- Rapid failure of polymer pipes;
- Not applicable to all crops;
- Demand pressure, etc.

So the bottom line is that we need to use water-saving irrigation technologies to prevent water scarcity today and in the future. In addition, government subsidies for the use of water-saving technologies in irrigated areas offer great opportunities for farmers, landowners and others.

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