

# EFFECTIVENESS OF APPLICATION OF WATER SAVING TECHNOLOGIES IN SALINE SOILS

A. K. Juraev

Doctor of Agricultural Sciences, Professor  
Bukhara State Technical University

O. M. Yusupova

Student of Bukhara State Technical University

## Abstract

This article presents the results of experiments on the use of water-saving technologies when growing the cotton variety Bukhara-8 in conditions of saline soils in 4 variants, in scientific studies it was established that in scientific studies in the first irrigated variant the irrigation rate is 892-1162 cbm/ha and the seasonal irrigation rate is 5119 cbm/ha with a cotton yield of 3.55 t/ha. In the second option with drip irrigation, cotton had an irrigation rate of 224-342 cbm/ha and a seasonal irrigation rate of 3796 cbm/ha with a yield of 4.62 t/ha. Also in the third option, where the black film bed was irrigated when growing cotton, the seasonal irrigation rate was 3603 cbm/ha, the cotton yield was 4.41 t/ha. In the fourth option, where during the experiments the introduction of a hydrogel organic compound into the soil when growing cotton was supported, the irrigation rates were 714-966 cbm/ha, and the seasonal irrigation rate was 4381 cbm/ha, while the cotton yield in this option was 4.21 t/ha.

**Keywords:** Cotton, water, yield, drip, black film, hydrogel, technology, soil.

## Introduction

World scientists are conducting scientific research in certain priority areas to reduce the negative consequences of water scarcity, widely introduce water-saving technologies, improve the reclamation of saline lands, and ensure stable and high yields of agricultural crops. Increasing the efficiency of water-saving irrigation technologies in conditions of water scarcity, achieving stable and high yields of agricultural crops, improving the reclamation of saline soils, improving the water-physical properties and salt regime of soils, and increasing productivity are becoming promising areas.

In the current water shortage in our republic, scientific research on the introduction of water-saving technologies in the cultivation of the Bukhara-8 cotton variety in the conditions of alluvial, medium-loamy soils of the Bukhara region was carried out in the fields of the Muzaffar Zainiddinov farm in the Vobkent district of the Bukhara region. During the research, the water demand of cotton and its impact on cotton yield as a result of the use of water-saving irrigation technologies in the traditional method of cotton cultivation were studied. Research on drip irrigation of cotton on saline soils of the Bukhara region was conducted in 2021-2023 using the following experimental system.



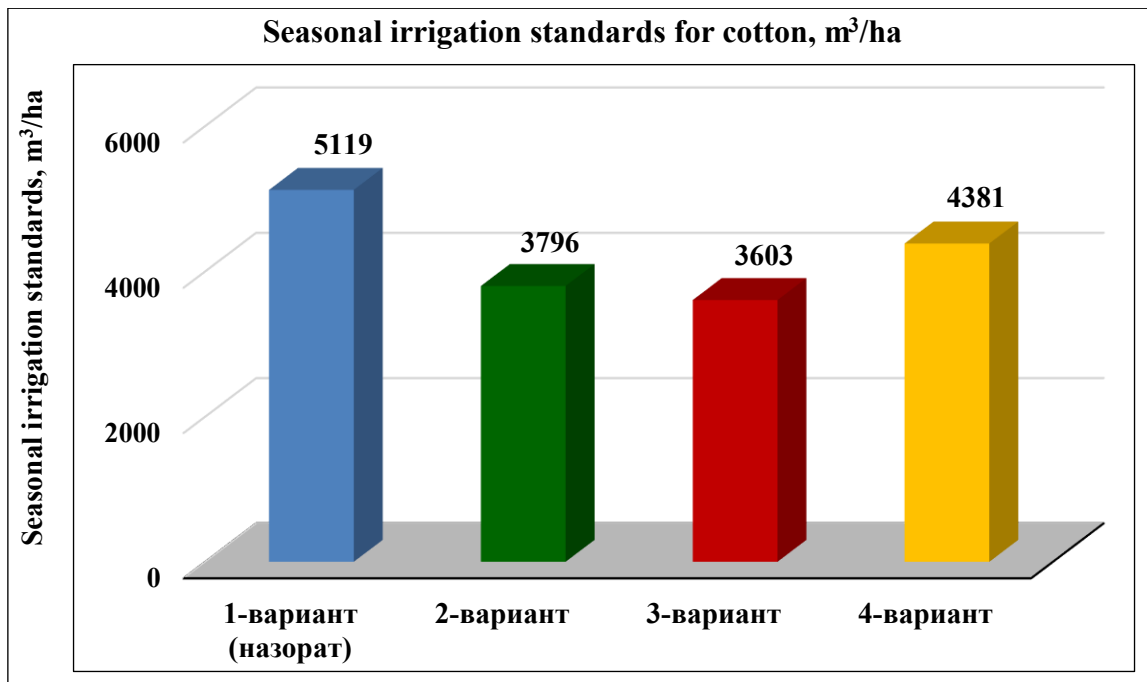
**Table 1 An experimental system for growing cotton based on water-saving irrigation technologies in Bukhara Province**

Options	Irrigation technology	Irrigation rates, m <sup>3</sup> /ha	Soil moisture before irrigation, % relative to ChDNS
1 (control)	irrigation	according to the moisture deficit in the 0-100 cm layer of the soil	70-75-65 %
2	drip irrigation	0-40 cm of the soil before flowering, according to the moisture deficit in the 0-70 cm layer during flowering	75-80-65 %
3	Irrigation by laying a black film on the edge	according to the moisture deficit in the 0-50 cm layer of the soil before flowering, and in the 0-100 cm layer during flowering	70-75-65 %
4	irrigation using hydrogel organic compound	according to the moisture deficit in the 0-50 cm layer of the soil before flowering, and in the 0-100 cm layer during flowering	70-75-65 %

### Experiment results:

In the experiments conducted on the irrigation of the Bukhara-8 variety of cotton in conditions of alluvial, moderately saline soils of the Bukhara region, cotton was irrigated 6 times during the season, and the irrigation system was implemented in the 1-3-1 system. In cotton irrigation, the irrigation rate was 892-1162 m<sup>3</sup>/ha and the seasonal irrigation rate was 5119 m<sup>3</sup>/ha. In the 2nd option, in which the drip irrigation technology was introduced in cotton irrigation, irrigation was carried out in the 2-13-1 system, and cotton was irrigated 16 times during the season. The amount of water used for each irrigation was 224-342 m<sup>3</sup>/ha and the seasonal irrigation rate was 3796 m<sup>3</sup>/ha, 1323 m<sup>3</sup>/ha less water was used compared to the control option. Also, in option 3, where the Bukhara-8 cotton variety was irrigated with a film on the bed, the cotton was irrigated 4 times in the 1-2-1 system, with a single irrigation rate of 764-987 m<sup>3</sup>/ha and a seasonal irrigation rate of 3603 m<sup>3</sup>/ha, and it can be seen that in this option, 1516 m<sup>3</sup>/ha less water was consumed than in the control option. In scientific research, when cotton was irrigated with hydrogel granules mixed into the soil, irrigation was carried out in a 1-3-1 system, with irrigation rates of 714-966 m<sup>3</sup>/ha and a seasonal irrigation rate of 4381 m<sup>3</sup>/ha, and 738 m<sup>3</sup>/ha less water was used than in the control option.





**Figure 1.** Effect of introduction of water-saving technologies on irrigation pattern in cotton cultivation.

**Cotton yield.** During the experiments conducted on the introduction of water-saving technologies in the cultivation of the “Bukhara-8” cotton variety on the alluvial, medium-loamy soils of the Bukhara region, analyses were conducted on the impact of the introduction of water-saving technologies on cotton yield. In the control variant 1, where cotton was irrigated using the traditional method, that is, by trenching, the cotton yield was 35.5 c/ha, while in the second variant, where drip irrigation technology was introduced, the cotton yield was 46.2 c/ha on average. This indicates that the yield was 10.7 c/ha higher than in the control variant. It was found that in the third variant of the experiments, where cotton was irrigated using a film covering the trench, the cotton yield was 44.1 c/ha, which was 8.6 c/ha higher than in the control variant. Also, it can be seen that the yield of cotton in the 4th option, in which the hydrogel crystal was mixed with the soil and watered with cotton, was equal to 42.1 t/ha, compared to the control option, the yield increased by 6.6 t/ha.

### Conclusions

It was found that optimal watering and feeding procedures of Bukhara-8 cotton variety in drip irrigation technology increase the yield of cotton by 8.9-9.6 t/ha and have a positive effect on fiber quality indicators.

When growing the Bukhara-8 cotton variety in the field using film-bed irrigation technology, maintaining the soil moisture content before irrigation at 70-75-65% relative to the maximum allowable moisture content, and irrigating 4 times in the 1-2-1 system with irrigation rates of 764-987 m³/ha and a seasonal irrigation rate of 3603 m³/ha, ensures a cotton yield of 44.1 c/ha, a profitability level of 51%, and water resources savings of 1516 m³/ha.

When the Bukhara-8 variety of cotton is irrigated using the hydrogel polymer compound, water



resources are saved by 692-738 m<sup>3</sup>/ha, the cotton yield is 5.4-6.6 tons/ha higher, and the amount of the crop grown at the expense of 1 m<sup>3</sup> of irrigation water is 833-854 grams.

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