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THE IMPORTANCE OF APPLYING WATER-SAVING TECHNOLOGIES IN MAIZE CULTIVATION

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Abstract
This article presents the results of experiments conducted on the use of drip irrigation as a water-saving technology in maize cultivation.

Keywords. Corn, resource, fertilizer, drip, irrigation, climate, standard, technology.

Introduction

In the development of our country's economy, agriculture and water management play a crucial role. Therefore, it is essential to organize scientific and practical research in this field at the required level, to test modern innovative technologies for crop irrigation, and to implement them widely. In our region, where water scarcity is increasing day by day, the stability and development of agricultural production largely depend on the effectiveness of irrigation technologies. Among the various irrigation methods used in agriculture, drip irrigation is considered one of the most efficient and resource-saving technologies. This is because the use of this technology significantly reduces water consumption, cuts down the costs of mineral fertilizers and technical operations by up to 50%, and increases crop yield—all of which have been proven through research. For this reason, this method of irrigation is becoming more widespread each year. In the context of global climate change, conducting scientific research on the application of drip irrigation in irrigated fields is crucial for the efficient use of water resources. In Uzbekistan, the irrigation of maize is carried out in a differentiated manner based on climatic, soil-hydrogeological, organizational, and farm conditions, as well as on the purpose of cultivation (grain or silage) and the biological characteristics of the varieties and hybrids used. Under different climatic and soil-hydrogeological conditions, maize is traditionally irrigated 5 - 7 times. The timing of irrigation is usually determined based on the plant's external appearance, physiological indicators, and especially the soil moisture level.

When maize is irrigated using drip irrigation, the irrigation rate decreases, but the number of irrigations increases. The main reason for this is the effort to maintain uniform soil moisture.

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Another advantage of drip irrigation is the ability to apply mineral fertilizers in liquid form directly through the irrigation system, which positively affects the growth and development of the plants. The scientific novelty of this study lies in the implementation of water-saving irrigation technologies in maize cultivation during a time of increasing water scarcity, aligned with current reforms aimed at the efficient use of water resources in irrigated areas. Field experiments using the drip irrigation method were conducted in the irrigated lands of Bukhara region. The irrigation norms and seasonal irrigation volumes for maize were studied under farm conditions using actual measurements. In the control variant (Variant 1), where furrow irrigation was used, the seasonal irrigation norm was 5760 m³/ha. The irrigation scheme was 1-3-1, and irrigation was carried out 5 times. The interval between irrigations was 19–21 days. It is especially worth noting that the irrigation norm per application was 880 - 1240 m³/ha.

Figure 1. Drip Irrigation of Maize

In the drip-irrigated Variant 2, where the pre-irrigation soil moisture was maintained at 70-80-70% of the field capacity, the irrigation scheme followed a 2-9-1 pattern, and a total of 12 irrigations were carried out. In this variant, the seasonal irrigation norm amounted to 4651 m³/ha. Regarding irrigation norms, the smallest single irrigation volume was 339 m³/ha, with a total irrigation duration of 4^{20} hours. The highest single irrigation volume was recorded at the end of the vegetation period, reaching 554 m³/ha, with a total irrigation duration of 7^{10} hours. In this variant, the irrigation interval range was 8 - 14 days.

In conclusion, it is worth emphasizing that using drip irrigation as a water-saving technology for maize cultivation not only conserves water resources but also reduces the use of mineral fertilizers, labor, and fuel and lubricants—since there is no need for post-irrigation inter-row cultivation. Additionally, drip irrigation enables water savings of up to 1000–1200 m³ per hectare.

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