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THE EFFECTIVENESS OF USING TECHNOLOGIES FOR SPRINKLING IRRIGATION OF CROPS FROM RIVER AND GROUNDWATER

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Abstract
This article analyzes the effectiveness of irrigation technologies for crops using river and stream waters. Based on research, the advantages of the irrigation method in saving water, increasing productivity, and improving environmental conditions are shown. The scope of application of the technology, existing limitations, and recommendations for its implementation are also covered. The article contains scientific and practical foundations aimed at the rational use of water resources and the development of modern agricultural technologies.

Keywords: Water scarcity, water-saving technologies, sprinkler irrigation, irrigation intensity, raindrop size, soil types, and slope.

Introduction

Today, all countries of the world are implementing consistent reforms to ensure the efficient use of land and water resources, develop water resources management systems, and modernize water management facilities. When analyzing the process of water use, it is necessary to pay attention to another issue , namely, that no country in the world uses almost 100 percent of its irrigated land in agriculture , as Uzbekistan does . In Central Asia, and in particular, in Uzbekistan, due to the complete absence of precipitation during the summer vegetation period, soil moisture is maintained only through irrigation measures. This situation requires not only responsibility, but also the expenditure of large amounts of money. Uzbekistan's irrigated land areas differ sharply from other countries both in terms of the importance of the water management system in the processes of cultivating these areas and producing high yields, and in the amount of funds allocated by the state to this sector. As is known, in developed countries, great importance is attached to the improvement of irrigation technology. Progressive methods of irrigation technology, although they require high initial capital investments, allow saving on water consumption and labor costs. This is especially important in countries where labor is expensive.

In Uzbekistan, in the context of water shortages caused by global climate change, it is important to effectively use existing water resources and widely introduce efficient irrigation technologies to achieve high yields from agricultural crops and sustainably provide the population with food.

At the same time, issues such as sustainable water supply for the population and all sectors of the economy, improving the reclamation of irrigated lands, and introducing market principles and digital technologies into water management are becoming increasingly urgent, based on the concept of water management development for 2020–2030. In particular, one of the urgent tasks is the expansion of water-saving irrigation technologies in the cultivation of agricultural crops in conditions of water scarcity, state support, and attraction of foreign investment. [1]
Based on the above objectives, the use of technologies for sprinkling irrigation of crops from river and aquifer waters is currently gaining relevance.

The main part According to the research conducted in the territory of the Khovasabad MFY of the Khovas district under the cooperation agreement concluded with the Syrdarya Reclamation Expedition under the Lower Irrigation Basin Department and Gulistan State University, based on the data in the reports for 2023–2024, the sprinkler irrigation method was assessed as one of the most effective methods that has a positive effect on the soil, plants and the microclimate of the lower air layer. Irrigation mechanization and complex impact on the environment served as a reliable agrotechnical tool for stable plant growth and high yields. Unlike other irrigation methods, in sprinkler irrigation, water (and, if necessary, fertilizers in it) is sprayed into the atmosphere using special pumps and falls on the plants in the form of raindrops.

Advantages:

- The possibility of mechanizing labor processes, that is, combining irrigation with other agricultural work;
- Ensures uniform and complete germination of sprouts, which is especially important in saline lands and in cases where the high concentration of salts during germination is dangerous;
- Can be used with minimal preparation even on complex terrain, steep slopes, sandy and poorly developed soils;
- Small, successive irrigations can not only moisten the soil, but also improve the microclimate (refreshing irrigation);
- It is easier to form and regulate the crop by managing the regime of soil, vegetation and nutrients;
- Due to the economical use of irrigation water, the coefficient of water use has increased by 25-30%.

Disadvantages:

Despite the advantages of sprinkler irrigation, it also has some disadvantages. In particular, when implementing this method on large areas, the following should be taken into account:

- In order not to disturb the reclamation condition of the soil, it is necessary to use underground water with a mineralization of up to 3 g/l;
- If the groundwater salinity exceeds 3 g/l, it is recommended to mix irrigation with river water.[2]

Conclusion

It's raining. irrigation technology water from resources wise use , water shortage under the circumstances fertility increase and environmental stability in providing important Research has confirmed the high efficiency of this technology. In the future , the widespread implementation of this method will be of particular importance, especially in regions with limited water resources.

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