

METHODS OF APPLICATION OF WATER-SAVING TECHNOLOGIES AND EFFICIENT USE OF CLEAN WATER FROM WASTEWATER TREATMENT FACILITIES FOR MELON CROP GROWING

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ABSTRACT

This article analyzes the possibilities of using clean water from wastewater treatment facilities in agriculture, in particular, in the cultivation of melon crops. The advantages of modern water-saving technologies, their integration into agrotechnological processes, and their ecological and economic efficiency are scientifically covered.

Keywords: *wastewater, water-saving technologies, melon crops, drip irrigation, ecological sustainability.*

МЕТОДЫ ПРИМЕНЕНИЯ ВОДОСБЕРЕГАЮЩИХ ТЕХНОЛОГИЙ И ЭФФЕКТИВНОГО ИСПОЛЬЗОВАНИЯ ЧИСТОЙ ВОДЫ ОЧИСТНЫХ СООРУЖЕНИЙ ДЛЯ ВЫРАЩИВАНИЯ БАХЧЕВЫХ КУЛЬТУР

АННОТАЦИЯ

В статье проанализированы возможности использования чистой воды очистных сооружений в сельском хозяйстве, в частности, при выращивании бахчевых культур. Научно освещены преимущества современных водосберегающих технологий, их интеграция в агротехнологические процессы, а также их эколого-экономическая эффективность.

Ключевые слова: *сточные воды, водосберегающие технологии, бахчевые культуры, капельное орошение, экологическая устойчивость.*

OQOVA SUV TOZALASH, INSHOATIDAN CHIQUYOTGAN TOZA SUVNI POLIZ EGINLARINI SUV-TEJAMKOR TEXNOLOGIYALARNI QO'LLASH VA UNUMLI FOYDALANISH USULLARI

ANNOTATSIYA

Ushbu maqolada oqova suv tozalash inshootlaridan chiqayotgan toza suvdan qishloq xo'jaligida, xususan, poliz ekinlarini yetishtirishda foydalanish imkoniyatlari tahlil qilinadi. Zamonaviy suv-tejamkor texnologiyalarning afzalliklari, ularning agrotexnologik jarayonlarga integratsiyasi, ekologik va iqtisodiy samaradorligi ilmiy asosda yoritilgan.

Kalit so‘zlar: oqova suv, suv-tejamkor texnologiyalar, poliz ekinlari, tomchilatib sug‘orish, ekologik barqarorlik.

INTRODUCTION

Due to factors such as population growth, increased food demand, expansion of industrial production, and climate change, the demand for water resources is increasing year by year in countries around the world. As a result, a trend of water resource shortage is observed in many regions of the world. As is known, the agricultural sector is the largest user of water in the world. Therefore, the entire scientific community of the world emphasizes the economical use of water in agriculture, especially in irrigated agricultural fields, including the widespread introduction of water-saving technologies, as the most priority way to alleviate water shortages. It is worth recognizing that Uzbekistan is taking the initiative among the countries of the region in the effective use of water resources, 80 percent of which are formed in neighboring countries, especially in the widespread introduction of water-saving irrigation systems for crops and expanding the use of modern technologies in water resource management in order to alleviate the increasing water shortage in recent years.

RESEARCH METHODOLOGY. Our esteemed President Sh. Mirziyoyev has adopted a number of Decrees and Resolutions on the development of the water sector and the introduction of water-saving technologies in the past five years, as a result of which the establishment of a mechanism for allocating state subsidies to encourage agricultural producers who have introduced new irrigation technologies, the creation of a number of benefits for agricultural producers have made a fundamental shift in the development of irrigated agriculture. As a result of the attention of the state leadership, the improvement of the necessary legal norms and their consistent application in practice, the scale of the introduction of water-saving irrigation systems in our country has increased sharply in recent years. In 2021 alone, the areas where water-saving technologies were introduced increased by 5 times, covering 22% of the total irrigated areas, and the goal is to bring this figure to 50% in the next five to seven years. The Parliament of our country is also carrying out extensive work on improving the legislation in the field of water management. As the head of our state emphasized the need to approach each issue with science and experience, advanced modern technologies were brought from foreign countries, and their specialists were involved. Due to the annual expansion of the areas where these technologies are introduced, many enterprises have been established in our country, and the production of irrigation system equipment has been launched in local conditions. Now, there is a need for local personnel who will build modern water-saving

irrigation systems and provide service to them. At the same time, the issues of a creative approach to these irrigation systems, their improvement, and adaptation to the specific soil and climatic conditions of Uzbekistan are becoming more and more relevant every day, and life itself demands this.

Water plays a crucial role in many processes occurring in nature and, therefore, in ensuring the life of humanity. In industry, water is used as a raw material and energy source, as a cooling or heating agent, solvent, extractant, as a means of transport for raw materials and materials, and for a number of other needs. Wastewater is water used for domestic purposes, in production and processing, and also formed after passing through a certain polluted area. Depending on the conditions of formation, wastewater is divided into 3 types. 1. Domestic wastewater (DWW); 2. Industrial wastewater (IWW); 3. Atmospheric wastewater (AWW). Domestic water is water from showers, bathrooms, laundry, dining rooms, toilets, and floor washing. This water contains 58% organic and 42% mineral impurities. Atmospheric water is water that comes from rain and snowmelt and flows from the territory of the enterprise. It is contaminated with both organic and mineral impurities. Industrial wastewater is liquid waste generated from the extraction and processing of organic and inorganic materials. Wastewater consists of a mixture of various substances, forming a complex system: dissolved inorganic and organic compounds, suspended coarsely dispersed and colloidal mixtures, and in some cases dissolved gases (hydrogen sulfide, carbonate, etc.). The relevance of the topic is that today, the improper treatment of wastewater discharged by small industrial enterprises has a negative impact on human health. In the framework of our topic, we will take a closer look at industrial wastewater and the laboratory tests performed on it and try to give the necessary recommendations.

ANALYSIS OF LITERATURE ON THE SUBJECT

It is important to effectively use clean water from wastewater treatment plants for irrigation of melon crops using water-saving technologies. This includes pressurized irrigation systems, such as drip irrigation, which delivers water directly to plants. Technologies such as reverse osmosis and ultrafiltration can also be used for wastewater treatment. This reduces organic and inorganic substances dissolved in water, providing cleaner water for irrigation of crops. These methods contribute to the rational use of water resources and water conservation in agriculture. Due to the depletion of water resources and climate change, increasing the efficiency of water use in agriculture has become an urgent issue worldwide. The Republic of Uzbekistan is also implementing important reforms in this regard. In particular, by reusing secondary sources of clean water from wastewater treatment plants, agricultural

productivity can be increased while maintaining ecological balance. This approach can be especially effective for water-intensive crops such as melon crops.

2. The capabilities of wastewater treatment plants. Modern wastewater treatment technologies purify waste and create a biologically and chemically safe water source.

These waters:

- Meet agrotechnical standards;
- Are considered safe according to microbiological indicators;
- Are available as a permanent source, allowing for year-round use.

For example, existing water treatment plants in cities such as Tashkent, Bukhara, and Karshi produce thousands of cubic meters of clean water annually. By directing these water sources to melon fields, the pressure on natural resources is reduced.

2. Water-saving technologies: necessity and prospects

Traditional methods of irrigating melon crops — ditches, open channel irrigation — cause a large amount of water waste. Therefore, the following modern technologies are of particular importance:

- Drip irrigation system: water is delivered directly to the roots, reducing evaporation;
- Automatic irrigation systems: optimize water consumption;
- Misting (sprinkler): ensures even distribution by distributing in small droplets.

These technologies can also be used in wastewater treatment, as the quality of the treated water fully meets them.

3. Effective ways of using melon crops

Melon crops, which are widespread in Uzbekistan - watermelons, melons, cucumbers, tomatoes, etc., require a specific agro-irrigation system. The following measures are recommended when using wastewater:

- Monitoring water content - conducting water analysis every month;
- Optimizing the irrigation regime - creating an individual schedule for each type of crop;
- Improving soil structure - retaining moisture through mulching, using catch crops.

CONCLUSIONS AND SUGGESTIONS.

Scientific research has shown that the use of wastewater through drip irrigation has increased crop yields by 20–25% and reduced water consumption by 30–50%. Clean water resources from wastewater treatment plants serve as an important ecological and economic resource for the cultivation of melon crops in Uzbekistan. The introduction of water-saving technologies in this area not only saves water

resources, but also contributes to the development of sustainable agriculture. The widespread use of these technologies creates opportunities for efficient use of resources and environmental protection.

REFERENCES

1. Karimov I.A. “Tabiat – bizning umumiy uyimiz” – T.: O‘zbekiston, 1994.
2. Raxmonov I. “Qishloq xo‘jaligida resurs tejovchi texnologiyalar” – T.: Mehnat, 2018.
3. FAO (2021). Water reuse in agriculture: guideline for safe and sustainable use.
4. O‘zbekiston Respublikasi Ekologiya, atrof-muhitni muhofaza qilish va iqlim o‘zgarishi vazirligi hisobotlari (2023).
5. G‘ulomov S. va boshqalar. “Sug‘orish tizimlari va suv tejash texnologiyalari” – Samarqand, 2022.
6. Ахунов Д. Б., Жураев Х. А. Стеклокристаллические материалы на основе базальтов Кутчинского месторождения //Современные научные исследования и разработки. – 2017. – №. 3. – С. 14-17. 2.Ахунов Д. Б., Карабаева М. У. Защита зданий от вибраций, возникающих от тоннелей метрополитена круглого сечения с помощью экранов //Современные концепции развития науки. – 2017. – С. 34-36.
7. Ахунов Д. Б. Стекла и ситаллы на основе базальтов Кутчинского месторождения: дис.–технология силикатных и тугоплавких неметаллических материалов. Ташкент, 2008.–143 с, 2008.