EFFECTIVE USE OF RESOURCE-SAVING TECHNOLOGY OF DRIP IRRIGATION ON LIGHT-TOOTHED, MEDIUM-SALYNIC GRAY SOILS

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Annotatsiya

Maqolada iqlim o'zgarishi sharoitida suv resurslaridan foydalanishning iqtisodiy samaradorligi, yashil iqtisodiyot, iqlim o'zgarishi, "yashil" mezonlar, mavjud suv resurslarini suv iste'molchilari orasida qat'iy taqsimlash, iqlim xavfi, suv resurslariga raqamli texnologiyalarni jalb qilish dolzarbligi, zamonaviy texnologiyalar hamda ularni tadbiq qilish iqtisodiy samaradorligi, avzalliklari, tejamkorlikka erishish uchun raqamli texnologiyalarni tadbiq qilish, xorij tajribasi asosida tashkiliy-amaliy masalalar tahlil qilingan va xulosa va tavsiyalar ishlab chiqilgan. Mamlakatimizda o'rtacha sho'rlangan tuproqlarda g'o'zani tomchilatib sug'orish texnologiyasi samaradorligini oshirish maqsadida Farg'ona viloyatida ekin maydonlarining tuproq holatini nazorat qilish va biostimulyatorlardan foydalanish bo'yicha tajriba o'tkazildi. Umumiy tahlillar natijasida g'o'za fenologiyasi va sug'orish me'yorlari aniqlandi.

Аннотация

В статье анализируются экономическая эффективность использования водных ресурсов в условиях изменения климата, зеленая экономика, изменение климата, «зеленые» критерии, строгое распределение имеющихся водных ресурсов между водопотребителями, климатический риск, актуальность привлечения цифровых технологий в водные ресурсы, современные технологии и их экономическая эффективность, преимущества, применение цифровых технологий для достижения экономии, организационные и практические вопросы на основе зарубежного опыта, а также разрабатываются выводы и рекомендации. С целью повышения эффективности технологии капельного орошения хлопчатника на среднезасоленных почвах в нашей стране в Ферганской области был проведен опыт по мониторингу состояния почв возделываемых площадей и применению биостимуляторов. В результате общих анализов были определены фенология хлопчатника и нормы полива.

Abstract

The article analyzes the economic efficiency of water resources use in the context of climate change, green economy, climate change, "green" criteria, strict distribution of existing water resources among water consumers, climate risk, the relevance of involving digital technologies in water resources, modern technologies and their economic efficiency, advantages, the application of digital technologies to achieve savings, organizational and practical issues based on foreign experience, and develops conclusions and recommendations. In order to increase the efficiency of drip irrigation technology for cotton on moderately saline soils in our country, an experiment was conducted in the Fergana region on monitoring the soil condition of cultivated areas and using biostimulants. As a result of general analyzes, cotton phenology and irrigation standards were determined.

Kalit so‘zlar: Toza ekologik muhit, sho‘rlangan tuproq, g‘o‘za yetishtirish, tomchilatib sug‘orish texnologiyasi, o‘zgaruvchan sug‘orish, korvert usul, biostimulyatorlar, mikroorganizmlar, g‘o‘za fenologiyasi, fitohormonlar, mineral tuzlar.

Ключевые слова: Чистая экологическая среда, засоленная почва, хлопчатник, технология капельного орошения, чередующееся орошение, метод капельного полива, биостимуляторы, микроорганизмы, фенология хлопчатника, фитогормоны, минеральные соли.

Key words: Clean ecological environment, saline soil, cotton cultivation, drip irrigation technology, alternating irrigation, corvert method, biostimulants, microorganisms, cotton phenology, phytohormones, mineral salts.

Introduction: Recently, Uzbekistan has been experiencing a trend towards the development and bio-ization of agricultural production, along with the reduction of chemical damage to the soil, which opens up the possibility of wide introduction of biological products, including growth promoting products, for various purposes in plant science. A number of researchers [2-5] found in laboratory experiments the stimulating effect of heterofermentative lactic acid bacteria on the germination of seeds and the development of plant seedlings (wheat, rice, cabbage, spinach and tomato).

The positive effect on plant growth and development is explained by the synthesis of a wide range of compounds (organic). During glucose fermentation, heterofermentative lactic acid bacteria synthesize organic acids, 2,3-butanedione, hydrogen peroxide, antibiotics. The formation and improvement of a healthy lifestyle depends on environmentally friendly agricultural products and, ultimately, on the development of an integrated management system through

biological means. One of the main factors determining the effectiveness of ecologically clean agricultural production is biological means created on the basis of microbial biotechnologies.

Discussion: These biological agents are safe for the population and the environment, and they also have a multifunctional mechanism of action on soil and plants to restore soil fertility, develop rhizosphere microorganisms. Lactose-fermenting bacteria include a unique group of microorganisms that are resistant to acidic environments, exhibit probiotic properties, and have a number of beneficial properties. Milk-fermenting bacteria isolated from dairy products and plants are widely used in the food industry.

Literature analysis and methods: Research on the economic efficiency of rational use of water resources in the context of climate change has been one of the most researched issues over the past 20-30 years. For this, decrees, resolutions and similar regulatory and legal documents serving the development of this area are being implemented by our President. In particular, the adoption of the Resolution of the President of the Republic of Uzbekistan No. PQ-4477 dated 04.10.2019 “On approval of the Strategy of the transition of the Republic of Uzbekistan to a “green” economy for the period 2019-2030” can be considered one of the practical results of the economic reforms being carried out in this direction.

As noted in this resolution, in recent years, our country has been paying special attention to the low level of energy efficiency of the economy, the irrational use of natural resources, the slow pace of technological innovation, the introduction of innovative solutions for the development of the "green economy", and the efficiency of agricultural land, including the use of water-saving technologies.

The resolution identifies the main tasks of the transition to a "green" economy as increasing the energy efficiency of the economy and rational use of natural resources through technological modernization and the development of financial mechanisms;

Incorporating "green" criteria based on advanced international standards into priority areas of public investment and spending;

"facilitate the implementation of pilot projects in the areas of transition to a "green" economy through intensified cooperation with international financial institutions";

improving energy efficiency in basic sectors of the economy;

diversifying the consumption of energy resources and developing the use of renewable energy sources;

Adapting to and mitigating the effects of climate change, increasing the efficiency of natural resource use, and preserving natural ecosystems;

Measures have been identified to enable the development of financial and non-financial mechanisms to support the "green" economy [1].

Currently, scientists around the world are conducting research into the application of lactic acid probiotic bacteria isolated from plants in agriculture. In particular, scientists from the Laboratory of "Microbiology and Biotechnology of Probiotics" of the Institute of Microbiology of the Academy of Sciences of the Republic of Uzbekistan isolated lactic acid bacteria that synthesize phytohormones (GC and ISC) in high quantities from plants and based on them developed agricultural, there are more than 136 types of gibberellins, and research is being conducted in the field of cotton cultivation, mainly because of their positive effect on plant growth.

In the scientific literature, it is noted that ISK is synthesized by gram-negative and gram-positive bacteria. The response of plants to phytopathogens is carried out through the biosynthesis of biologically active substances (phytohormones, antibiotics). Phytohormones synthesized in plants are in a passive state and require the use of biopreparations containing (Gk, ISK) in order to become active. Gibberellic acid is a natural hormone that enhances the development of plants and is widely used worldwide due to its effective effect in the cultivation of agricultural products. Biopreparation used in experimental tests is an environmentally friendly product created on the basis of an association of promising active local milk-fermenting bacteria. The active milk-fermenting bacteria included in this biopreparation have properties that synthesize gibberellin and indolyl acetic acid, break down cellulose, produce antibiotics, vitamin B complex, non-exchangeable amino acids, and protect plants from pathogenic fungi. Since the biopreparation was created on the basis of local bacterial strains, it gives effective results in any soil and climatic conditions of our republic [8].

The biological preparation "Probiophyto" was tested on cotton, wheat, vegetables, and melon crops in the Kashkadarya, Surkhandarya, Samarkand, Namangan, Fergana, and Tashkent regions. The biological preparation increases the beneficial microflora of the soil, improves its productivity, structure and physical properties, restores the functioning of the soil plant-microorganism triad, prevents and protects against damage by phytopathogens, and enhances the

development of and serves to obtain a high-quality and high yield, to ensure food security for the population, to increase the country's export potential, and to replace drugs imported from foreign countries.

It also improves the condition of the soil, increases its fertility and eliminates sources of disease-causing microflora. It enhances the development of agricultural crops, increases their resistance to various harmful effects of external abiotic factors, i.e. increases their resistance to stress, early ripening of crops, increases yield, and serves to obtain high-quality products. It enriches the soil with beneficial microflora, neutralizes pathogenic microflora contained in applied organic fertilizers, and converts chemical fertilizer residues in the soil into a form that can be absorbed by plants and delivered to them.

Methods of conducting research in practice: In the conditions of saline and salinity-prone soils, cotton was sown 60 cm between rows, and in the control variant, directly drip-irrigated without the use of biostimulants based on the scheme 2-12-1, it was irrigated a total of 15 times, the one-time irrigation rate was 249-311 m^3/g, the seasonal irrigation rate was equal to 4075 m^3/g, and the cotton yield was 40.2 tons/g.

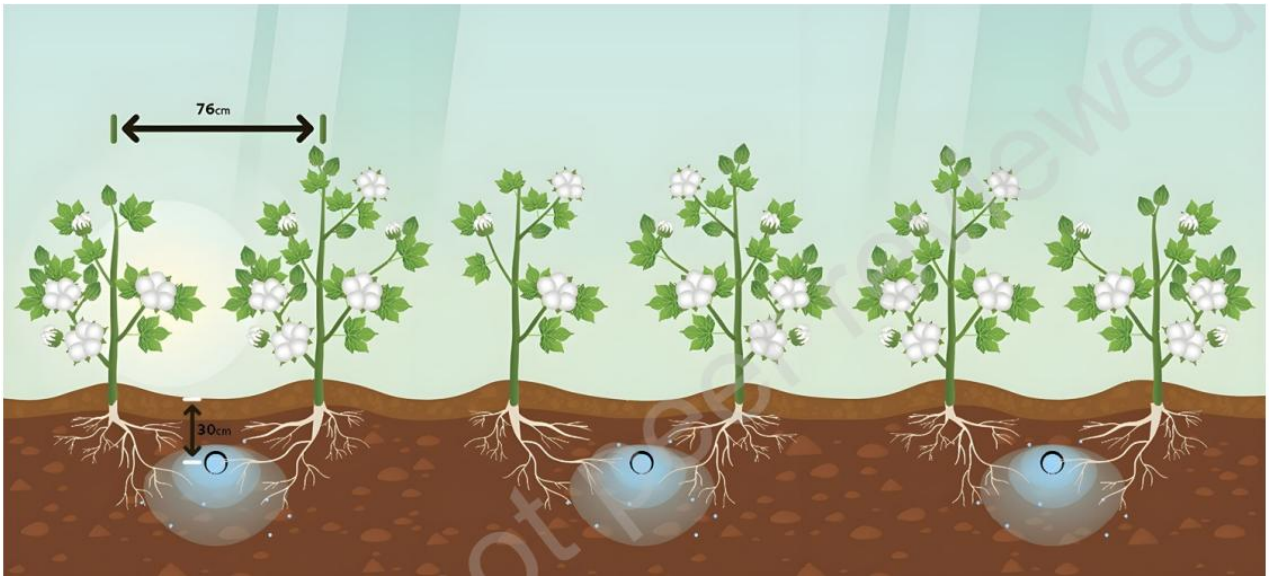

Figure 1. The apperance of soil wettness after irrigation with bulbs (Netafim)

In option 2, where the cotton is treated with a suspension of Probiophyto biostimulant before planting and the first and second irrigations, drip irrigation technology is introduced based on the 2-11-1 scheme, a total of 14 irrigations were carried out, the rate of 1-time irrigation was 240-267 m^3/g, the seasonal irrigation rate was 3635 m^3/g, and the yield of cotton was 46.6 tons/g.

Table 1. Evaluation of the effectiveness of the research conducted

Cotton yield ts/g	42.2	46.6	49.8
Seasonal irrigation rate m^3/ha	4025	3635	3360
One-time irrigation rate m^3/ha	250-312	240-268	230-260

In the third variant, where the seeds were treated with a suspension of Probiophyto biostimulant 3 times before planting and drip irrigation technology was introduced, a total of 13 irrigations were carried out in the 2-10-1 scheme, with a single irrigation rate of 230-260 m^3/g, and a seasonal irrigation rate of 3360 m^3/g. It was 706 m^3/g compared to the control option and 280 m^3/g water saving compared to the second option, 49.8 ts/g from cotton, 9.4 ts/g higher than the control option (Table 1).

When analyzing the changes in the content of chlorine in the composition of low-saline soils of the Fergana region, it was found that in the case of cotton planting and treatment with Probiophyto biostimulants during the first, second and third irrigations, by the end of the vegetation period, the chlorine content in the soil at the depth of 0-100 cm increased by 0.019%. It was found that the amount of chlorine accumulated in the soil was lower by 0.007% in the 0-40 cm layer and by 0.007% in the 0-100 cm layer compared to the control option, that is, the field irrigated directly without the use of biostimulants, if it increased to 0.017%.

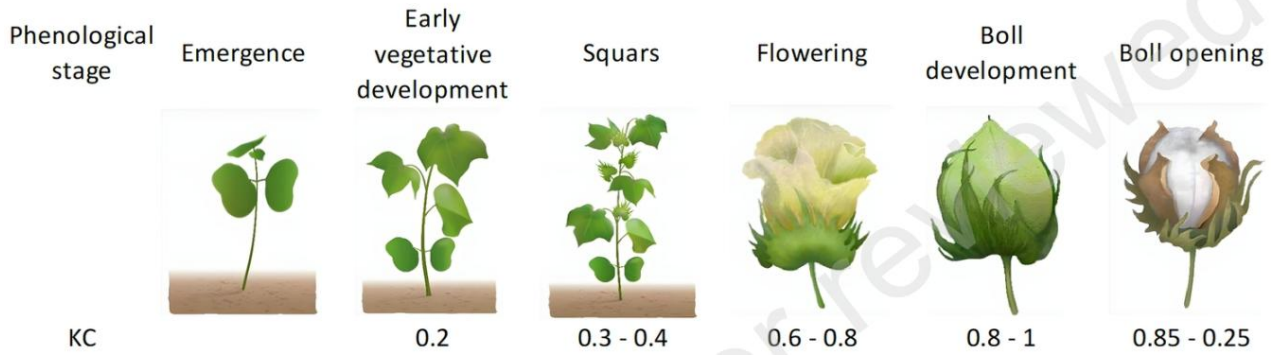

Figure 2. The condition of the crop at any stage of development and the size of its leves (KC) (Netafim)

In the conditions of low-saline soils of the Fergana region, in variants 2 and 3, where cotton was grown using ProBioPhyto biosimulators, the salt content in the wastewater was 0.253 g/l in terms of chlorine ions and the dry residue was 2.310 g/l, by the end of the growing season, these indicators decreased to 0.012 and 0.022 g/l, respectively, and made 0.233 and 2.263 g/l. It is observed that it is reduced by 0.048 and 0.062 g/l, respectively, compared to the control variant.

In the conditions of low-saline soils of the Fergana region, the highest cotton yield was obtained when the cotton variety "Namangan-77" was grown with soil

moisture of 75-80-65% relative to CHDNS and mineral fertilizers were applied at the rate of N-200; P-150; K-100 kg.

In the first, second and third irrigations, the yield was 49.8 c/g, which was observed in the drip irrigation variant, treated with the Probiophyto biostimulator in the form of a suspension. In this variant, the conditional net profit is 15 million 582 thousand soums/g, and the profitability level is 67.4%.

Conclusion. The use of local biostimulants in the planting and cultivation of cotton in the conditions of moderately saline soils of the Fergana region increases the plant's tolerance to salt-related external stresses, improves soil condition, increases productivity, and ensures high and stable cotton yields. In the case of current global climate change and water shortage in our Republic, the use of biological preparations can solve many problems in agriculture and increase the efficiency of various agrotechnologies.

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