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# Efficiency of Use of Clay Water with Drop Irrigation

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**ABSTRACT:** The article presents the results of theoretical studies and field trials of the author, conducted in ancestral - economic conditions. Field experiments were carried out on the territory of the Khuzhayakshanba IGC of the Kagan fog of Bukhara region. The technology of garden irrigation with clay water using drip irrigation has been developed. With the introduction of drip irrigation technology in intensive gardens, water resources are saved by 20-60%, mineral fertilizers up to 50% and fuel and lubricants up to 30%, the results of the work are analyzed and presented. In addition, the irrigation regime corresponds to the water needs of plants and excess water is not used, while water evaporation in the soil is insignificant, moisture will collect only near the root system of plants, as a result, water does not disperse throughout the field, due to the small absorption of water by the soil, the level of subsoil water will not rise.

**KEY WORDS:** irrigation, drip irrigation, irrigation methods, clay water, subsoil water, water resources, salinization, root, evaporation.

## I.INTRODUCTION

Our Government has been paying a serious attention to progress of irrigation culture in our country, intensification of reforms in water resources, and material and technical strengthening of this sector. Large-scale activities associated with introduction of water-saving techniques, including drip irrigation, film irrigation and irrrigation using the mobile flexible pipes have been put in practice. In this context, the Government resolutions "On Measures for Further Improvement of Irrigated Land Improvement and Efficient Use of Water Resources during 2013-2017" and "On Measures for Egfficient Organization of Introduction and Financing of Drip Irrigation System and New Water-Saving Technologies" were adopted.

## II. THE MAIN PART

Scope of works to be undertaken in these directions and mechanisms of their imlementattion are clearly determined in these documents.Task of introduction of drip irrigation on 25 thousand ha, irirrigation through polyfilm laying on 46.5 thousand has and systems of irrigation using mobile flexible pipes on 34 thousand ha of land nationwide by 2018 had been set. During 2018-2023, introduction of the drip irrigation system on 21.5 thousand ha of land areas of the farms and other land users and provision of concessional loans with interest rate of 6% to agricultural producers by commercial banks from the resources of the Fund for Improvement of Irrigated Land under the Ministry of Finance. In addition, amendments and addenda to the Tax Code were introduced as to exemption of legal entities, which introduce drip irrigation techniques, from the Single Land Tax associated with land area covered by such techniques for the period of 5 years.

According to the International Irrigation and Drainage Committee, areas under crops, where drip irrigation systems were introduced, had grown from 436 thousand ha to 3.2 million ha globally over 1981-2000. Namely, such areas increased by 1 million ha in the USA and by 200 thousand ha in each oog India, Australia, Spain, Israel, and China. Currently, drip irrigation technology has been introduced on the lands with total area of 4.5 million ha globally. Great attention is paid in our country to wide introduction of the drip irrigation system. Over the last 3 years, the drip irrigation technology has been introduced on the lands with total area of 5.5 thousand ha. In 2013, this system was introduced on the lands with total area of more than 2.2 thousand ha. Namely, this system is applied on 255 ha of lands in Samarkand Region, 250 ha in Namangan Region and nearly 170 thousand ha in Ferghana Region.

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Cotton growing technology under the drip irrigation system includes the following key indicators: Use of high-yield and fast-ripening varieties adapted to various soil climate conditions; rational system of main, pre-ploughing and interrow soil tillage; planting of high-quality cottonseeds, classified introduction of mineral fertilizers; a system, which helps in full automation of irrigation process and efficient use of water resources; harmonized system of plant protection from siseases, pests and weeds; mechanized calking and defoliation of cotton plants; and mechanized cotton harvesting. Main difference of the drip irrigation system lies in the possibility of partial introduction of mineral fertilizers and herbicides to thenpant through water and lack of interrow tillage during vegetation period.

## III. EXPERIMENTAL RESULTS

Research studies had been undertaken at the Training and Research Center of the Bukhara Branch of Tashkent Institute of Irrigation and Melioration with the view of complex academic study and mass introduction of the drip irrigation technology. Soil of the experimental field was medium loamy, with the depth of ground waters of 2.2-2.5 metres, and 1.9-2.2 metres during the cotton vegetation period and was mildly saline. Irrigation was performed using the turbid water directly from the aryk (canal) without filtration. According to the experimental results, drip irrigation system has a number of advantages over the interrow irrigation and studies identified the saving of 45-50% of water and 40-50% of fuels and lubricants and mineral fertilizers. In addition, reduction of the number of interrow tillage by 6 times, and spending of 85 cubic metres of water per 1 ha for growing of 1 centner of cotton were observed.

We can observe the positive improvement of hydrophysical properties of the soil in the field under drip irrigation as compared with traditionally irrigated field; namely, reduction of volume mass, improvement of the soil's water conduction property. It was established that in case of drip irrigation productivity grew by 7.4 centners/ha. In addition, due to continuous maintenance of mositure on the areas under drip irrigation, salinity level increased just slightly and plants didnot suffer the vilt disease. Soil at the experimental fields was medium loamy, and medium-fiber Bukhoro-6 cotton variety was planted with cotton interrow space of 60 cm. At the ploughed layer of the soil (0-30 cm) the soil volume mass was 1.38-1.41 g/cm$^3$, and in the under plough layer (30-50 cm) this indicator somewhat increased to 1.49-1.58 g/cm$^3$, and relative mass and total porosity indicators in these layers were correspondingly 3.14-3.21 g/cm$^3$ and 51.3-47.1%.

Hydrophysical properties of the soil were as follows: limited field water capacityy at the soil layer of 0-100 cm was 20.3-21.4; natural moisture at ploughed layer was 17.2-18.5%, and under plough layer – 18.3-20.8%; cotton irrigation regime was formed based on the pre-irrigation moisture level and estimated soil layer of 0-50 cm as established in the experimental system. Obtained data evidence high efficiency of the drip irrigation as compared with furrow irrigation. For instance, while 5,200m$^3$/ha brutto water is spent per season in case of furrow irrigation, we can observe that 2,280 m$^3$/ha of water in scenarios 2 and 3, and total of 2,760 m3/ha of water in the fourth scenaruio is spent in case of drip irrigation. Thus, upon drip irrigation under the 70-75-70% scheme water was saved by 53%, and upon drip irrigation according to 70-80-65% scheme water saving was 47%.

Features of agrotechnical case of cotton plants and crops included in its complex taking into consideration the tradionally irrigated meadowy alluvial soil conditions and use of new technologies and drip irrigation system have been provided above. High water saving efficiency achieved in the course of these experiments has also demonstrated its ecologically positive properties. Regionally widespread irrigation erosion and wash-off of mineral fertilizers in meadowy alluvial soils are prevented. Through this method, there is a good opportunity for continuous moisture supply to the plant's root level and efficient utilization of water and nutrients. Advantage of drip irrigation is primarily demonstrated in saving of water resources. At the same time, a unique irrigation mode, low evaporation and prevention of water waste are achieved. Most importantly, since water is delivered to the plant through the pipes in drip irrigation, the surface of field soil is not dried and, as a result, there is no need for performance of interrow tillage.

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Upon irrigation of cotton plants using the traditional method, i.e. through the rows, it was determined that part of water was wasted as a result of its partial ingress into lower soil layers in the main canals and its evaporation. Studies identified that 1.5-2.5 thounsand cubic meters of water are wasted per one hectare due to evaporation and ingress. Development of moden land improvement nd irrigation methods for the cotton and other plants grown on the rows and thir introduction into practice with the view of preventing the negative aspects are among the urgent issues nowadays. Technique of irrigation through laying the polyfilm between the cotton plant rows serves as a factor, which enables the reduction of the demand for irrigation water and energy costs as well as increase of soil fertility.

Water saving by 42 percent in average and additional cotton yield of 7-9 centners per hectare or 23% increase has been observed upon irrigation through laying the black polyfilm between the cotton plant rows on the fields of the Training and Research Center of the TIIAME Bukhara Branch. Under this non-traditional irrigation technique, there is opportunity for even soil moistening across furrows, reduction in evaporation of soil moisture after irrigation, full utilization of nutrients by the crops due to prevention of washout of mineral fertilizers under pressure. Creation of favourable conditions for active development of the root system due to destruction of weeds because of prevention of sunlight impact on the furrow base, prevention of soil compaction due to avoding the tillage between the rows and quality moistening of the productive soil layer as a result of irrigation at reduced norms, and increase of productivity have been observed. Irrigation technique through laying the polyfilm between the cotton plants rows is a technological direction, which enables reduction of water demand and energy consumption by 35-40% and increase of soil productivity.

## IV. CONCLUSION AND FUTURE WORK

Saving of water by 15-20%, even water distribution along furrows and increased of useful area under crops by 1.5-2.5% and easening of irrigation works and reduction of manual labor by 2 times as compared with tradition irrigation methods has been observed as a result of irrigation of cotton field using the mobile flexible pipes instead of main irrigation channels. Such manufactured mobile fexible pipes are intended for a land site of 4 ha, this area is irrigated simultaneously using the hoses. Since the land plot is irrigation for a short period, soil preparation occurs evenly in all parts of the field. Since water is supplied to the field for a short time, normal growth of cotton plants and increase of productivity by 2.5-3.0 centners as compared with traditional irrigation method are observed.

## REFERENCES

1. Decree of the President of the Republic of Uzbekistan from February 7, 2017 President's Decree No 4947.
2. Methods of field experiments.Tashkent, 2007, 176 p.
3. Karimov G',. Fazliyev J "Automation of intensive garden seedlings' drip irrigation" Молодой учёный Journal № 10 (90) / 2015
4. Fazliyev J. "Drip irrigation technology in gardens" Интернаука. Science Journal № 7(11) April 2017
5. J.Fazliyev. "MODERN IRRIGATION METHODS FOR GARDENS " iScience № 22 2г. Pereyaslav - Khmelnitsky. Ukraine 2018, №22, 24-26 p.
6. J.Fazliyev. «TECHNOLOGY OF THE DRIP IRRIGATION USE IN GARDENS AND VINEYARDS» Путь науки The way of science international scientific journal № 11 (57), 2018
7. Fazliyev J. EFFICIENCY OF APPLYING THE WATER-SAVING IRRIGATION TECHNOLOGIES IN IRRIGATED FARMING «ИНТЕРНАУКА» Science Journal № 21(103) June 2019 г. Part 3
8. I.Xudayev,J.Fazliev, "Drip irrigation - as a water-saving way irrigation of orchards and vineyards", «Школа Науки» № 4 (15) March 2019
9. I.Xudayev,J.Fazliev,S.Baratov, " Drip irrigation technology for orchards and vineyards " AGRO ILM 1(57) 2019