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Scientific Substantiation of the Use of Collector Water in Irrigated Areas

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Abstract: In this article, the author made suggestions and recommendations for irrigation of agricultural crops as an additional resource in the irrigated fields of Bukhara region.

Keywords: agricultural crops, irrigated land areas, collector-zovu networks, land salinity.

Searching for water reserves is one of the most important tasks in Central Asia, where water shortage is acutely felt due to the expansion of irrigated areas. Prevention of water shortage in our country in years with relatively low rainfall, water supply to economic sectors, agriculture is one of the urgent problems of today.

It is known from history that due to the dry climate of the territory of our Republic, the main factor for the survival and development of any civilization is the correct and efficient use of water resources. Humans have been cultivating new territories since ancient times.

The presence of large areas in the oases of Zarafshan, Khorezm and Bukhara located on the banks of the Great Silk Road passing through Central Asia, as well as the proximity of the Zarafshan and Amudarya waters to these places, created the basis for irrigation and development of fields in the region.

Due to its location in the desert zone, the territory of Bukhara region, which makes up 11% of the territory of our republic, does not have permanent water sources. Atmospheric precipitation in most cases sinks and evaporates underground without creating currents. In the spring, small streams sometimes appear during the cold winter. Their water is used up without reaching far.

In the barren areas of the region's desert zone, water brooks and ponds are formed due to rains.

Since Bukhara region is located in an arid (arid) zone, precipitation is mostly in the form of rain. Snow cover does not last long without being chronic and thick. The distribution of precipitation throughout the year is extremely uneven.

Spring is relatively the busiest season, and 40-45 percent of the annual precipitation falls on this period. The hydrological improvement conditions of the irrigated land areas of the region have their own characteristics and are somewhat complicated, like the southern regions of the republic. The water demand of the Bukhara region has been met by the Zarafshan River since ancient times. As a result of the increasing demand for water in the upper part of the Zarafshan river, the share of the water of the Zarafshan river reaching the territory of the region is decreasing year by year. Since the irrigated land areas of the region are located in the lower part of the Zarafshan river, underground seepage waters are complex depending on the hydro and hydro-chemical regime. Especially in the middle and lower regions of the region, the melioration situation is extremely difficult due to the

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slow movement of groundwater and its location close to the surface. High air temperature and many hot days lead to a large amount of surface water being used for evapotranspiration.

This, in turn, causes a sharp increase in the amount of salt in the aeration section. As a result, salinity is restored in irrigated areas. The part of Zarafshan passing through the Bukhara Oasis is called the Central Bukhara ditch, and drains sewage and ditch water. The water shortage in the lower part of Zarafshan necessitated the digging of the Amu-Bukhara canal. The water demand of the region's population and farms is currently being met by the full Amudarya water. The amount of this water is now somewhat significant, and the average annual flow in the main part of the channel is 145-170 cubic meters per second. It is necessary to understand that the cost of Amudarya water, which is discharged with the help of pumping stations, is several times more expensive. In addition, this artificial river, which flows relatively opposite to the slope of the relief, is the reason for the deterioration of the ecological condition of desert landscapes in large areas. It is known that the regime of underground seepage water in irrigated areas mainly depends on the amount of water taken to the border of the area and the amount of drainage water discharged from the border.

Table 1. Underground water supply in Bukhara region in 2021-2022.

the location of the waters

№	Districts	Years	Total observed area (thousand g)	Autumn-winter period (novegation) metr	Irrigation period (vegetasia) meter	Yearlik medium yes
By province		2021	274599	2.64	2.56	2.60
		2022	274599	2.66	2.52	2.59
1	Bukhara district	2021	30121	2.65	2.55	2.60
		2022	30121	2.69	2.58	2.63
2	**Vobkent**	2021	21515	3.02	2.82	2.92
		2022	21515	3.06	2.83	2.94
3	**Jondor**	2021	32945	2.39	2.45	2.42
		2022	32945	2.49	2.43	2.46
4	**Kogon**	2021	18775	2.40	2.36	2.38
		2022	18775	2.40	2.24	2.32
5	**Olot**	2021	21521	2.24	2.06	2.15
		2022	21521	2.21	2.13	2.17
6	**Peshku**	2021	22776	2.85	2.89	2.87
		2022	22776	2.95	2.83	2.89
7	**Romitan**	2021	27221	2.53	2.40	2.47
		2022	27221	2.53	2.32	2.42
8	**Shofirkon**	2021	28353	2.75	2.64	2.69
		2022	28353	2.73	2.56	2.64
9	**Korakul**	2021	25076	2.26	2.18	2.22
		2022	25076	2.21	2.17	2.19
10	**Korovulbozor**	2021	19289	3.18	3.13	3.15
		2022	19289	3.31	3.02	3.16
11	**Gijduvon**	2021	27007	2.80	2.64	2.72
		2022	27007	2.72	2.58	2.65

*Note: Compiled by the author based on the data of Amu-Bukhara ITXB.

In 2021-2022, on 274,600 thousand hectares of irrigated areas in the region, as a result of monitoring the location of groundwater in the autumn-winter and irrigation (vegetation) period, it was found that 2.64 meters in the autumn-winter period (novegetation) and 2.56 meters in the irrigation period in 2021, on average It was 2.60 meters.

In 2022, it was 2.66 meters in the autumn-winter period and 2.52 meters in the irrigation period, with an average of 2.59 meters. In the cross-section of districts, the groundwater level in the irrigated land areas of Bukhara, Vobkent, Peshko, Qorovulbazar and Gijduvan districts was 2.8 meters on average in 2021-2022

The location of the surface of underground seepage waters and their hydrochemical regime are the main factors affecting the melioration of irrigated areas. It is known that the regime of underground seepage water in irrigated areas mainly depends on the amount of water taken to the border of the area and the amount of drainage water discharged from the border.

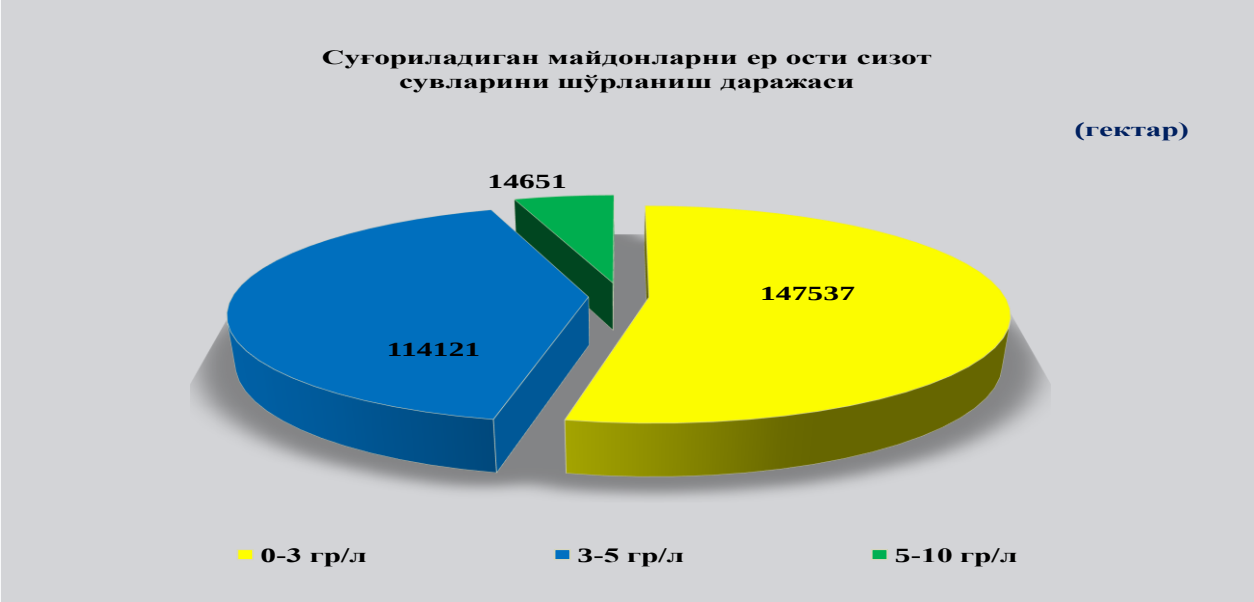

Figure 1. Level of salinity of groundwater in irrigated areas of Bukhara region.

As can be seen from the table, of the total 274.60 thousand hectares of irrigated areas of the Bukhara region, the areas with the salinity level of underground seepage water are 5-10 g/l, 14651 thousand hectares, the areas with 3-5 g/l are 114121 thousand hectares, and the salinity level is 0-3 g/l. It consists of 147537 thousand square meters. In the area of irrigated areas, underground seepage water is divided into three according to the amount of mineral salts. That is, regions with a salt content of 1.0-3.0 g/l, these are Peshko', Vobkent, G'ijduvon districts, regions with a salt content of 3.0-5.0 g/l in the underground water, Kogon, Jondor, Romitan, Shafirkon districts make up the majority of irrigated land areas does. Areas of Karakol, Olot districts are areas with salt content of underground water above 5.0 g/l. It is possible to see that the use of collector water in the region is changing in a positive direction.

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