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GROUNDWATER MONITORING OF IRRIGATED AREAS (IN THE CASE OF BUKHARA REGION)

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Annotation: In addition to our country, Bukhara region, today, comprehensive works are being carried out on the use of underground water in order to improve the melioration of irrigated lands, increase soil fertility. In this article, the author made comments on the example of Bukhara district of Bukhara region.

Key words: Underground water, collector, ditch, irrigated areas of Bukhara district, water resources, agriculture.

Groundwater makes up a significant percentage of the total fresh water on earth. It is the main resource for the earth and is necessary for human habitation and irrigated land. In order to reliably manage and monitor groundwater, it is necessary to have all types of information or to implement monitoring schemes in the complex of wells. These observations are the main source of information needed to draw conclusions about the hydrological behavior of groundwater, since large-scale groundwater extraction has adverse effects on water levels and quality[1]. Collected groundwater data is useful for creating numerical models that allow analysis of changes in groundwater level and quality [2]. These models represent robust tools to support water management efforts.

It implements the process of automatic monitoring of the rise and fall of groundwater, mathematical modeling and monitoring of quantitative and qualitative indicators of groundwater layers using software, studying and monitoring changes in levels due to natural and man-made effects. In the process of scientific research, it requires several organic processes to solve the following problems: Data monitoring studies are carried out based on the transmission of groundwater data through modern information technologies and communication network channels, as well as their mathematical modeling. . Geoinformation models of improvement of irrigated land reclamation are used to predict drought or swamping in natural and man-made areas as a result of the rise in the level of groundwater, as well as to make scientific research decisions on reducing the level of groundwater in the region[3].

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In order to ensure the stability of water resources and determine the potential of groundwater monitoring, the design of the groundwater system based on geoinformation technologies was carried out as follows:

First step: Determine the research area to be studied by the groundwater monitoring system. The study area was studied based on hydrogeological conditions, land use and potential water use sources.

Step Two: Gather information on groundwater levels, aquifer characteristics, water quality, and flow rates. These data were collected by means of borehole sampling and geophysical surveys.

Step Three: An analysis of the groundwater system was conducted to identify conditions and trends. By completing these steps, a groundwater monitoring system was designed based on geoinformation technologies for effective monitoring and management of groundwater resources.

The regional center is the city of Bukhara. The main water source for the Bukhara region is the "Amu Darya" basin, and the main waterways that meet the water needs of the irrigated lands are the I-II turn of the "Amu-Bukhara" machine canal and the "Amu-Korakul" canal.

In addition to these, "Quyi-Mozor", "Todakol" and "Shorkol" water reservoirs are additional water sources for the region. Also, mainly in the spring months of the year, the water coming from the "Zarafshan" river is also used to meet the water needs of the region.

During the movement of underground seepage waters, all irrigated areas are saturated at the expense of irrigation fountains and water supplied to the land, therefore, in some lands, filtration zones are formed at the expense of irrigation and seepage waters. The depth of the seepage water level varies depending on the amount of wastewater supplied to the irrigated areas, besides, the change of the seepage water level is also influenced by the pressure of underground water located in the pit. In the region, underground pressure water is formed due to seepage water flowing from outside the irrigated areas. The main reason for the formation of pressure in seepage water is that the amount of seepage water flowing underground into the irrigated land area is much higher than the amount of seepage water leaving.

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According to long-term observations, the average annual level of groundwater in the irrigated areas of Bukhara region is 2.47 m-3.05 m. This indicator is 2.49-3.68 m in the upper districts of the region (Gijduvon, Shofirkon, Vobkent, Peshko), 2.18-3.01 m in the districts around the regional center (Bukhara, Romitan, Kogon) and lower districts. (Olot, Karakol, Jondor) was around 1.81 - 2.81 m.

The highest period of underground seepage water level is in March and the lowest period is in December. Its one-year amplitude of change was 0.58 m. When analyzing the location of the groundwater level according to the characteristic location period, i.e., on April 1 before vegetation - 2.52 m, on July 1 during vegetation - 2.63 m, and on October 1 after vegetation - 2.72 m, After the salt washing activities carried out in the region during this period, on April 1, in most of the irrigated areas, the level of seepage water is at a depth of 2.03-3.70 m.

The irrigated areas were distributed as follows based on the location of the groundwater level during the characteristic period.

Years, months	Irrigated area (ha)	Including the location of the groundwater level							
		0,0-1,5 (m)	%	1,5-2,0 (m)	%	2,0-3,0 (m)	%	above 3,0 m	%
2021 year									
1.IV	276309	18275	6,6	56883	20,6	164518	59,5	36633	13,3
1.VII	**276309**	8070	2,9	**47534**	17,2	**156393**	56,6	64312	23,3
1.IX	276309	5784	2,1	34634	12,5	169717	61,4	66174	23,9
2022year									
1.IV	276309	11665	4,2	55804	20,2	176017	63,7	32823	11,9
1.VII	276309	9352	3,4	41264	14,9	174690	63,2	51003	18,5
1.IX	276309	6847	2,5	**28134**	10,2	**155663**	56,3	85665	31,0

If the norm of irrigation with mineralized water is less than the water deficit up to the limit field moisture capacity of the soil, then the process of salt accumulation in the soil occurs. For this reason, in such conditions, the irrigation rate is increased by 15-20% compared to river water irrigation, and the seasonal rate is increased by 20-25%, i.e. "salt flush irrigation mode" is used. The deeper the aquifers are located, the higher the productivity of agricultural crops. Common irrigated areas in the province

It is 274.6 hectares. In 2020-2021, the location of seepage waters was as follows.

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Sewage collected in the collector-drainage networks of Bukhara, Jondor, Vobkent and Romitan districts is dumped. The total catchment area of the collector is 64.6 thousand ha. About 80 domestic and inter-farm collector waters of the region are put into the Central-Bukhara ditch. The Central-Bukhara ditch serves an area of 1,200 hectares in the region. The following results were obtained from the composition of Central Bukhara well water.

The turbidity of the water flowing from the central Bukhara ditch is 1 liter

in water was 2 milligrams. Alkalinity of Central Bukhara well water is 3.0 milligrams. Dry residue in 1 liter of water 1348.0 mg/dm3, total hardness 13.0 mg/dm3, nitrogen nitrite 18.8 mg/dm3, chlorides 385.0 mg/dm3, sulfates 633.0 mg/dm3, fluoridewas mg/dm3. Ammonium nitrogen content was not observed. The amount of special substances characteristic of local substances (phosphate, copper, lead, zinc) in the water content of the Central Bukhara well was not determined. In agriculture, the use of water from the collector-zozur and waste lakes for irrigation of agricultural crops is an important means of using the potential of water resources. Currently, the amount of Central Bukhara collector water in irrigation systems is 40-50%. Vobkent district has a rich experience of mass use of mineralized collector water with the help of pumps in times of water shortage in irrigated areas. In fact, our goal is to use land and water resources wisely and protect them.

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