STUDY OF MODERN GEOPHYSICAL CONDITIONS IN THE REPUBLIC OF UZBEKISTAN

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Groundwater use and monitoring is one of the urgent issues of today’s global climate change. Global climate changes have been observed in recent years, which is of particular importance for the Republic of Uzbekistan, where natural moisture content is a problem in itself, and it is important to protect underground water.

During the period of independence, hydrogeological research was systematically carried out in the Republic, great attention was paid to finding new underground water deposits and determining their reserves.

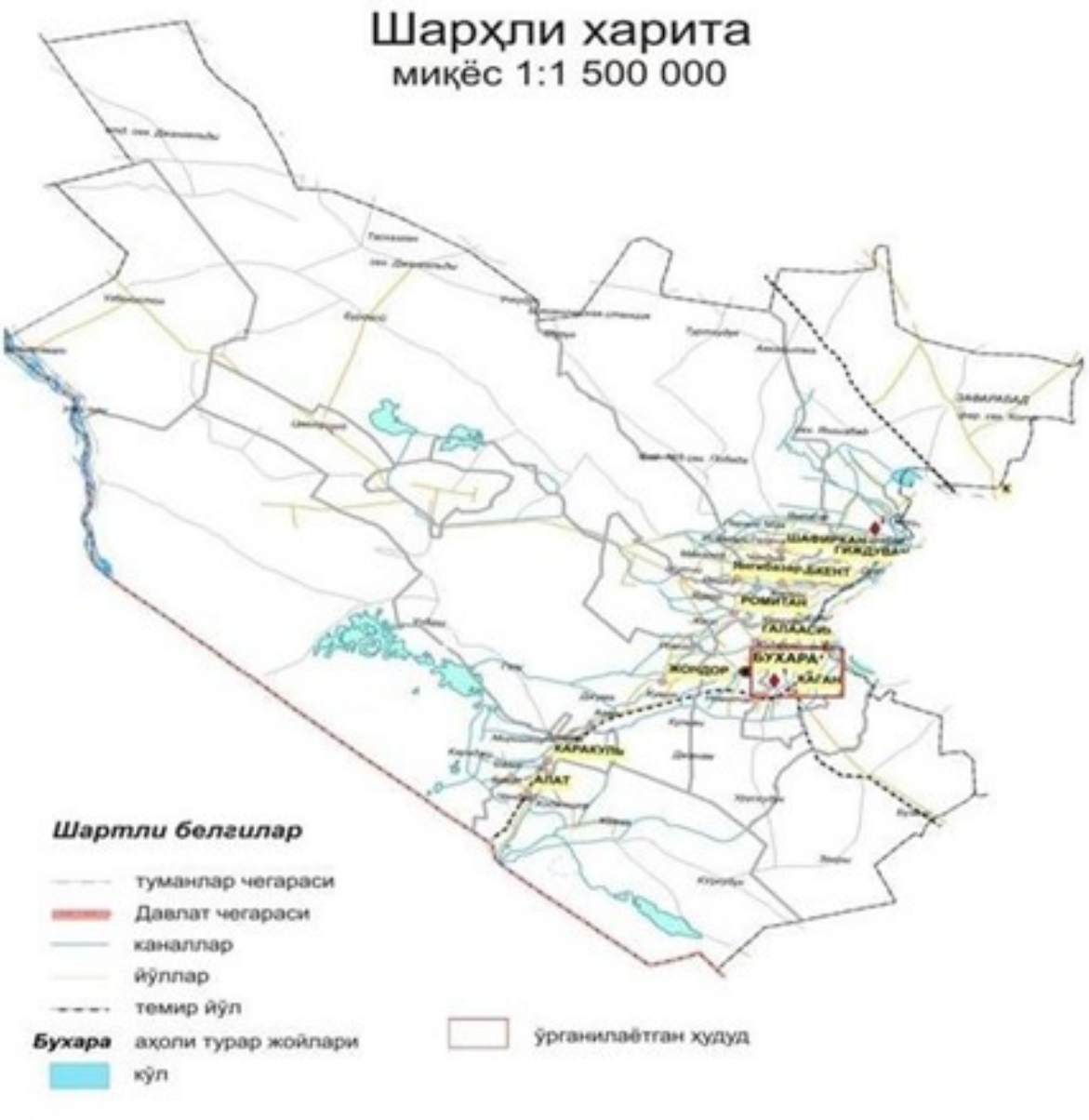
The purpose of state monitoring of groundwater in the republic varies depending on the priorities of the country’s economic development in different periods. From the middle of the 60s to the end of the 80s of the last century, in connection with the intensive development of irrigated lands, research was carried out on the problems related to the study of the hydrogeological and land reclamation conditions of the developed areas. The issues of changing the hydrodynamic and hydrochemical regime

of underground waters in the lower reaches of rivers, the state of waste water intensively used for irrigation of newly developed areas have not been fully studied and are becoming a problem.

President of the Republic of Uzbekistan Sh.M. Mirziyoyev's decision No. 2954 of May 4, 2017: "On measures to regulate the rational use of underground water reserves in 2017-2021" and No. 430 of the Cabinet of Ministers of the Republic of Uzbekistan : "Usage of underground water on measures to further regulate activities in the field" was confirmed in the decisions. In connection with these decisions, scientific and practical work is currently being carried out on the identification of fresh underground water resources in our republic, their rational use, the supply of clean drinking water to the population, and the creation of a single database on water resources.

In connection with these decisions, scientific and practical works are currently being carried out. In the long term, providing the population with quality drinking water based on the implementation of complex measures and targeted programs for the development and modernization of the drinking water supply system is one of the priority directions of the social policy in our country.

The territory of Bukhara region covers an area of 40.5 thousand km ^{2} and is administratively bordered by Navoi region in the northeast, Kashkadarya region in the southeast, Khorezm region in the northwest, and the Republic of Karakalpakstan. According to natural conditions, the territory of the region is divided into irrigated and desert regions.



Picture-1. Detailed map of Bukhara region

The source of drinking water supply for the population of Bukhara region is mainly from Zarafshan and Amudarya surface and underground reservoirs and Kuyimozor reservoir.

Bukhara city is supplied with drinking water at the expense of the Damhoja regional water pipeline, which partially supplies the population with drinking water. At the same time, the inhabitants of the region are using the underground and running

water in the area. Residents of the cities of Olot and Karakol and the district use Amudarya water.

In order to meet the needs of the population for drinking water, it is important to carry out groundwater monitoring methods in regional hydrogeological regions based on modern GAT technologies, to quickly analyze changes in the level of groundwater and to create opportunities for effective management of water resources in necessary cases. Groundwater resources are of primary importance for drinking water supply, irrigation and river stability. Determining the quality and quantity of underground water resources, assessing their condition is one of the urgent issues.

Qualitative and quantitative changes in groundwater cannot be assessed and predicted without retrospective data. In order to carry out such research, we believe that it is necessary to rely on the hydrodynamic and hydrogeochemical monitoring data of underground waters.

Groundwater, which is an important source of fresh water in the Republic, is constantly under threat due to over-exploitation, pollution and climate change, and it is an important task to develop proposals and measures for the rational use of fresh ground water in the future. At the same time, rational exploitation of underground water can lead to pollution and depletion of aquifers, failure of water intake structures. Therefore, it is of particular importance to create a system for managing the operation of underground waters and monitoring their condition. The most effective way to ensure sustainable groundwater extraction is to monitor and maintain groundwater monitoring, an assessment and prediction system.

The current and ancient delta of the Zarafshan River in Bukhara region is composed of Quaternary sediments with a thickness of 5-10 m to 100 m.

The deposits in the study area are covered with sandy gravels, their thickness is from 3 m to 10 m, and silt soil. The deposits belong to the Quaternary period and consist

of common rocks. These deposits are saturated with water, and the groundwater in the layers is hydraulically connected to each other [5].

Bukhara region has arid climatic conditions, the annual average temperature in January is -2ºC. from +1ºC, absolute minimum is -26ºC, winter lasts 1-2 months. The average temperature in July is around 29.5-36ºC, the highest temperature is 45-46ºC goes up to The amount of sunlight during the year is 2800-3000 hours.

Insufficient air humidity during the dry heat, that is, the summer months, causes strong evaporation, and it is observed that the amount of precipitation increases by 10 times. The maximum value of evaporation is observed in June-August and is up to 200 mm.

Bukhara region is one of the arid regions, and the arid regions are regions where evaporation is several times higher than precipitation. Arid regions include deserts and even steppes. The formation and development of arid regions, including deserts, is subject to the uneven distribution of heat and moisture on the surface of the Earth, and the zonal pattern of the geographical crust of our planet. According to the aridity of the land of the globe, it can be divided into 4 zones: extraarid, arid, semiarid, subhumid (a zone with insufficient agriculture).

According to the data obtained from observation bore wells during the research period, the high state of the ground water level was 1.5-3.0 m in March-August, and the low state was 3.5-4.2 m in January-February. The range of oscillation was 1.05-2.0 m. The level of syzot water was observed to be 0.20-0.50 m higher than in the previous research period, and 0.50-0.60 m in places with low drainage.

As a result of hydrogeological studies, it was determined that there is a reserve of underground water with a salinity of up to 3.5 g/l. In addition, the main part of the

proven reserve of underground water suitable for drinking (salt content up to 1.5 g/l) in the region is located in the Bukhara underground water field, but they are not evenly distributed across the area and section. Potable groundwater is preserved in aquifers associated with the paleo (ancient) bed of the Zarafshan River.

Summary. As a result of hydrogeological research conducted in previous years, it was determined that there is a reserve of underground water with a salt content of up to 3.5 g/l. In addition, the main part of the proven reserve of underground water suitable for drinking (salt content up to 1.5 g/l) in the region is located in the Bukhara underground water field, but they are not evenly distributed across the area and section. Potable groundwater is preserved in the aquifers associated with the paleo (ancient) bed of the Zarafshan River [2].

The hydrogeological situation in almost all areas of the region is more complex, and due to the lack of movement of underground water when water is poured into irrigated lands, its upward movement accelerates and brings the salts contained in it to the active layer. The long and hot summer accelerates the accumulation of salts in the active layer of the soil as a result of evaporation. Such negative consequences sharply reduce crop germination and development.

As a result of the conducted research, the condition of underground water in the area is changing from year to year. The main reasons for this are the following. These are: atmospheric precipitation and the amount of water entering the region. It would be appropriate to monitor the condition of underground water and collect data on the condition and analyze them.[8]

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