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THE USE OF FRESH GROUNDWATER FOR VARIOUS INDUSTRIAL NEEDS

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Article history:		**Abstract:**
Received:	24th October 2021	Irrational use of shared water resources, including groundwater, by branches of the national economy and in irrigated agriculture. The ways and methods of solution in order to conserve groundwater resources are proposed.
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Along with surface water sources, groundwater is also widely used for irrigation and water supply. More than 45 thousand wells have been drilled on the territory of the republic for various needs, of which 27 thousand (60%) are operating. The rest are not operated for various reasons — lack of pumps, the need for restoration, well cleaning, as well as for economic reasons, etc. Over the past 30-50 years, fresh groundwater resources have been continuously declining. If in 1965. they amounted to 40.7 million m3 /day, but now they have decreased by 16.3 million m3/day, i.e. by 40%. Currently, there are 27 thousand wells for lifting groundwater for various purposes. There are 4172 operating wells, spending 1.2 billion annually. kWh of electricity for water intake, colossal material resources are spent on the maintenance and reconstruction of wells, basic equipment and automation of installations.

Scientific research is being conducted in the field of using unconventional sources of energy supply for borehole installations, but at the same time, studies of the operating modes of these installations have been practically minimized, aspects of automatic regulation of drainage installations and their reliability have not been sufficiently considered. The Republic of Uzbekistan is located in the center of the Central Asian region in a closed depression with no conditions for the removal of contaminated surface and groundwater beyond its borders. Under these conditions, a very small amount (9.5-11.3 km3/year) of the rivers' own water resources being formed and the predominance of transboundary river flow in the trunks of the Syrdarya and Amu Darya rivers has led to increased interest in the use of groundwater by the branches of the national economy. This required the identification of patterns of formation of groundwater resources, methods of their study, assessment of operational reserves, solving problems of economic development and performing a significant amount of prospecting and exploration work, balance studies, the creation of a regional network of observation points for the regime of groundwater and long-term monitoring observations. Groundwater, especially fresh water, is the most important strategic raw material. If they make up 10% of the amount of water resources, then their specific weight reaches 60% in the total water consumption for household and drinking needs. The population of the republic today and in the future is provided, and will be provided with good-quality drinking water at the expense of fresh groundwater. Forecasted groundwater resources with a mineralization of up to 5 g/l amount to 66 million m3/day, of which with a mineralization of up to 1 g/l — 24.4 million m3/day. They are concentrated mainly in the Fergana Valley (34.5%), Tashkent (25.7%), Samarkand (18%), Surkhandarya (9%), Kashkadarya regions (5.5%), the rest have about 7% of the total resources.

1presented groundwater resources on the territory of the republic. As a result of many years of prospecting and exploration, the operational reserves of fresh and slightly mineralized groundwater for various purposes (22.9 million m3/day) were estimated and approved.

The root cause of all existing problems has been identified: irrational use of shared water resources, including groundwater, by branches of the national economy and in irrigated agriculture.

During circulation in the system, part of the water evaporates in cooling towers, from the surface of open ponds and sewage treatment plants, and when sludge and sediments are removed, it is lost as a result of participation in chemical reactions, is subjected to various physico-chemical influences, including evaporation, as a result of which the concentration of salts and scale-forming compounds increases in it. With repeated use, mechanical suspensions, various corrosive compounds and microorganisms accumulate in the water. All this causes intensive scale deposition and corrosion of condensation and refrigeration equipment, impairs heat transfer. Due to the increase in the content of salts in the water, including calcium and magnesium salts, and other impurities, it is necessary to remove part of the water and replace it with fresh. For this purpose, the so-called recharge or purge of the system is carried out. Instead of the water dumped from the reservoir, fresh water is taken away. It is possible to cover the losses of recycled water at the expense of domestic wastewater, as well as rain and flood waters after their preliminary preparation.

The combined impact on groundwater resources of regressive and transgressive qualitative depletion (pollution) reduces the amount of resources on average for 30 years by 8.25 km3/year or 0.26 km3/year. This volume for the specified period amounted to 7.8 km3 or 28.8% of the total amount of groundwater resources. The greatest decrease was in fresh groundwater resources of 12.19 m3/s per year or 0.38 km3 per year, which over 50 years amounted to 11.52 km3 or 42.5% of their total value. A similar process occurred with the regional operational groundwater reserves, which in general were qualitatively depleted by about the same amount (8.0 m3/s or 0.25 km3 per year) as the total groundwater resources.

Thus, in order to preserve groundwater resources, their rational use and prevent depletion, along with the measures taken by the Government of the republic, the authors consider it necessary: 1. Develop and implement measures to reduce and streamline discharges of collector-drainage and other wastewater (municipal and industrial) into surface watercourses, which are the main source of groundwater supply. 2. Gradually reduce the use of fresh groundwater for various needs of industry and agriculture, to replace them with poorly mineralized, especially in irrigated areas with high groundwater levels, where vertical drainage along with reclamation effect will replenish irrigation water resources. 3. To accelerate the equipping of water intake facilities and water users with water use metering devices, as well as to restore and streamline reporting on water use. 4. To improve the pricing policy and payment for the use of water resources, which will stimulate their economical spending. 5. In agriculture, apply bioagrotechnologies that increase the content of humus in the soil, protecting groundwater from pollution. 6. To develop recommendations and technical proposals for the rational use of water resources from underground sources and to investigate the borehole water intake system for the effective use of artesian pumping units, from the point of view of energy and water conservation.

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