Water Resources of South Uzbekistan and Its Efficient Use in The Future (On the example of Surkhandarya region)

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ABSTRACT
This article describes the current state of surface water resources in the Surkhandarya region of southern Uzbekistan, which has a dry subtropical climate, and the work that needs to be done to use them more efficiently in the future.
Keywords: dry subtropical, pumping stations, water resources, mudflow reservoir, agriculture, sewage.

INTRODUCTION

Surkhandarya region of the Republic of Uzbekistan is located in the southernmost part of the country between the northern latitudes 370101-390021 and the eastern latitudes 660321-680251. The region is bordered on the east and northeast by Tajikistan, on the south by Afghanistan, on the west by Turkmenistan and on the west and northwest by Kashkadarya region. The region is 20.8 thousand sq. Km. and surrounded by high mountains to the east, and only the south and southwest are open, resulting in an arid subtropical climate. Due to the southern geographical location of the region in Uzbekistan, complex orographic features, arid climatic conditions, natural population growth is much higher than the average rate in the country, the area of arable land is much higher than in rural areas [6].

The development of productive forces in the arid Surkhandarya region, which has a dry subtropical climate, depends on its access to water resources. This opportunity varies in different geographical areas of the region. The hydrography of the region is characterized by small rivers and streams in the northern and northeastern regions (foothills and mountainous areas), abundant spring water, while the southern and central areas are characterized by water shortages [8].

MAIN PART

Surkhandarya region is the largest irrigated agriculture region in Uzbekistan. There is a possibility to increase the total area of irrigated land from the current 350 thousand hectares to 500 thousand hectares. Currently (January 1, 2020) 350 thousand hectares of irrigated land are 300 thousand hectares of arable land [7]. The population's arable land is 61.4 thousand hectares, of which 42.3 thousand hectares are cultivated, 9.12 thousand hectares are orchards, buildings and structures are occupied by 10 thousand hectares. [5].

Dashnabad, Sangardak, Kofirnigon, Tupalang, Karatag, Khojaipok, Surkhan, Sherabad rivers, and partially springs are the main sources of water for the region's households and population.

To alleviate water shortages, additional water from the Amu Darya, groundwater and the Gissar canal, which is used to draw water from the neighboring Republic of Tajikistan, will be provided by pumping stations [9].

In order to improve the water supply of the farms, the Department of Irrigation Systems "Amu-Surkhan" was established, which includes the irrigation systems "Surkhan Magistral", "Tupolang-Karatag", "Surkhan-Sherabad", "Amu-Zang" and "Iskra" [11]. In total, the department has 108 pumping stations, the largest of which are "Amu-Zang-1", "Amu-Zang-2", "Bobotag", "Jaihun", "Iskra", "Sherobod" and "Kattakum". Stations [10].

In order to efficiently use and distribute water, the reservoirs "Southern Surkhan", "Uchkizil", "Oktepa", "Tupalang", "Degrez" and hydropower plants Zharkurgan, Tupalang, Sherabad have been built and are being used in the region. The project volume of 5 existing reservoirs is 1572.8 million m3, the actual volume used is 875.8 million m3, of which the useful water volume is 779.8 million m3, the water level is 100 km2, the area attached to them is 258.2 thousand hectares [4].

An average of 300-430 million m3 of conditional fresh water per year from irrigated lands is discharged into rivers and streams such as Surkhan, Bandikhonsoi, Oltinsoy, and Kizilsuv and used for re-irrigation [12]. An average of 453-508 million m3 of wastewater with a high level of mineralization is discharged annually through open, closed-bed and vertical drainage systems. [14].

Pollution of surface water sources in the region corresponds to the process of natural pollution in mountainous areas, and the process of natural pollution does not have a significant impact on water quality and its composition [13]. Pollution of water sources starts mainly from the outflow zones (cones) of rivers in the mountainous areas and is mainly related to the amount of water received for agriculture and the quality of wastewater and groundwater discharge. corresponds to However, this indicator is different in different water sources and their catchment areas and constitutes a different category of classes. In particular, the average level of mineralization of the Sherabad River is 1.6-2.3 grams per liter, which is mainly due to the melting of saline rocks. According to the analysis of samples taken from the control point of the Hydrometeorological Center in the part of the Amu Darya River passing through the city of Termez, the water pollution index varied from 0.63 to 0.95 and was class II pollution [15].

There are 12 wastewater treatment plants in the region with a total treatment capacity of more than 60,000 m3 per day [16]. The largest of them are in the city of Termez with a treatment capacity of 22.5 thousand m3 and in the city of Denau with a capacity of 20 thousand m3, which are designed for biological treatment of wastewater. These treatment facilities treat an average of 6.0-6.5 million m3 of wastewater per year. [17]. The drinking water needs of the population of cities and many villages are met mainly by groundwater sources. The level of centralized supply of clean drinking water in the region is 41.6%, and the level of sewerage is 4%.

At present, the average annual demand for irrigation water in the region is more than 4.0 billion m3, and the region receives 3.5 billion cubic meters of water a year from rivers. m3, in some years 4.5 bln. m3 of water is discharged into the Amu Darya due to lack of capacity of 800.0 million m3 or 20% of the existing reservoirs [18]. At the same time, an average of 1.5 billion m3 of water is pumped annually from the Amu Darya through several pumping stations to cover the shortage of reservoirs, and 480.0 million kWh of electricity or 30 billion soums are spent [19]. This, in turn, requires measures to increase the capacity of existing reservoirs in the rivers and to build new ones [20].

CONCLUSION

In the arid climate of the Surkhandarya region of southern Uzbekistan, we believe that the following can be achieved through the implementation of the following activities for the efficient use of groundwater resources and the improvement of water supply;

- If the projected capacity of the Tupolong Reservoir is 500 million m3, the South Surkhan Reservoir will cover the deficit of 350 million m3 of water lost as a result of sludge reduction and improve the water supply of 112 thousand hectares of land [4];

- If the capacity of the Khangaronsoy mudflow reservoir, which is under construction, reaches 10 million m3, more than 1.0 thousand hectares of dry lands in Baysun district will be provided with guaranteed water [21]. Mountain residents will be involved in the cultivation of agricultural crops and additional jobs will be created; Construction of a 40 million m3 mudflow reservoir on the Sherobod River will improve the water supply of 20,000 hectares of land, with the transfer of 4.5 thousand hectares of self-sufficient water supply to the Sherobod pumping station to 60.0 million kWh or 3.7 billion soums will be saved from the budget; [1].

- Construction of a 14.0 million m3 mudflow reservoir on the Obizarang River will improve the water supply of 6.0 thousand hectares of irrigated lands in the Sariosiyo district and create opportunities for the development of 300 hectares of new lands using drip irrigation technology; [1].

- Water shortages in these areas can be eliminated by constructing 90 million m3 of mudflow reservoirs on the Aksuv River and 7.0 million m3 of mudflow reservoirs on the Muzrabodsoy River;

- It is necessary to sharply increase the number of wastewater treatment facilities from residential areas and arable lands;

- Widespread introduction of drip irrigation technology in agriculture;

- Implementation of promising water projects by expanding the attraction of foreign investments and grants;

- Reconstruction and modernization of existing hydraulic structures, as well as the installation of modern irrigation systems and the implementation of other similar measures can solve the problem of water supply in the arid climate of Surkhandarya region.

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