

## **Nexus Demonstration Project Continues Work on Pumping Stations in Tajikistan**

Over 90% of land in Tajikistan is occupied by mountains hovering up to 7,000 meters and higher. At the same time, half of the country is located at an altitude of over 3,000 meters above sea level, and such a mountainous landscape creates the need to lift the water from rivers and canals to irrigate the land. In this regard, over 50% of the irrigated lands of Tajikistan are located in pumping irrigation zones, for which large pumping stations have been built in the country.



*Photo: Golodnostep Pumping Station - 1 in Zafarabad district of Sughd Province*

Agriculture is a major consumer of water and energy resources. The sector uses 90% of water resources and 10% of the country's total electricity consumption for pumping stations. Irrigated lands produce about 80% of agricultural products, while the sector creates jobs for 70% of the population and accounts for 20% of the country's GDP.

In Tajikistan, the total area of potentially irrigable land is estimated at more than 1.5 million hectares, 50% of which (762,198 hectares) have been developed in 2020. The rate of development of new land plots over the past 10 years averaged 1,834 hectares annually. The authorized agency is considering an increase in the area of irrigated land in the long term to ensure food security and employment of the population in rural areas, which will require additional technical resources.

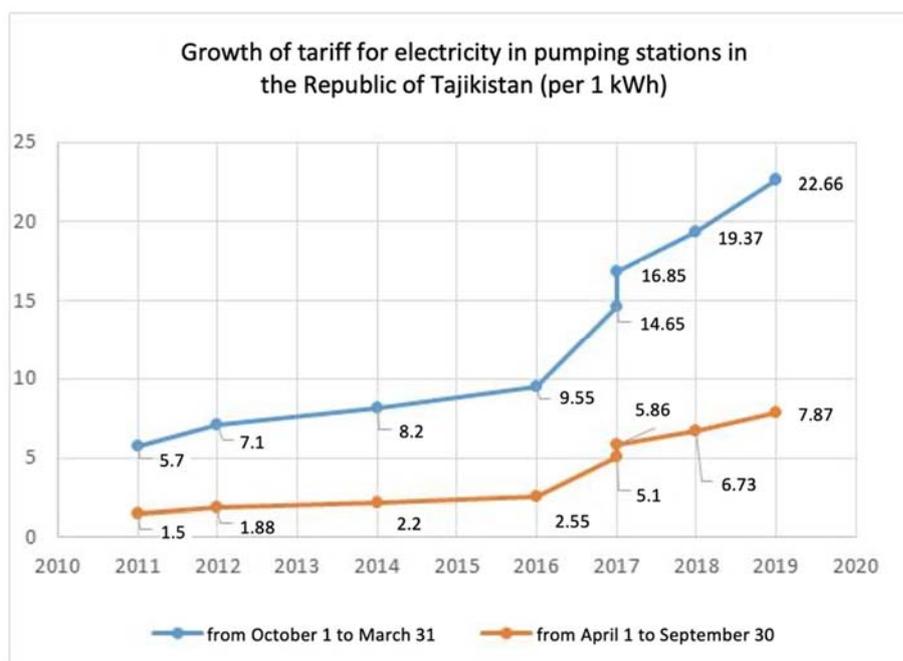
The irrigated area per capita of the country in 2020 is only 0.08 hectares, while in 1970, for example, this figure was 0.17 hectares, and in 2004 – 0.11 hectares. According to average statistical data, the annual population growth in Tajikistan is 2.2%. With such a rate of demographic growth, the population of the republic is expected to reach 11.2 million people by 2030. To maintain the level of 0.08 hectares of irrigated land per capita, it is necessary to annually develop the land covering the area of at least 15 thousand hectares, and, obviously, in the zones of pump irrigation.



*Photo: Local farmers irrigate fields in Zafarabad district of Sughd Province*

Meanwhile, pumping stations built in the 1950-1970 have noticeable wear and tear. There are no energy saving equipment at the facilities, and electric meters for measuring electricity consumption in large pumping stations are not automated, which makes it difficult to calculate the actual power consumption.

With a low solvency of end consumers of agricultural enterprises and dekhan (farm) households, the government subsidizes the electricity tariff. So, during the growing season (from 1 April to 30 September), the electricity tariff is 7.87 diram (0.69 US cents) per 1 kWh, and during the non-growing season (from 1 October to 30 March) – 22.66 diram (2.0 US cents) per kWh. Meanwhile, the tariff of farmers' water usage is 2 diram (0.17 US cents) per 1 m<sup>3</sup> of water.



*Source: Agency for Land Reclamation and Irrigation under the Government of the Republic of Tajikistan*

The cost of water production exceeds the cost of irrigation water delivery to farms by a factor of four, as the same water has to be lifted by cascade pumping stations to get it to the right height. On average, the collection rate for water supply services is 55%.

Dekhkan (farm) households, on the other hand, depend on a sustainable and planned supply of water to farmers. However, the process is not easy for farmers in pumping irrigation zones. If one or more pumping station units fail, there are interruptions in the supply of water to irrigation systems, which negatively affects the yield of agricultural crops, and farmers can incur losses.

Overall, the situation is making the irrigation sector unprofitable and may lead to instability in the water, energy and food (WEF) security of the country.



*Photos: TM-2 Canal in the Zafarabad district, the beginning of the canal on the left and a shortage of water in the middle of the right.*

Due to the lack of water that is delivered through the TM-1, TM-2 and TM-4 canals, farmers are forced to drill wells to irrigate their lands. Well drilling costs range from \$ 20,000 to \$ 25,000. However, drilling is carried out without preliminary geological surveys. As a result, certain farmers are left without water after drilling the wells and incurring costs because they still cannot access the artery of the aquifer. But some farmers are still making progress in these activities, leading to uncontrolled groundwater withdrawals and lowering aquifer levels, contributing to land degradation in the Zafarabad district, as well as drying up orchards and other crops.



*Photos: Drilling wells and dying gardens in the Zafarabad district of the Sughd Province*

In this regard, the European Union project "[Central Asia Nexus Dialogue Project: Fostering Water, Energy And Food Security Nexus And Multi-sector Investment \(Phase II\)](#)" and the project "Laboratory of Innovative Solutions for the Water Sector of Central Asia" implemented within the framework of the [Central Asia Water and Energy Program \(CAWEP\)](#), have joined forces to support the authorized bodies of Tajikistan in search for innovative solutions for the efficient operation of pumping stations.

Currently, work is underway to automate the monitoring system for electricity consumption in pumping stations at the level of the Sughd Province, where pumping stations consume up to 70% of the country's total electricity consumption for pumping stations. Additionally, there is progress in introducing energy efficient technologies in the large Golodnostep Pumping Station of the Zafarabad district in the Sughd Province.



*Photo: National experts examine 173 electricity meters in the Sughd Province of Tajikistan*

The project also involves the international pump manufacturer Grundfos, which shares international experience in improving energy efficiency with national experts.

Based on the results of this work, investment proposals will be developed in early 2022 for the automation of power consumption at pumping stations and the modernization of the Golodnostep Pumping Station. These proposals will be presented for consideration at the government level and among potential investors.

The implementation of the demo project demonstrates close coordination between two competing industries, such as energy and water resources, in the search for solutions to provide end users with water and energy resources in the medium term.



*Photo: Measurements of water and electricity consumption in the pumping station Golodnaya Stepskaya Pumping Station - 1 with the support of Grundfos*

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Photo credit: *National experts of the demo project*

Disclaimer: *This article was produced with the financial support of the European Union in the framework of the “Central Asia Nexus Dialogue Project: Fostering Water, Energy and Food Security Nexus and Multi-sector Investment (Phase II)”. Its contents are the sole responsibility of the author and do not necessarily reflect the views of the European Union.*