



AFGHANISTAN'S IRRIGATION AND HYDROPOWER PROJECTS: IMPLICATIONS FOR WATER RESOURCES MANAGEMENT IN CENTRAL ASIA

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Annotation: This study examines Afghanistan's growing role in transboundary water use in Central Asia, with particular attention to the Amu Darya basin. The research analyzes Afghanistan's geographical position, water resources, hydropower potential, irrigation needs, and the possible impact of its water-development projects on downstream Central Asian states. Special attention is given to the construction and operation of water infrastructure, including dams and irrigation systems, and their potential consequences for the quantity and seasonal distribution of transboundary water resources. The study also considers the interests of Afghanistan, Uzbekistan, Turkmenistan, and other countries sharing the Amu Darya basin.

Keywords: Afghanistan, Central Asia, transboundary waters, Amu Darya, water resources, water management.

Afghanistan's growing investment in irrigation and hydropower projects has become an increasingly important factor in the management of transboundary water resources in Central Asia. Afghanistan occupies a strategically important geographical position because several of its major rivers are connected to the wider Amu Darya basin, which is shared by Afghanistan and the Central Asian states. For decades, Afghanistan's internal conflicts and limited economic capacity restricted the development of its water infrastructure. However, the expansion of irrigation systems, construction of dams, and development of hydropower facilities have increased Afghanistan's capacity to regulate and utilize water resources. This development creates new opportunities for Afghanistan's economic growth, while simultaneously raising concerns among downstream countries, particularly Uzbekistan and Turkmenistan, whose agriculture and ecosystems depend heavily on the waters of the Amu Darya. One of the most important aspects of Afghanistan's water policy is the development of irrigation. Agriculture remains a major component of the Afghan economy and provides livelihoods for a large part of the population. However, agricultural production is highly dependent on water availability. Afghanistan has historically experienced inadequate irrigation infrastructure, inefficient water distribution, and significant losses within traditional irrigation systems. Consequently, the development of modern irrigation infrastructure has become an important national priority. New canals,



reservoirs, dams, and water-control structures can increase agricultural productivity and improve food security. At the same time, the expansion of irrigated agriculture can increase water withdrawals from rivers that cross national borders. Afghanistan was not fully integrated into the Soviet-era water management system. As a result, its increasing development of water infrastructure represents a significant change in the regional water balance. Afghanistan's construction of irrigation facilities allows it to use a larger proportion of water for domestic agricultural purposes. From Afghanistan's perspective, such projects are essential for economic reconstruction, poverty reduction, food security, and national development. From the perspective of downstream states, however, large-scale water withdrawals may reduce the amount of water available for agriculture, particularly during periods of drought or low river flow.

The Amu Darya is particularly important in this context. The river system receives water from several tributaries originating in the mountainous territories of Afghanistan and Central Asia. Historically, the countries of the region developed their agricultural systems according to the availability and seasonal distribution of these water resources. During the Soviet period, an extensive system of regional water management was established in Central Asia. Water from upstream mountainous areas was largely used to support irrigation in downstream republics. After the independence of the Central Asian states, however, the management of these shared resources became more complicated because national interests increasingly influenced water policies. Another important area is hydropower development. Afghanistan possesses considerable hydropower potential because of its mountainous terrain and extensive river systems. Hydropower projects can provide electricity to communities that have historically experienced limited access to reliable energy. They can also contribute to industrial development and reduce dependence on imported electricity. Unlike irrigation projects, hydropower facilities do not necessarily consume large quantities of water because water can continue downstream after passing through turbines. Nevertheless, dams can significantly alter the timing, storage, and seasonal distribution of river flows. Therefore, the impact of hydropower projects must be evaluated not only in terms of total water consumption but also in terms of changes in the hydrological regime. One of the most significant examples of Afghanistan's expanding water infrastructure is the development of the Qosh Tepa Canal. The canal is designed to divert water from the Amu Darya for agricultural development in northern Afghanistan. Its construction has attracted considerable attention from Central Asian countries because of its potential implications for downstream water availability. The canal demonstrates how



Afghanistan's agricultural development priorities can directly influence regional water management. If substantial amounts of water are diverted during periods of low flow, downstream countries may experience additional pressure on already limited water resources. Nevertheless, Afghanistan's water projects should not automatically be viewed as a source of conflict. They can also create opportunities for regional cooperation. Afghanistan needs infrastructure, investment, technical expertise, and stable access to energy and agricultural markets. Central Asian states, meanwhile, require predictable water flows and effective mechanisms for managing shared rivers. These interests are not necessarily incompatible. Properly designed agreements could allow Afghanistan to develop its water resources while protecting the legitimate interests of downstream countries.

A major challenge is the absence of sufficiently comprehensive and effective regional mechanisms involving Afghanistan in the management of the Amu Darya. Existing Central Asian water institutions were largely established before Afghanistan became an active participant in large-scale development of the river's resources. As Afghanistan's water use increases, it becomes increasingly important to establish mechanisms for dialogue and information exchange between Afghanistan and the downstream states. Hydrological data sharing is particularly important. Accurate information about precipitation, river discharge, reservoir levels, irrigation withdrawals, and planned water infrastructure can help countries anticipate potential shortages. Without reliable information, even technically manageable water-management issues may develop into political disputes. Regular communication between Afghanistan and Central Asian states could therefore contribute significantly to regional water security. The implications are particularly important for Uzbekistan, where agriculture depends heavily on irrigation. Uzbekistan has historically faced serious water-management challenges, including water scarcity, inefficient irrigation, salinization, and the degradation of the Aral Sea ecosystem. Any additional reduction or change in the seasonal availability of Amu Darya water could create further difficulties for agricultural production and environmental management. Turkmenistan is also highly dependent on irrigation and therefore has an important interest in maintaining predictable water supplies. International water law also provides an important framework for addressing these challenges. The principles of equitable and reasonable utilization, prevention of significant harm, prior notification of potentially significant projects, and cooperation among riparian states can provide a foundation for developing mutually acceptable arrangements. However, legal principles alone are insufficient. They need to be supported by political dialogue, technical cooperation, joint monitoring, and practical mechanisms for



resolving disagreements.

Climate change makes the situation even more complex. Central Asia is already experiencing increasing temperatures, changing precipitation patterns, glacier retreat, and more frequent periods of water stress. These changes may reduce the predictability of river flows and increase competition for water. Under such circumstances, expanding irrigation without improving efficiency could intensify pressure on transboundary Rivers. Afghanistan and the Central Asian states therefore have a shared interest in water-saving technologies, modern irrigation systems, efficient reservoirs, and climate-adaptive agricultural practices. In conclusion, Afghanistan's irrigation and hydropower projects represent an important transformation in the regional water landscape. These projects have legitimate economic and social objectives, including agricultural development, food security, energy production, employment, and poverty reduction. However, because Afghanistan shares important river systems with Central Asian states, its growing capacity to regulate and consume water has implications beyond its national borders. The development of the Qosh Tepa Canal and other water infrastructure demonstrates the necessity of incorporating Afghanistan more actively into regional water-management frameworks. The most sustainable approach is not to prevent Afghanistan from developing its water resources, but to establish mechanisms that balance Afghanistan's development needs with the water-security interests of downstream countries. Greater transparency, data exchange, joint research, efficient irrigation, international legal cooperation, and regular diplomatic dialogue can help transform potential water competition into constructive regional cooperation. In this context, Afghanistan should be viewed not only as a potential challenge to Central Asian water security but also as an essential partner in building a more sustainable and cooperative system of transboundary water management.

THE LIST OF USED LITERATURE

1. Dukhovny V. A., de Schutter J. L. Water in Central Asia: Past, Present, Future. — Boca Raton: CRC Press, 2011. — 256 p.
2. Wegerich K. Water Resources in Central Asia: Regional Stability and Sustainable Development. — London: Routledge, 2010. — 224 p.
3. Sehring J. Water Security and Transboundary Water Management in Central Asia. — Berlin: Springer, 2012. — 198 p.
4. Ahmad M., Wasiq M. Water Resources Development in Northern Afghanistan and Its Implications for Regional Water Security. — Washington, D.C.: World Bank, 2004. — 132 p.



5. Rakhmatullaev S. Water reservoirs, irrigation and transboundary water management in Central Asia, Environmental Earth Sciences. — 2010. — Vol. 59, No. 6. — 369 p.
6. Wegerich K. Hydro-hegemony in the Amu Darya Basin. Water Policy. — 2007. — Vol. 9, No. 1. — 188 p.