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# Policy brief

Impact of Afghanistan's  
Water Developments in  
Amu Darya Basin on  
Central Asia

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## Introduction

Central Asia, historically a water “hot spot” due to its geographical location, dry climate, and dynamic demography, has grappled with water-related challenges throughout its history including its post-Soviet transformations. The collapse of the unified economic system in 1991 led to independent states building national systems, significantly altering joint water planning, allocation, and management. In 1992, the five newly established Central Asian countries founded the Interstate Coordination Water Commission (ICWC) to manage regional water resources, keeping the latest Soviet time water allocation principles. However, dissatisfaction arose, leading to a hydro-political deadlock driven by differences in economic pressures and development approaches among Central Asian countries (CACs).

In the mid-1990s, upstream counties shifted reservoir operations to prioritise energy usage, leading to conflicts with downstream irrigation requirements. Efforts to reconcile these differences culminated in the Syr Darya agreement, effective only from 1999 to 2001, ultimately contributing to a prolonged hydro-political deadlock. This rendered water a sensitive and securitised domain.

The current state of Central Asia's water systems remains uncertain, marked by ongoing transformations in regional and national water institutions. The growing climate impact is ubiquitous. Droughts and water shortages affect both upstream energy production and downstream irrigation. Moreover, low efficiency of utilisation, limited availability, and potential negative climate impacts on water resources further contribute to the region's uncertain future, intensifying competition for water resources across all sectors. Amidst all these challenges, the recent introduction of the Taliban's Qosh-Tepa canal adds another dimension, heightening the stakes in the region.

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## **Taliban's Qosh-Tepa Canal in the Amu Darya River Basin**

Following the Taliban's assumption of power in Afghanistan in August 2021, the construction of the Qosh-Tepa canal started in March 2022. The canal is a crucial development initiative of the Taliban, symbolising post-US progress. High-ranking Taliban officials, as well as ordinary Afghans, regularly visit the canal, which is actively promoted through national broadcasting and social media.

The Qosh Tepa, Qush Tepa, or Khosh Tepa irrigation canal (QTC) spans 281 km in length, 100 meters in width, and reaches a depth of 8 meters. Upon completion, the canal is designed to divert or extract around 650 m<sup>3</sup>/sec, or 13 km<sup>3</sup> of water annually, from the Amu Darya River.<sup>3</sup> The intake of the canal is located on the main Amu River at the joint border of Afghanistan and Tajikistan. The canal traverses Balkh and Jawzjan provinces, connecting to the Andkhoy irrigation canal in Faryab province in northern Afghanistan. Additionally, it will facilitate water conveyance for the Andkhoy Irrigation Project in Faryab Province, potentially irrigating around 550000 to 585000 hectares of land (1.35 million acres, or 5500 square kilometers) in these provinces once operational.

However, the QTC is not a new project; its origins are Afghanistan's Economic and Social Seven-Year Plan (1955–1961). Initially conceptualised for a 200-kilometer-long canal and a 100,000-hectare irrigation scheme in the northern province of Balkh, the initial concept considered the installation of pump stations with a capacity to abstract 110 m<sup>3</sup>/sec. However, no detailed study was undertaken for this plan. The current canal, which has a 5- to 6-time larger abstraction capacity, is based on a feasibility study funded under USAID's Strengthening Watershed and Irrigation Management (SWIM) program.

The feasibility study (FS), which started in March 2018 and ended in December 2019, was conducted by Afghan Accenture Consulting Services (AACS), the consultant, in association with BETS Consulting Services Ltd., in collaboration with the Ministry of Agriculture, Irrigation, and Livestock (MAIL), the Ministry of Energy and Water (MEW), and the National Environmental Protection Agency (NEPA) under the previous Afghan government. During the pre-feasibility phase of the study, six different alternatives were proposed, some of which included storage dams and intakes on the Kukcha and Kunduz tributaries of the Amu Darya River inside Afghanistan. The estimated budget for the canal's construction is around 600 million USD, and the canal is to be constructed in three phases over nine years. The primary purpose of the QTC is to support

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<sup>3</sup> Feasibility Study Main Report (Volume I). Khush Tepa Irrigation Scheme and Power Generation (KTISPG) Feasibility Study Project. AACS Consulting in association with Bets Consulting, Kabul, Afghanistan, December 23, 2019

agriculture development in the northern provinces of Afghanistan. Once completed, QTC would be Afghanistan's most significant agriculture project.

According to the Feasibility Study, the project's irrigation demand for the proposed 600,000 ha command area is up to 13.1 km<sup>3</sup> of water annually from the Amu Darya. In addition, 10% of the mean annual flow, amounting to 3.04 km<sup>3</sup> per annum, is designated as the environmental/ sanitary flow. More than 80% of water abstraction will occur from May to September to meet the project's irrigation demand. The peak project demand is 1,103.96 m<sup>3</sup>/s and appears in June. This coincides with the regional agriculture season in downstream Uzbekistan and Turkmenistan.

### **Potential Impacts of QTC**

Qosh Tepa canal, once completed, will use a maximum of 13 km<sup>3</sup> of water from the Amu Darya River. Over 80% of this abstraction occurs during the regional planting season, putting additional strain on the limited water resources of the Amu Darya River.<sup>4</sup> The QTC would triple the use of Afghanistan's 5 km<sup>3</sup> water from the Amu Darya River. The Amu Darya River basin accounts for around half of Afghanistan's renewable water resources. Due to a lack of infrastructure and water storage capacity within Afghanistan, the country is vulnerable to the effects of recurring droughts and floods.

Afghanistan's increased use of shared water resources holds implications for neighbouring riparian countries, particularly downstream Uzbekistan, and Turkmenistan. These countries rely heavily on over 83% of the basin's total renewable water resources, primarily for agriculture. Despite a continual decline in the share of cotton in irrigated land over the last decade, the region's ecosystem has been seriously damaged. The Aral Sea, once the fourth inland sea in the world, has drastically reduced due to regional water competition and inefficient water allocation limits from the Soviet era.

In addition, Central Asia is experiencing accelerated temperature increases, twice the global average, with projections indicating rises of 2-4 degrees Celsius by 2050 and 3-5 degrees Celsius by 2080, according to the Intergovernmental Panel

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<sup>4</sup> Feasibility Study Main Report (Volume I). Khush Tepa Irrigation Scheme and Power Generation (KTISPG) Feasibility Study Project. AACS Consulting in association with Bets Consulting, Kabul, Afghanistan, December 23, 2019

on Climate Change<sup>5</sup>. This will bring additional water stress, and glaciers will melt faster, resulting in a short-term surge in waters and a severe reduction<sup>6</sup> of glacier runoff in the longer term. The river flow is anticipated to decrease between 10 to 30 percent<sup>7</sup>. The region will become more arid, especially in the western parts of Turkmenistan, Uzbekistan, and Kazakhstan<sup>8</sup>. Decreasing water flows and more frequent heat waves will harm crop productivity and food security.

The Amu Darya River's current water allocation system, based on the 1992 Almaty Agreement, needs to account for Afghanistan's potential future water use. The QTC calls into question existing uses and regional water-sharing procedures. Without cooperation with Afghanistan, the effects on downstream communities, particularly those at the ends of irrigation systems and the environment, could be exacerbated. Uncertainty about upstream planning impedes proper planning based on predicted flow fluctuations. Climate consequences and uncertainty would only aggravate these problems and impact the unstable regional water allocation systems encompassing other riparian countries in the greater Aral Sea Basin.

Agricultural water consumption surpasses 90% in both Uzbekistan and Turkmenistan. QTC is primarily designed for irrigation, with a peak abstraction of approximately 10 km<sup>3</sup>, anticipated from May to August, aligning with the regional cropping season. This heightened demand places additional strain on available water resources, particularly affecting regions at the end of irrigation systems and those cultivating less water-intensive, complicating the shift to alternative crops.

According to SIC ICWC, in dry years, the Amu Darya River basin riparian countries receive only 50% of their water needs (limits). Around 150-200 thousand irrigated lands have been abandoned in the low Amu Darya basin for

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<sup>5</sup> Lutz, A. F., Immerzeel, W. W., Gobiet, A., Pellicciotti, F., and Bierkens, M. F. P.: Comparison of climate change signals in CMIP3 and CMIP5 multi-model ensembles and implications for Central Asian glaciers, *Hydrol. Earth Syst. Sci.*, 17, 3661–3677, <https://doi.org/10.5194/hess-17-3661-2013>, 2013.

<sup>6</sup> Reyer, C., Otto, I.M., Adams, S. *et al.* Climate change impacts in Central Asia and their implications for development. *Reg Environ Change* 17, 1639–1650 (2017). <https://doi.org/10.1007/s10113-015-0893-z>

<sup>7</sup> Ahmad, Masood; Wasiq, Mahwash. 2004. Water Resource Development in Northern Afghanistan and Its Implications for Amu Darya Basin. World Bank Working Paper; No. 36. © Washington, DC: World Bank. <http://hdl.handle.net/10986/14939> License: [CC BY 3.0 IGO](https://creativecommons.org/licenses/by/3.0/).

<sup>8</sup> E. Lioubimtseva, G.M. Henebry, Climate and environmental change in arid Central Asia: Impacts, vulnerability, and adaptations, *Journal of Arid Environments*, Volume 73, Issue 11, 2009, Pages 963-977, ISSN 0140-1963, <https://doi.org/10.1016/j.jaridenv.2009.04.022>. (<https://www.sciencedirect.com/science/article/pii/S0140196309001220>)

the last decades due to the absence of regular irrigation<sup>9</sup>. Moreover, around 400,000 people already moved from the northern parts of Uzbekistan to the central parts of the country or Kazakhstan. The main reason for migration is environmental degradation and lack of water. The irrigation areas of Karakalpakistan, Khorezm, and Bukhara provinces in Uzbekistan depend entirely on the flow of the Amu Darya River and thus will be the most affected regions<sup>10</sup>. Additionally, agricultural lands in Kashkadarya (75-85%) and Surkhandarya (55-65%) will experience the consequences of reduced water availability, leading to soil degradation in arable land areas and pastures. Furthermore, a 35% reduction in Amu Darya River flow could result in a 0.7 to 6 percent GDP reduction and a loss of 250,000 jobs in Uzbekistan<sup>11</sup>.

In Turkmenistan, most irrigated areas are dependent upon water resources from the Amu Darya River. The country diverts more than 30% of the Amu Darya flow through the Karakum Canal, crucial for irrigated agriculture in regions like Lebab and Dashoguz. A reduction in river flow would likely impact rural populations and the irrigated agriculture sector, especially the state-owned cotton industry. Despite this general water shortage, Turkmenistan has heavily invested in greening its deserts through massive irrigation infrastructure such as the Karakum Canal and the Golden Age Lake<sup>12</sup>.

Salinity affects agriculture productivity and entails health and economic impacts on the populations. Water salinity is already high in the Amu Darya region, with over 50% of the irrigated lands affected by soil salinity in Uzbekistan<sup>13</sup>. This number is even higher in Turkmenistan<sup>14</sup>. According to a study by the World

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<sup>9</sup> <http://www.cawater-info.net/amudarya>

<sup>10</sup> Gafurov et al. Impacts of Qosh Tepa Canal on the Agriculture Sector in Uzbekistan, June 2023, Policy Study Uzbekistan, German Economic Team (<https://www.german-economic-team.com/uzbekistan>)

<sup>11</sup> *ibid*

<sup>12</sup> Collado E. R, Water War in Central Asia: The Water Dilemma of Turkmenistan, 2015, Geopolitical Monitor ([Water War in Central Asia: the Water Dilemma of Turkmenistan | Geopolitical Monitor](#))

<sup>13</sup> Hamidov, A et al. Operationalizing water-energy-food nexus research for sustainable development in social-ecological systems: An interdisciplinary learning case in Central Asia. *Ecol. Soc.* 2022 (<https://doi.org/10.5751/ES-12891-270112>)

<sup>14</sup> UNECE, Environmental Performance Review of Turkmenistan reveals soil salinity, waterlogging, land degradation and biodiversity losses are top environmental challenges for the country, 2012, (<https://unece.org/press/environmental-performance-review-turkmenistan-reveals-soil-salinity-waterlogging-land>)

Bank, 10-15% of the total water used for agriculture in Uzbekistan is used for salt leaching<sup>15</sup>.

The decline in water quantity caused by QTC's water withdrawal will likely exacerbate water quality degradation in the basin. The land topography on the right side of the QTC, where most irrigation is planned, may allow agricultural drainage and return water to flow back into the Amu Darya River. This could result in further water quality degradation in downstream regions of the basin. Additionally, due to the sandy nature of the soil along the canal, water delivery efficiency, water logging, salinity, and groundwater quality deterioration (Arsenic, Fluoride, and other heavy metals) could emerge as new environmental challenges in the Amu Darya River basin.

According to the World Bank, one-third of the population in Central Asia, totalling 22 million, already lacks access to safe water<sup>16</sup>. Around one-third of Uzbekistan's population (rural and urban) lives in areas dependent on irrigation water supply from the Amu Darya River. Around 47% of the population in Turkmenistan is employed in the agriculture sector. Currently, 7.8 million people live in districts of Uzbekistan, which could be affected by the QTC canal water withdrawals. Populations in these regions are expected to increase to 8.7 million by 2030 at current population growth rates.

A report by a German economic team indicates a possible loss of 250,000 jobs in Uzbekistan in the case of 25% of water intake by QTC<sup>17</sup>. The most vulnerable populations are in areas highly dependent on the water flow of the Amu Darya, such as Khorezm and Karakalpakistan. These regions, already experiencing high out-migration, may face increased risks and out-migration pressures due to additional water stress. Among vulnerable groups, such as female-headed households, the impact includes higher risks of drought-induced losses in productivity, reduced agricultural yields, limited access to clean drinking water, and fewer coping alternatives.

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<sup>15</sup> A Akramkhanov, A Akbarov, S Umarova, QB Le 2021. [Agricultural Livelihood Types and Type-Specific Drivers of Crop Production Diversification: Evidence from Aral Sea Basin Region](#). Sustainability 15 (1), 65

<sup>16</sup> Jennifer J. et al. Central Asia: at the confluence of global water action and climate resilience Dushanbe conference to emphasize role of water in sustainable development, 2022, The World Bank Water Blog ([Central Asia: at the confluence of global water action and climate resilience Dushanbe conference to emphasize role of water in sustainable development \(worldbank.org\)](#))

<sup>17</sup> Gafurov et al. Impacts of Qosh Tepa Canal on the Agriculture Sector in Uzbekistan, June 2023, Policy Study Uzbekistan, German Economic Team (<https://www.german-economic-team.com/uzbekistan>)

The adverse impacts on women, particularly in rural areas reliant on agriculture, are already highly vulnerable to economic exclusion, which will be exacerbated in the affected areas. The informal and seasonal work in agriculture, for instance, during cotton harvest season, offers a few opportunities for women to earn cash income despite challenges related to poor working conditions and fair payment for the picked cotton.

### **Concluding remarks and recommendations**

As an upstream, latecomer country, Afghanistan's attempt to develop water resources is seen as a zero-sum game in the regional context. Premature water-sharing agreements were deemed limiting for Afghanistan's future use of shared rivers due to scarce water resources. On the other hand, the Afghan government is investing in the independent development of shared rivers to secure public support and strengthen its population base. Years of deprivation, underdevelopment, transit route closures, and mistreatment of Afghan refugees in neighbouring countries have fuelled public support for such projects in Afghanistan.

The Amu Darya basin is already faced with increasing challenges of water availability due to excessive water withdrawal and competition. Climate change projections cast an uncertain situation in the short and medium term. The QTC will further increase these pressures. The existing regional platforms are currently unable to address these challenges effectively. However, these shared challenges can create space for collaboration and mutual benefits in various ways and provide a common ground for identifying shared opportunities.

The repercussions of water withdrawal from the Amu Darya will impact Central Asian countries, especially Turkmenistan and Uzbekistan. Reduced water availability may affect the riverbanks and incur additional costs for pumping water to irrigation canals of both countries. Moreover, the absence of high productivity and technological agriculture in Afghanistan further complicates improving the water situation.

Multi-track actions are required to establish sustainable water relations between Central Asia and Afghanistan. The **first track** involves improving agriculture cooperation, providing agricultural inputs, extending support for productivity in existing irrigated areas, and promoting responsible water use. It is essential to provide extension support and advocate for increasing the productivity of old irrigated areas, avoiding the development of newly irrigated, low-productivity lands, and supporting increasing water access for old-irrigated sites.



The **second track** focuses on increasing trade and supply of food products to Afghanistan, improving energy supply, and training Afghanistan's technicians, engineers, and water and agriculture specialists. It also supports agriculture universities and sets up communities of practice groups between Central Asia's expert groups and Afghanistan. Finally, it starts joint research on potential water improvements and opportunities for climate-proof water management in Afghanistan.

The **third track** emphasises developing a political-diplomatic platform for crafting regional/basin or/ bilateral water agreements between Central Asian countries and Afghanistan. As a start, UNRCC or international projects such as Green Central Asia (Germany) and Blue Peace (Switzerland) could be used for the Afghanistan- Central Asia water dialogue series to develop a framework for water cooperation. The International Fund for Aral Sea (IFAS) could serve as an institutional framework for the inclusion of Afghanistan into Central Asia water cooperation activities.