

Drinking Water Supply and Sanitation in Central Asia



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Abstract

Drinking water accounts for merely 7% of total water consumption in Central Asia, but its supply plays a special priority role in sustainable development. Drinking water is a critical health factor. However, the poor technical condition of water supply and treatment facilities in all countries of Central Asia (*depreciation: up to 80%*) prevents their proper operation, making it impossible to produce drinking water of high quality. The sector suffers from high water loss (*up to 55%*), with 9.9 million people (*13.5% of total population*) having no access to safe drinking water. Achievement of SDG 6 in Central Asia is possible if a \$2 billion infrastructure financing gap is closed every year in 2025–2030. International financial institutions, multilateral development banks, and development agencies can contribute to reducing the investment deficit in the water supply and sanitation sector. One of the possible solutions is to mobilise private capital and management expertise of major players (*including through public-private partnerships*). It is advisable to enforce balanced investment planning strategies and policies, review tariffs, increase the R&D and educational potential of the water sector, etc.

Keywords: Central Asia, water resources, water security, agriculture, water supply, sanitation, water conservation.

JEL: F15, L66, N55, Q53, L95, Q25.

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SUMMARY

Access to high-quality drinking water and sanitation is an internationally recognised basic and **fundamental human right**. The share of drinking water supply in total water intake is rather modest, with utility and drinking water accounting for a mere 7% of total water consumption in Central Asia (*Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan, collectively "CA"*), and 13% of global water consumption. Still, it plays a special and **priority role** compared with the other types of water use. The quality of drinking water is a critical health factor. According to the WHO, 90% of diseases in developing countries are caused by consumption of poor-quality drinking water or a failure to comply with sanitary and hygienic rules and standards during the operation of utility water supply systems. Access to quality drinking water has significant economic returns, as high as 7 to 1 in developing countries. For the CA region, this indicator is estimated at 3 to 1 and **this value is explained, compared to other developing countries**, by the presence of more developed infrastructure and high rates of access to safe drinking water in cities, etc.

However, water security in many regions of the world is currently **under threat**. According to the UN, about two billion people have no access to safe drinking water, and 3.6 billion people have no access to safe sanitation. More than 40% of people in the world live in regions with a critical shortage of water. More than 80% of domestic wastewater in developing countries is dumped into rivers and seas without treatment. Water pollution undermines the security of global water supply. It is projected that by 2050 about 33% of the world's river sub-basins will be affected by water scarcity caused primarily by water pollution, as well as by hydrologic and climatic factors. Economic activity in these regions (which occupy 32% of the global land surface, and are home to 80% of the world's population) is accompanied by intensive pollution of both surface and ground water sources. Another important issue is joint management of water resources in transboundary river basins.

The situation will be **getting worse** over the long term. By 2050, drinking water consumption will increase by 50–63%. The key driver is the growth of the population, especially urban population: by 2050, 70% of people in the world will be living in cities. Water supply, in turn, will be affected by the adverse impact of climate change, ageing infrastructure, and declining water quality. That is why water security and sustainable sanitation are the key areas covered by Sustainable Development Goal (SDG) 6.

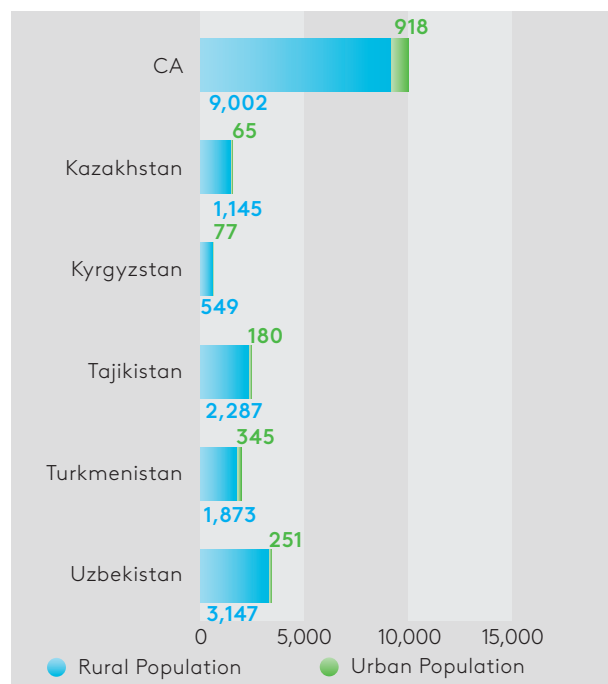
In CA, the challenges involving drinking water access and purification are **even more formidable**. The region is situated in an area of mounting water stress. By 2028, it will have reached the stage of chronic water shortage. The consequences of that will impact all sectors of the economy: agriculture, industry, public utilities, and drinking water supply. The water supply and sanitation sector is critically affected by:

- climate change;
- anticipated population growth and rapid urbanisation;
- ageing infrastructure;
- deteriorating water quality;
- outdated water management practices, etc.

Today, **9.9 million people, or 13%** of the CA population, have no access to safe drinking water (see [Figure A](#)). In 1994–2020, intake of water for utility and household purposes

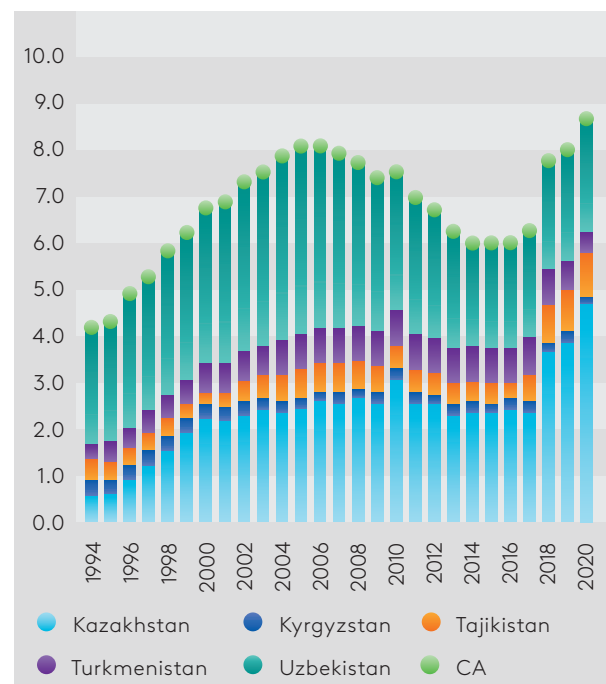
increased twofold to reach 8.6 km³ (see Figure B), while investments in drinking water supply infrastructure failed to cover that consumption growth. As a result, water supply infrastructure and sanitation equipment wear and tear is extremely high. Wear and tear of water supply and sanitation networks in Central Asia is estimated at up to 80%. Physical and commercial water losses in distribution networks can be as high as 55%. In all CA countries, the poor state of repair of water supply and sanitation infrastructure facilities impedes their proper operation, making it more difficult to produce high-quality drinking water.

↓ Figure A. Number of People Without Access to Safe Drinking Water in CA, 2020, thousand people



Source: compiled by EDB experts using data provided by AQUASTAT, 2024.

↓ Figure B. Water Intake by the Utility and Household Sector in CA, km³/year, 1994–2020

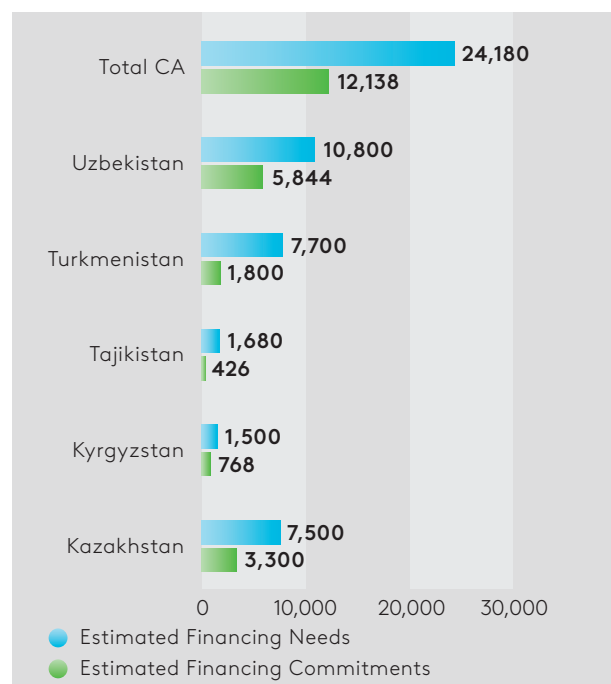


Source: compiled by EDB experts using data provided by AQUASTAT, 2024.

Many problems that the CA countries are facing in the water supply and sanitation sector have persisted for quite a long time. With the formation of independent Central Asian states, decentralisation of management of water supply and sewerage systems intensified with their transfer to local municipal ownership and transition to market conditions of economic management. That gave rise to major organisational, economic, financial, institutional, and legal challenges. Due to the impact of objective political, social, and economic factors that are typical for emerging economies, the CA countries experienced difficulties with the implementation of water supply improvement programmes, with four to six such programmes being approved in each of those countries over the last 30 years.

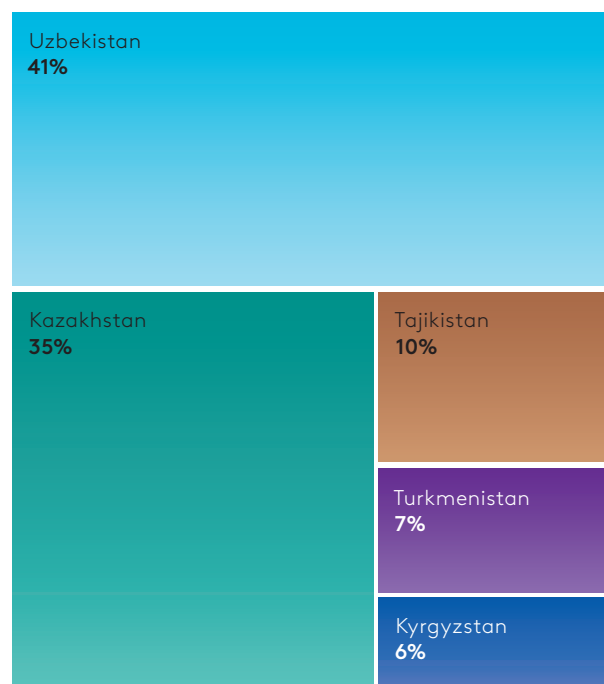
An analysis of water supply and sanitation sector development plans and programmes adopted in CA shows that the proposed scope of their **financial support** is clearly **insufficient to ensure achievement of SDG 6** by 2030. A comparison of planned (anticipated) and projected 2025–2030 funding commitments leads to the conclusion that the region is facing a deficit of more than \$12 billion for the entire period, or about \$2 billion per year (see Figure C). The largest financing shortfall among the countries of the region is expected to occur in Uzbekistan: \$826 million per year, or almost \$5 billion in 2025–2030 (see Figure D). A major financing shortfall is projected for Kazakhstan at \$700 million per year, or \$4.2 billion in 2025–2030. In Tajikistan, the financing shortfall will be rather significant given the size of the country's economy, reaching \$209 million per year, or more than \$1.2 billion in 2025–2030.

↓ Figure C. Estimated CA Financing Shortfall, 2025–2030, \$ million



Source: compiled by EDB experts using data provided by the UN and government agencies.

↓ Figure D. CA Financing Shortfall Structure, 2025–2030



Source: compiled by EDB experts using data provided by AQUASTAT, 2024.

The main challenges faced by the CA water supply and sanitation sector are in the following domains: **institutional and legal (governance-related); financial and economic; and technical**. Accordingly, any viable solution requires an integrated approach. The proposed measures, when taken together, form a **general conceptual framework** that can be used to deal with the problems of the CA water supply and sanitation sector.

At the **institutional and legal level**, we suggest that the regulators take the following nationwide steps:

- **Create a mechanism to enable intersectoral coordination** among authorised central and local government bodies and the sector's companies. The new body may design infrastructure facilities, supervise their construction, and introduce modern management methods. Its most important tasks will be to implement international financial and human resources management standards, as well as boost the effectiveness of tariff and investment policy tools in order to gradually increase the profitability of water supply and sanitation companies.
- **Boost the R&D potential** of the water supply and sanitation sector. With higher quality at all project stages, from feasibility studies to detailed design, as well as effective supervision of construction sites, the countries can slash corruption while reducing budget expenditures and water facility construction and operating costs.
- **Train more specialists** in all technical and chemical engineering fields, taking into consideration the urgent need to protect water resources from pollution and improve the quality of drinking water. Those specialists should have extensive knowledge of industry-specific water preparation and wastewater treatment issues. An important prerequisite of safe provision of water supply and sanitation services is the availability

of qualified personnel capable of mastering advanced management, financing, operating, and maintenance methods.

- **Protect surface and ground water sources**, as well as river basins. These matters should be prioritised by all national strategies. The proposed solution is to use economic tools to combat water pollution (for example, by penalising polluters with additional taxes and fines), find ways to effectively promote clean technologies and innovations, and provide financial support to projects envisaging purification of water and restoration of water resources.

Several action plans proposed at the **regional level** could be implemented within the framework of the International Fund for Saving the Aral Sea (IFAS).

- Considering the compelling need of the CA countries for Official Development Assistance (ODA), the IFAS should occupy an increasingly prominent place on the regional agenda. **Coordination of efforts aimed at achieving SDG 6** should become one of its primary objectives. To deal with international water use issues, it will be necessary to find new co-operation mechanisms and tools to be employed in transboundary river basins.
- To resolve critical HR issues, it is necessary to strengthen regional co-operation in the area of personnel training. A **special HR program**, complete with all requisite financing and implementation mechanisms, can be adopted under the aegis of the IFAS as part of the Aral Sea Basin Programmes package (**ASBP-4**).
- It is necessary for the IFAS, in co-operation with the UNESCAP and the UNECE, to develop a **Water Supply and Sanitation Programme** that will benefit the **residents of the Aral region** who have suffered from the Aral catastrophe, and set up a consortium of international banks. When creating the consortium for the construction of large-scale water supply and sanitation facilities, it is necessary to rely on international best practices as well as experience accumulated by the CA countries in the course of their co-operation in the IFAS format.
- It would be advisable to establish a PPP-based **head organisation for the provision of design and consulting services** to the CA water supply and sanitation sector. That organisation could coordinate design activities across CA, pursue uniform scientific and technological policies in that sphere, and interact with donor countries and MDBs by providing them with up-to-date information on water supply and sanitation projects together with related feasibility studies.

The CA countries are facing a major challenge: they **need to raise financing** for the water supply and disposal sector. We suggest that the following practical steps be taken at the **financial and economic level** taking into account existing international experience and our assessment findings.

- The financing gap can be reduced by **actively attracting funds from international financial organisations**, multilateral development banks, development agencies, etc. (IFIs). These institutions wield significant potential to finance the CA water supply and sanitation sector. At this time, the sector accounts for only 6% of total IFI-approved sovereign financing provided to the CA countries, with 147 projects costing \$4 billion (out of a total of \$67.5 billion) completed in 2008–2023. However, as the sector's investment appeal improves, IFIs may seek more active engagement in its financing. Besides, great potential is also available in the **non-sovereign financing** segment.
- The CA water supply and sanitation sector needs private investments and large players. To attract those, it will be necessary not only to modify the existing ownership and governance structure, but also to create conditions conducive to effective development of market relations in that area. It is becoming increasingly important to **strengthen the public-private partnership (PPP) institutions**. With PPPs playing a more active role in the water sector, state and private structures will be able to co-operate in a more productive fashion. Expansion of the water services market will boost competitiveness and improve operating efficiency of individual companies. The availability of strong PPP institutions is likely to encourage private operators to join water sector projects. The advent of private players, including transnational corporations (TNCs), will help the CA countries to gain access to innovations, technologies, and experience required to modernise the sector.
- The CA countries should **improve their tariff systems**. With current water tariffs in the region being extremely low, the CA countries can partially hike them to improve the financial sustainability of their water supply and sanitation companies. This will stimulate investments in the development of infrastructure and improve the quality of services. The CA countries can also delegate their tariff approval and review functions to the companies operating in the sector, with control functions vested in local governments or independent regulators. International best practices indicate that it is important for water supply and sanitation companies to keep state support in the form of subsidies and soft loans, and preserve targeted subsidies for low-income and socially disadvantaged groups of the population.

The implementation of investment projects in the water supply and sanitation sector can produce a significant economic impact. **Investments are vital for human health, education, and social well-being**. They also have a multiplier effect. For CA, it is estimated at **\$3 per \$1** of investments. Adequate water supply, water disposal (sanitation), and wastewater treatment have a beneficial effect on people's health, the economy, and the natural environment. Access to clean drinking water supply and sanitation reduces health risks, frees up time for education and other productive activities, and increases the productivity of the labour force.

At the **technical level**, it would be advisable for the CA countries to carry out certain priority activities in their villages and cities.

First and foremost, considering the urgency of the matter, it is necessary to ensure reliable **supply of drinking water to people living in rural areas**, as the share of the rural population is likely to remain significant throughout the region. In many situations where there is a need to provide primary access to clean water supply and sanitation, the following simple and proven solutions may be employed:

- **Monitor the sanitary status of small rivers**, and protect them from pollution and depletion;
- **Switch from open water bodies to ground water sources**. This will improve the quality of drinking water and reduce the risk of pollution. It is important to deploy monitoring systems to control the quality and amount of ground water;
- **Switch to local systems** to purify, decontaminate, and condition drinking water in places where its users are located. This will ensure safe water access without lengthy transportation and storage. It is necessary to install desalination plants of various types and designs in areas experiencing a shortage of fresh ground water;
- **Create shared water supply systems** with an economically optimal range of operation. This will improve access to water for agricultural needs.

The population of the region's **cities** is growing, and their urban infrastructure is evolving. However, old systems are becoming obsolescent and incapable of meeting the needs of a modern society. Stable operation of urban and rural water supply and sanitation systems depends on reliability and a good state of repair of pipelines — their most capital-intensive and vulnerable component. It is necessary to do the following:

- **Upgrade the existing water pipelines, distribution networks, and treatment facilities**: in particular, replace worn-out pipes and obsolescent equipment, build modern integrated treatment facilities, etc. This will increase the efficiency and reliability of the water supply;
- **Use state-of-the-art technologies and long-lasting materials**, such as spheroidal graphite cast iron (ductile iron) and PE100 polyethylene. This will reduce maintenance costs and prolong system service lives. When restoring the throughput capacity of corroded water conduits, it is possible to prevent further degradation and extend their service lives by applying sand/cement lining;
- With the deployment of information technologies, **create a system for integrated continuous network control and rapid monitoring** of nationwide metering of water consumption and water losses, including prompt detection and elimination of leaks. This will reduce energy consumption and commercial water losses to an economically viable level;
- **Upgrade the existing industrial production base** by incorporating relevant projects in investment programmes to strengthen the region's science and research potential, and organise local production of modern equipment for the water supply and sanitation sector.