THE STATE OF WATER RESOURCES AND WATER SUPPLY SYSTEMS IN THE CONTEXT OF GLOBAL CHALLENGES AND UZBEKISTAN'S NATIONAL STRATEGY

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Abstract. Water security in the XXI st century has transformed from an environmental issue into a key factor in global macroeconomic stability, directly affecting national security. Today, access to clean drinking water is fundamental to life, supporting food systems, economic growth, and the health of nations and ecosystems. However, anthropogenic pressures and climate change have led to a crisis in the global water sector. In particular, in the Republic of Uzbekistan, located in an arid zone (an area dominated by deserts and semi-deserts, author's note) with limited water resources, issues of rational water use and modernisation of water supply infrastructure are of existential importance.

Access to safe drinking water and sanitation remains a pressing issue for billions of people around the world. This is not just a matter of inconvenience – it is a matter of

life and death. Speaking at a meeting of the Human Rights Council, UN Deputy High Commissioner for Human Rights Nada Al-Nashif reminded us of this, emphasising that. There is nothing more fundamental than water, she said. «And yet more than 2 billion people do not have access to safe drinking water, and 3.4 billion do not have adequate sanitation».

Global trends and implementation The Sustainable Development Goals adopted in 2015 identified 17 pressing global goals that contribute to solving many problems. In particular, Sustainable Development Goal 6 addresses the issue of 'Clean Water and Sanitation' as a fundamental imperative aimed at ensuring universal access to water resources and their rational use. Water is seen not simply as a natural resource, but as the basis of life, a critical factor for the functioning of food systems, economic growth and the maintenance of the planet's biosphere. However, current dynamics indicate the existence of deep structural imbalances and risks.

Despite the progress achieved between 1990 and 2015, the proportion of the population with access to improved sources rose from 76% to 90%, absolute deprivation rates remain high.

Here are some facts: more than 2 billion people still do not have access to safe drinking water supplies. In Central Asia, for example, this figure stands at 9.9 million people, or 13.5% of the population; the sanitation situation is even more critical. Around 3.6 billion people live without access to adequate sanitation services, and 2.4 billion do not even have basic sanitation facilities. This has serious medical and demographic consequences: every day, around 1,000 children die from diarrhoeal diseases caused by water supply and sanitation problems, and the annual child mortality rate for these reasons reaches 400,000 cases; the problem of water scarcity is highly geographical in nature. More than 40% of the world's population lives in regions experiencing water

shortages, and this situation is expected to worsen. By 2050, water shortages are expected in 33% of the world's river sub-basins due to climatic factors and pollution.

Below are facts from the official website 'Sustainable Development Goals'. Access to safe water and sanitation and the rational use of freshwater ecosystems are of paramount importance for human health, environmental sustainability and economic prosperity.

Three out of ten people worldwide do not have access to safe managed drinking water sources, and six out of ten do not have access to sanitation services.

At least 892 million people worldwide continue to practise open defecation.

Women and girls are responsible for collecting water in 80 per cent of households without access to water.

Between 1990 and 2015, the proportion of the global population using improved drinking water sources increased from 76 per cent to 90 per cent.

More than 40 per cent of the world's population faces water scarcity, which is projected to worsen. Currently, more than 1.7 billion people live in river basins where water consumption exceeds the capacity to replenish water supplies.

2.4 billion people do not have access to basic sanitation services such as toilets or equipped cesspools.

More than 80 per cent of wastewater generated by human activity is discharged into rivers or seas without any treatment.

Every day, around 1,000 children die from preventable diarrhoeal diseases caused by problems with water supply and sanitation.

In the modern period, the Republic of Uzbekistan is in a zone of high water stress, which is due to its arid climate, the transboundary nature of its main waterways, and intensive demographic growth. The current situation is characterised by a growing imbalance between water supply and water consumption, exacerbated by infrastructure

degradation. The data presented indicate a critical trend in the country's water balance. In particular, according to World Bank forecast models, a ‘convergence of supply and demand’ is expected by 2050. Water demand is projected to increase from the current 59 km³ to 62–63 km³ per year. This is due not only to population growth, but also to the needs of irrigated agriculture, which remains the dominant consumer of water resources in the region. Available water resources are expected to decline from 57 km³ to 52–53 km³ per year. The main drivers of this process are climate change (melting of the Tien Shan and Pamir glaciers, changes in precipitation patterns) and anthropogenic pressure in the countries of the upper Amu Darya and Syr Darya rivers. A comparison of forecast values indicates a potential fivefold increase in water scarcity by 2050. This poses existential risks to food security and requires a transition from an extensive water use model to an intensive one based on the principles of integrated water resources management.

In the context of growing water scarcity, exacerbated by climate change, with warming in the region occurring at a rate exceeding the global average, the Republic of Uzbekistan is implementing a systematic transformation of the water sector. This transformation is enshrined in Presidential Decree No. PP-436 and the Uzbekistan 2030 Strategy, representing a transition from extensive water consumption to an intensive model based on digitalisation and resource conservation.

Today, agriculture remains the main consumer of water resources in the region, so improving irrigation efficiency is a national security imperative. In particular, according to the state programme, the priority goal is to introduce water-saving technologies on an area of up to 1 million hectares. The dynamics of the process show exponential growth: since 2021, the area covered by drip irrigation systems has already tripled. The transition to drip irrigation and sprinkler irrigation makes it possible to mitigate the risks associated with the projected reduction in available water resources

from 57 to 52–53 km³ by 2050, while demand continues to grow. It also contributes to higher yields and lower production costs through the rational use of fertilisers and fertigation.

It should be noted that the set of measures being implemented in Uzbekistan indicates the formation of a new water use model based on the synergy of state regulation (introduction of standards, tariff setting), international cooperation (transfer of technologies and standards) and private initiative (start-ups, innovations). The success of this strategy by 2030 will depend on the pace of infrastructure renewal and the depth of digital technology penetration in the agricultural sector.

The analysis confirms the scientific validity of the theses presented in the text. The global water crisis is systemic in nature and is caused by a combination of climate change, population growth and chronic underfunding of infrastructure. Overcoming these imbalances requires a paradigm shift in management, from ‘supply management’ to ‘demand management’ and the attraction of private capital through public-private partnership mechanisms.

LIST OF SOURCES USED

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2. Drinking water supply and sanitation in Central Asia. Report by the Eurasian Development Bank. 2024.

3. Internet resource: https://news.un.org/ru/story/2025/06/1465681

4. Internet resource: https://hdr.undp.org/system/files/documents/hdr2015reportru.pdf