Azerbaijan TECHNICAL University

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AZERBAIJAN TECHNICAL UNIVERSITY

UI GREENMETRIC REPORT

REPORT ON WATER

2024

Introduction

Water is one of the most critical natural resources essential for life, economic development, and ecosystem health. Azerbaijan, a country that experiences significant seasonal variations in precipitation and is heavily reliant on both surface and groundwater sources, faces the dual challenge of managing water scarcity and pollution. In light of this, Azerbaijan Technical University (AzTU) has emerged as a leading educational and research institution actively working towards sustainable water management. As the university prepares the next generation of environmental engineers, it ensures that students are well-versed not only in theoretical knowledge but also in practical applications of water conservation and wastewater treatment technologies.

The university's initiatives range from installing water-efficient infrastructure to applying modern scientific techniques for water quality monitoring. Through international collaborations, national conferences, and integration of global standards into the curriculum, AzTU provides a comprehensive response to the water crisis. The development of innovative filtration and wastewater recycling systems, combined with data collection, monitoring and public engagement, positions AzTU as a beacon of best practices in the region. This report outlines these efforts and offers insight into how the institution contributes to the national and global vision of sustainable water resource utilization.

References

UI GreenMetric

National Information Portal on Sustainable Development

AzTU Sustainability

Objectives

- To ensure the sustainable use of water resources within the university campus.
- To implement effective water recycling programs.
- To monitor and improve the quality of both potable and waste water.
- To raise awareness among students and staff about water conservation.
- To comply with national and international standards for water quality and treatment.

- To contribute to Azerbaijan's environmental goals, including the 2024 "Year of Solidarity for the Green World" initiative.

Keywords

Water conservation	**Wastewater treatment**	**Azerbaijan Technical University**	**Ecological engineering**	**Environmental protection**
SDG 6	SDG 14	Water reuse	Marine pollution	Water quality indicators
Microbiological analysis	Chemical pollutants	Water standards	Azersu	Activated sludge
Anaerobic treatment	Aerobic treatment	Caspian Sea	Nabran	Irrigation reuse
Sustainable infrastructure	Student education	Climate change	Mechanical filtration	Gabala reservoir
Public water supply	Environmental monitoring	Greywater recycling	Wastewater infrastructure	Smart water systems

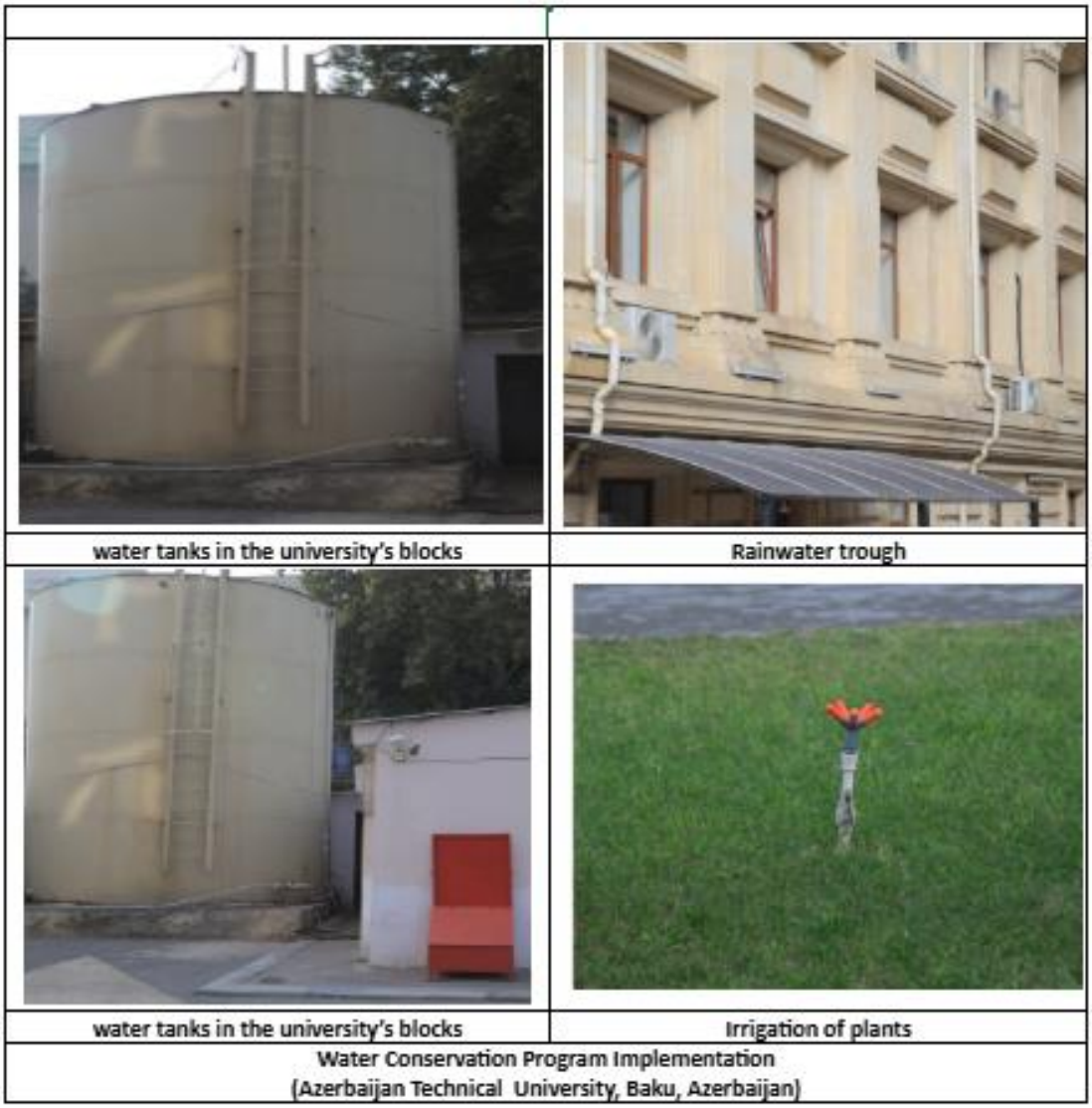
Current Situation

Azerbaijan Technical University (AzTU) has implemented several initiatives to manage water usage effectively. The campus utilizes one underground water tank and 13 building-level water reservoirs, supported by water meters that monitor monthly usage—approximately 3000 m^3 of treated water. Wastewater generated on campus undergoes mechanical and biological treatment processes before being reused for landscape irrigation, especially during dry summer months when rainwater harvesting is limited. These efforts help reduce freshwater demand and minimize environmental impact.

Additionally, AzTU collaborates with national institutions to monitor marine and inland water quality. Water samples from the Caspian Sea (Nabran region) are regularly tested in partnership with the Hygiene and Epidemiology Center, with increased frequency during the beach season. The university also integrates water quality education into its curriculum and aligns its practices with national standards

(e.g., AZS 929:2023) and global frameworks, ensuring that both academic and operational activities contribute to sustainable water management.

Water Source and Filtration



The university's drinking water is sourced from the Gabala reservoir. Though filtered, it is not considered safe to drink directly from the tap; thus, additional mechanical filters are used. Water is stored in one underground tank and 13 block-specific water tanks.

Water Usage

The average treated clean water usage is 3,000 m³ per month. Water meters monitor monthly consumption.

Water Efficient Appliances

Water Efficient Appliances Usage (Azerbaijan Technical University, Baku, Azerbaijan)

Appliance	Total Number	Efficient Units	Efficiency (%)
Toilet	250	150	60%
Washbasin (Wastafel)	150	100	66%

Average Efficiency: 63%

Wastewater Recycling

Wastewater is being treated and reused for plant irrigation, especially during dry summer months. Rainwater harvesting is not viable due to limited summer rainfall.

Water Quality Education

AzTU includes water quality education in its “Ecological Engineering” and “Environmental Protection” programs. Students are trained in physical, chemical, and microbiological testing methods.

Monitoring and Conferences

The university regularly organizes conferences and workshops, such as: “Water Resources in Azerbaijan: Problems and New Challenges” (Sep 27–28, 2024). Collaboration with government bodies like Azersu ensures compliance with national water standards.

Wastewater Treatment Process

Mechanical and biological treatment methods are used. Mechanical treatment removes large solid particles. Biological treatment includes both aerobic and anaerobic processes using microorganisms to break down pollutants.

Pollution Control and Marine Monitoring

The university's economic affairs department oversees incident management and system maintenance. Monitoring of the Caspian Sea water quality in Nabran is conducted with hygiene and epidemiology centers. Efforts are aligned with marine pollution prevention policies.

Future Goals

Looking forward, Azerbaijan Technical University (AzTU) aims to elevate its role in national and regional water sustainability through innovative, research-driven, and community-centered strategies. One major objective is to digitize water management infrastructure by integrating smart sensors and real-time data systems for tracking water quality, leakage, and usage efficiency across the entire campus. This digital monitoring will enable proactive maintenance and reduce unnecessary water loss.

AzTU also plans to expand its wastewater recycling capabilities by incorporating advanced filtration technologies such as membrane bioreactors (MBRs) and UV disinfection systems. Pilot projects will focus on greywater reuse in non-potable applications like cleaning, irrigation, and toilet flushing—effectively lowering the demand for treated freshwater. Additionally, the university envisions constructing a model eco-campus block that fully operates on recycled water, powered by renewable energy and monitored by AI-based control systems.

In the academic sphere, AzTU will increase interdisciplinary research funding in areas such as hydroinformatics, water-energy nexus, and circular water systems. Collaboration with international universities and environmental organizations will help promote student exchanges, joint studies, and applied research projects. Special workshops and innovation competitions will be organized to engage students in designing scalable solutions for water conservation and pollution control.

Finally, AzTU will strengthen policy dialogue with local authorities and NGOs to influence broader regulatory frameworks related to water governance. Community outreach programs, awareness campaigns, and training modules will be launched to spread knowledge about water-saving behavior and the importance of protecting water ecosystems. Through these strategic efforts, AzTU intends to emerge as a national leader in sustainable water innovation by 2030.

Conclusion

Azerbaijan Technical University's proactive approach to water management serves as a model for academic institutions seeking to integrate sustainability into their operations and curriculum. Through a combination of infrastructure investments, academic programs, and community outreach, AzTU demonstrates that higher education can play a central role in environmental stewardship.

The university's emphasis on both theoretical and applied knowledge ensures that graduates are equipped to tackle real-world water challenges. Its participation in national initiatives, compliance with international standards, and contribution to scientific literature highlight its leadership in the field.

As global water stress intensifies, institutions like AzTU are critical in driving research, innovation, and policy advocacy. Through continued investment in its people, technology, and partnerships, AzTU is committed to creating a resilient and sustainable water future for Azerbaijan and beyond.