Mingachevir State University

Report

14 LIFE BELOW WATER

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Introduction

The main purpose of this report is to systematically present the activities, initiatives, and achievements of Mingachevir State University (MSU) in relation to the United Nations Sustainable Development Goal 14 – "Life Below Water." The report covers the university's efforts in protecting aquatic ecosystems, ensuring biodiversity sustainability, promoting the efficient use of water resources, and enhancing students' environmental awareness.

The document also serves to evaluate the measures implemented in line with the university's sustainable development strategy, define future directions of action, and strengthen partnerships at local, national, and international levels.

The documentation of MSU's activities in this field demonstrates the university's environmental responsibility, research-oriented approach, and the integration of sustainability principles into the teaching process.

SDG 14 – "Life Below Water" – aims to protect and ensure the sustainable management of marine, river, lake, and other aquatic ecosystems. This goal seeks to prevent the global decline of biodiversity, reduce pollution in marine and freshwater ecosystems, and strengthen adaptive measures to address the impacts of climate change.

Considering Azerbaijan's geographical location and the significant hydro-ecological role of the Kura River and the Mingachevir Reservoir, the local relevance of SDG 14 becomes even more pronounced. The city of Mingachevir holds strategic importance in terms of water resources and hydro-energy infrastructure. Therefore, MSU's activities in monitoring aquatic ecosystems, reducing pollution, and promoting sustainable use make a valuable contribution at both regional and national levels.

At the local level, the implementation of SDG 14 ensures environmental protection through the efficient management of water resources, ecological education, and public awareness, thereby playing a vital role in fostering ecological culture.

Mingachevir State University has identified the principles of sustainable development as one of the key priorities in its strategic activities. The university carries out multifaceted initiatives aimed at enhancing environmental responsibility in education, research, and community engagement, with a particular focus on the protection of aquatic ecosystems.

By organizing practical laboratory work, ecological field research, and awareness-raising campaigns for students, the university helps foster environmental responsibility and a sustainability-oriented mindset among the younger generation.

MSU collaborates with the Ministry of Ecology and Natural Resources of the Republic of Azerbaijan, “Azersu” OJSC, municipal bodies, and local communities to implement joint projects on the conservation and efficient use of water resources. Through these initiatives, the university makes a significant contribution to the sustainability of regional ecosystems and the local implementation of SDG 14.

MSU’s Activities in Water Resource Conservation and Environmental Sustainability

Mingachevir State University (MSU) is taking significant steps toward the conservation, sustainable management, and promotion of environmental sustainability of water resources. The main goal of the university’s activities in this field is to strengthen students’ environmental awareness, technical skills, and sense of responsibility by linking their theoretical knowledge with real ecosystems and industrial facilities. One of the initiatives implemented for this purpose is the educational visit organized to the Mingachevir Hydroelectric Power Station (HES).

This excursion, held with the participation of students majoring in Industrial Engineering at the Department of Mechanics, was organized within the framework of University–Industry collaboration. The event aimed to provide students with an opportunity to apply their theoretical knowledge in a practical environment related to energy production and water resource management.

During the visit, students received detailed information about the historical development stages and technological principles of the Mingachevir Hydroelectric Power Station (HES), as well as its role in ensuring the country's energy security and promoting the efficient use of water resources. At the meeting conducted by Mr. Ali Ibrahimli, Head of the Technical Department of the HES, and Mr. Mahir Ismayilov, Head of the Department of Mechanics at MSU, it was emphasized that the Mingachevir HES holds strategic importance not only in meeting the nation's energy demands but also in the development of environmentally friendly energy sources.

Within the framework of the excursion, students observed first-hand the stages of energy production, mechanisms of water flow management, the operational principles of hydro-technical facilities, and the measures taken to minimize environmental impact. This experience enabled them to gain a deeper understanding of the importance of sustainable water resource use in the energy production process.

This initiative was carried out in line with the university's strategy to strengthen the integration of education, research, and industry, and it contributed to shaping students as environmentally responsible engineers.

By conducting such excursions on a regular basis, MSU contributes both to Sustainable Development Goal 14: Life Below Water and SDG 7: Affordable and Clean

Energy. These activities help young specialists develop knowledge and skills in the efficient management of water resources, the ecological aspects of hydropower, and the conservation of natural resources, while also supporting the ecological sustainability of the region.

Environmental Awareness and Community Engagement

Mingachevir State University (MSU) carries out educational activities aimed at the protection of aquatic ecosystems, the restoration of ecological balance, and the development of students' environmental consciousness. Within this framework, the university regularly organizes scientific-practical seminars, educational events, and student-led initiatives.

On the initiative of the "Ecology" club, operating under the Department of Physics and Ecology at the Faculty of Engineering, MSU held a scientific-practical seminar on "The Negative Impacts of Anthropogenic Factors on the Environment and Human Health." The event was conducted within the framework of the "Year of Solidarity for a Green World," declared in the Republic of Azerbaijan.

At the seminar, academic and administrative staff of MSU, as well as undergraduate and graduate students, participated. In her opening speech, Ms. Gulmira Mammadova, a lecturer at the Department of Physics and Ecology, emphasized the importance of discussing ecological problems, particularly the negative impacts of anthropogenic factors on water resources and human health. She also noted that

ensuring a clean environment is one of the key national priorities directly linked to the country's socio-economic development.

In accordance with the seminar program, students delivered presentations on various topics. E24 group students of the "Ecology" major, Narmin Abishova and Fatime Aliyeva, spoke on "Global Climate Change and Its Challenges"; EM23 group student of "Environmental Engineering," Zinyat Mahmudova, presented on "The Problem of Plastic Pollution in Water Bodies"; EM21 group student of "Environmental Engineering," Maleyka Heziyeva, addressed "Meeting the Demand for Food Products in Countries Around the World"; and E21 group student of "Ecology," Arzu Hasanova, presented on "Radiation and Life Safety."

The presentations particularly highlighted issues related to plastic pollution in water bodies and its impact on marine life. Participants engaged in extensive discussions on potential solutions to these problems, including waste management, increasing recycling, and strengthening public awareness initiatives.

Seminars of this kind make a significant contribution to fostering environmental responsibility among students in line with SDG 14, studying the scientific principles of aquatic ecosystem conservation, and developing practical skills to address ecological problems.

Students' Field Practice and Environmental Awareness

Mingachevir State University (MSU) places special emphasis on the practical application of ecological knowledge and providing students with hands-on experience in environmental protection. To this end, the university regularly organizes field visits and educational excursions to various scientific and industrial facilities.

An excursion was organized for IS22.1 and IS22.2 group students majoring in “Primary School Teaching” to the Mingachevir Fish Breeding and Aquaculture Scientific-Production Complex. The visit was conducted as part of the practical component of the course “Life Skills in Primary Schools and Methods of Teaching It,” under the guidance of senior lecturer Konul Jabbarova from the Department of Pedagogy and Psychology.

The excursion took place at the Mingachevir Fish Breeding and Aquaculture Complex, operating under “AZ Varvara” LLC in the Yevlakh district. Students were closely acquainted with the production and research processes at the complex and observed on-site activities aimed at fish breeding and the protection of aquatic ecosystems.

Experts at the complex informed the students that the main goal of the facility is not only to preserve ecosystem balance but also to contribute to the restoration and enhancement of the populations of sturgeon species, which are endangered in the Caspian Sea and the Kura River. Additionally, the activities of the complex are of strategic importance both ecologically and economically, serving the protection of the environment and ensuring the population has access to healthy and high-quality fish products.

This visit allowed students to apply the theoretical knowledge gained during their studies in a practical setting, while also understanding the importance of aquatic ecosystem conservation, biodiversity preservation, and sustainable production principles. Furthermore, this activity forms an integral part of MSU’s initiatives in environmental awareness and sustainability-oriented education, in line with SDG 14: Life Below Water.

Water Resource Conservation and Environmental Awareness Activities

A scientific-practical seminar on "Modern Approaches to Water Resource Conservation" was organized at MSU. The event was attended by staff from the Mingachevir Water Canal Administration, the 8th Regional Department of Ecology and Natural Resources (RESTI), the faculty of the MSU Faculty of Engineering, as well as graduate and undergraduate students.

In her opening speech, Associate Professor Tarana Yusibova, Head of the Department of Physics and Ecology, emphasized the decreasing water resources in the country and worldwide, the disruption of ecological balance, and the importance of modern management approaches in this context. She noted that the "Year of Solidarity for a Green World" initiative is aimed at strengthening both national environmental policy and global ecosystem responsibility.

Within the seminar, pressing issues such as water resource management, the treatment of polluted water, and the improvement of the Caspian Sea's ecological condition were discussed.

The following scientific presentations were delivered during the event:

- Tural Dursunov (Mingachevir Water Canal Administration) – "The Current State of Drinking Water Supply and Sewerage Systems in Mingachevir City";
- Ülkər Paşayeva (8th RESTI) – "Mechanisms for Treating Polluted Water";

- Gülmirə Məmmədova (MSU, Department of Physics and Ecology) – “Oil Pollution of the Caspian Sea and Methods of Protection”;
- Aysel Bayramova (MSU) – “Ecological Problems of Azerbaijan’s Main Water Artery.”

The presentations provided detailed scientific and practical solutions for water resource conservation and pollution prevention, including technological treatment mechanisms and ecological monitoring methods.

At the end of the event, a video clip titled “Water is the Source of Life” was shown. Additionally, a video exhibition demonstrated laboratory experiments conducted by MSU students of the “Ecology” and “Environmental Engineering” programs, involving the determination of phosphate, nitrate, and ammonium concentrations in water samples taken from the Kura River.

This seminar not only increased students’ interest in scientific research but also provided an opportunity to develop their knowledge and skills in sustainable water resource management, biomonitoring, and environmental safety. The event also demonstrated the effectiveness of MSU’s collaboration with local environmental agencies, its community-scientific partnerships, and its environmental awareness initiatives.

Scientific and Practical Activities on Sustainable Water Resource Management

Mingachevir State University (MSU) actively supports the implementation of the United Nations Sustainable Development Goals (SDGs) by participating in national and international initiatives focused on the protection of water resources and the sustainable management of ecosystems. The university’s scientific and practical activities in this field are distinguished by a comprehensive approach that integrates education, research, and public awareness.

A scientific-practical seminar on “Sustainable Management of Water Resources” was organized by the Department of Physics and Ecology at MSU. The event brought together faculty members, students, and graduate students from the Faculty of Engineering, fostering broad discussions on current issues related to water conservation and management.

The seminar was moderated by Associate Professor Təranə Yusibova, Head of the Department of Physics and Ecology. The opening speech was delivered by Vüqar Mustafayev, Head of the Department of Science and Innovation, who welcomed the participants on behalf of the university administration. He provided information about the “National Strategy on Sustainable Management of Water Resources” approved by the Decree of the President of the Republic of Azerbaijan, Ilham Aliyev, on October 10, 2024, emphasizing its importance. He also underlined the crucial role of higher education institutions in implementing this strategy, particularly in fostering environmental responsibility and promoting the efficient use of water resources among the younger generation.

Within the framework of the seminar program, MSU staff members delivered scientific presentations on the following topics:

- Fatimə Məmmədova – *“Sustainable Management of Water Resources: Realities and Perspectives”*
- Gülgün İsrafilova – *“Global Problems of Freshwater Reservoirs”*
- Gülmirə Məmmədova – *“Main Stakeholders of Water Management Systems”*

The presentations analyzed issues such as the impact of global climate change on water resources, maintaining ecological balance at the local level, water management models, and innovative technological approaches.

At the end of the event, a short film titled “Water is the Source of Life” was shown, highlighting once again the irreplaceable role of water for ecosystems and human activity, as well as its importance in preserving ecological stability.

This seminar demonstrated that MSU’s efforts in sustainable water resource management, environmental literacy, and the development of students’ practical skills are consistent, purposeful, and aligned with global sustainability priorities.

Scientific-Practical Seminar at Mingachevir State University (MSU) Dedicated to “22 May – International Day for Biological Diversity”

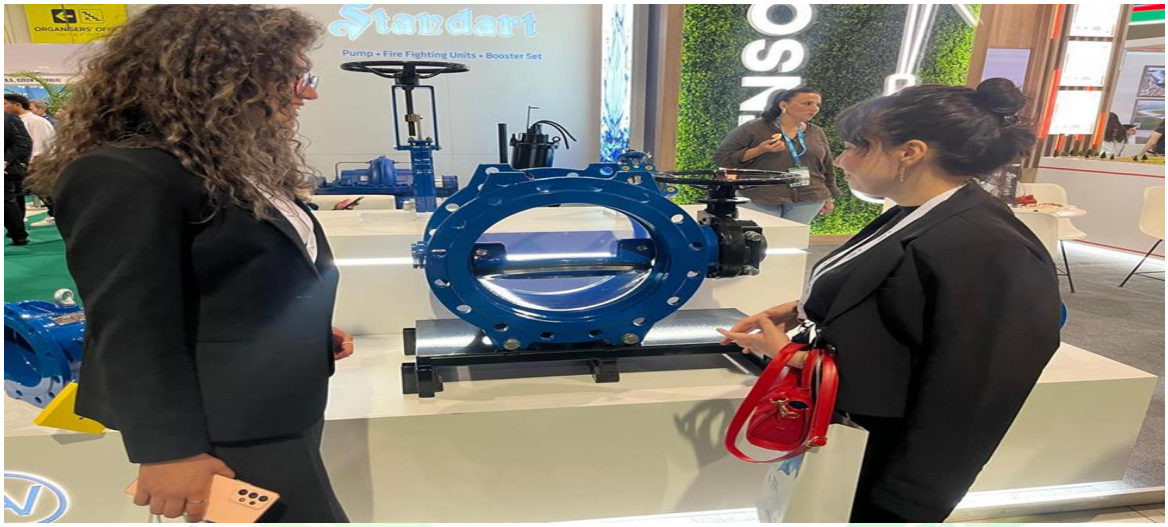
A scientific-practical seminar titled “The Color Palette of the Earth: Biodiversity” was held at Mingachevir State University (MSU), organized by the Department of Physics and Ecology. The event focused on the conservation of biodiversity in aquatic ecosystems, ensuring the ecological balance of freshwater basins, and promoting the sustainable management of aquatic environments.

The seminar moderator, Associate Professor Təranə Yusibova, Head of the Department of Physics and Ecology, emphasized the importance of protecting water resources, maintaining the sustainability of aquatic species, and ensuring ecological balance.

During the seminar, presentations addressed issues such as the decline of biodiversity in water bodies, the impact of pollution on ecosystems, and the application of modern technologies — including drones and artificial intelligence — in the monitoring and protection of aquatic environments.

The participants exchanged scientific ideas on the sustainable management of water resources and the conservation of aquatic ecosystems, contributing to the enhancement of students' knowledge and skills in this field.

Participation of MSU Students in the 6th "Caspian Water Innovation Forum"



Students of Mingachevir State University (MSU) participated in the 6th "Caspian Water Innovation Forum" held at the Baku Expo Center, organized by Aqualink LLC. The

forum served as a platform for broad discussions on the sustainable management of water resources, the protection of aquatic ecosystems, and the application of innovative technologies.

Under the supervision of Gülmirə Məmmədova, lecturer at MSU's Department of Physics and Ecology, students from the Ecology, Environmental Engineering, Chemistry Education, and Physics Education programs took part in the event. Within the forum framework, students familiarized themselves with the presentations and technological exhibitions of companies such as DuPont Water Solutions, Hydrophil GmbH, AO Smith, ProMinent GmbH, JUMO, and others.

Forum participants gained insights into cutting-edge scientific innovations related to modern water purification technologies, the protection of aquatic ecosystems, and the efficient use of water resources. Such events make a significant contribution to enhancing students' knowledge and skills in the fields of water resource conservation, aquatic biodiversity sustainability, and addressing environmental challenges.

Conclusion

Key Outcomes:

- Students and academic staff of Mingachevir State University (MSU) have enhanced their knowledge and practical skills by participating in various seminars, scientific-practical events, and field excursions focused on the protection of aquatic ecosystems and the sustainability of aquatic biodiversity.
- The university has implemented projects and training programs in the fields of sustainable water resource management, pollution reduction, and biomonitoring.

• Through participation in both local and international events, students have gained awareness of modern technologies and innovative approaches, as well as exposure to best practices in the conservation of aquatic ecosystems.

Future Goals and Development Directions:

- To expand training programs and practical activities aimed at protecting water resources and ensuring the sustainability of aquatic biodiversity.
- To improve the monitoring and biomonitoring of aquatic ecosystems through modern technologies and digital methods.
- To strengthen collaboration between the university, industry, and government agencies and to implement innovative projects for the sustainable use of water resources.
- To broaden public awareness programs on aquatic ecosystem conservation through cooperation with local communities and schools.
- To increase research activities and field experiments in the field of sustainable water resource management.