



SECTION 9

Water Education

9.1. Higher Education Institutions (HEIs) and Professional Development Centers

9.1.1. Kazakhstan

Kazakh National Agrarian Research University

The Kazakh National Agrarian Research University (KazNARU) was founded in 1929. The University includes in its structure the Research Institutes of Water Problems and Land Reclamation and of Agricultural Innovation and Ecology, the Forestry Research Institute, the Institute for Professional Development, the Water, Land and Forest Resources and Agrobiology faculties, the International Research Center (IRC) "Water Hub"²¹⁸, the Agrotechnological Hub, and the "Farmers High School". The Dissertation Council on 8D086 – "Water resources and water use" (specialization 6D080500 – "Water resources and water use"; Educational program 8D08603 – "IT-technology based water management") functions at the University as well.

Major Events and Activities in 2022

Research. Ongoing projects: (1) "Selection of non-traditional crops for intensive use of irrigated land and creation of a green conveyor depending on bioclimatic potential of cultivation zones" (2021-2023); (2) "Development of technology for rehabilitation of anthropogenically degraded drift sand of desert pastures in the Southern Balkhash region" (2021-2023); (3) "Evaluating the effectiveness of various land cover/use systems to mitigate climate change by reducing greenhouse gas emissions and increasing albedo" (2021-2023); (4) "The effects of excessive water use and agricultural intensification on the Aral Sea shrinkage: SES dynamics within the Syr Darya River basin"²¹⁹ (2021-2023, PEER, USAID); (5) "Interdependent dynamics of food, energy and water in Kazakhstan and Mongolia (FEWKZMG): connecting LULCC to the transitional socioecological systems"²²⁰.

The "Water Hub" carries out research²²¹ on: "Development of principles and methods of balanced water distribution in irrigation systems based on hydrological information and water formation in river basins"; "Development and optimization of energy-efficient reclamation technologies for soil management in irrigated agro-landscapes in Kazakhstan". Research is also conducted jointly with: (1) Ahmedsafin Institute of Hydrogeology and Environmental Geoscience on

groundwater, which is a strategic resource for water security; (2) RSE "Kazhydromet" on climate change and its impact on water resources; (3) Institute of Geography and Water Security on the reduction of water scarcity in the country; (4) KazSRIWE within the framework of the KMA's²²² research and development program "Irrigation technologies and techniques for development of new irrigation and reconstruction and modernization of existing irrigation systems": a demonstration polygon was opened with modern seepage prevention technologies and water meters on canals (Saymasay village, Almaty province).

Capacity building. The following events were organized: (1) training and presentation of the Model UN Program and the UN Academic Impact Program (February 23); (2) 14th Republican Olympiad for students specializing in "Water resources and water use" under "Hydraulics" and "Hydrology" disciplines (April 28-29).

Events. The 2nd international interdisciplinary scientific conference "Digitalization and sustainability for development management: economic, social and environmental aspects" (September 15) and a roundtable for discussion of the draft Concept of the Water Code of the Republic of Kazakhstan (December 2).

KazNARU took part in: (1) the international workshop "Modernization of curriculum towards the UN SDGs for Central Asian universities" on topics "Climate action" and "Sustainable cities and communities" (June 13-18, Bishkek); (2) International scientific conference "Construction Mechanics, Hydraulics and Water Resources Engineering" (CONMECHYDRO 2022) (August 23-24, NRU TIAME).

Achievements and awards. According to the international rating "QS World University Rankings" (QS WUR 2023), KazNARU took 443rd place among 1,500 universities.

Publications. Scientific journal "Research. Findings", Almaty 2022, on <https://journal.kaznaru.edu.kz/index.php/research/index>.

Source: www.kaznaru.edu.kz/?lang=ru, "Water Hub"

²¹⁸ established in 2017. The mission is to search for and transfer the best innovative technologies, new knowledge, adapt them to local conditions, and consolidate efforts of all water researchers in Kazakhstan and Central Asia for effective water management. The IRC "Water Hub" includes the "Water resources and land reclamation" Department, 14 research laboratories, Kazakh-American Center "Smart Water", Research Institute for Water Problems and International Water Cooperation, and the Institute for Advanced Training of Hydraulic Engineers

²¹⁹ jointly with the University of Michigan and the University of South Dakota

²²⁰ jointly with the University of Michigan, the Humanities University of Mongolia and the Mongolian Academy of Sciences

²²¹ within the framework of program-targeted financing "Irrigation technologies and techniques for development of new irrigation and reconstruction and modernization of existing irrigation systems"

²²² Kazakh Ministry of Agriculture

German-Kazakh University

The German-Kazakh University (GKU) was founded in 1999 with the aim of training students in line with the German standards. GKU has been the only German university in Kazakhstan and Central Asia up to present time. The [World Politics Faculty](#) of GKU has developed and carries out the training program "[Integrated Water Resources Management](#)"²²³; the Economics and Business Faculty holds the "[Strategic Management of Renewable Energy and Energy Efficiency](#)" Program. Within GKU, the [Center for Natural Resources and Sustainability](#) (CNRS) was established and received the status of the UNESCO Chair for Water Resources Management in Central Asia; GKU offers the Central Asia Youth for Water Network (CAY4W) and the Central Asian Journal of Water Research/[CAJWR](#)²²⁴. Since 2022, the Central Asian Journal of Sustainability and Climate Research/[CAJSCR](#) has been published.

Major Events and Activities in 2022

Research. CNRS jointly with (1) UNESCO published "[Sustainable Water Governance in Asia and the Pacific: UNESCO sites for water security towards the 2030 Agenda](#)"; (2) WB contributed to the country report "Climate and development in Kazakhstan", including analysis of political, socio-economic and environmental conditions, current and projected status of climate change, as well as its impact on water resources, cropland and pastures in regional and sectoral dimensions.

The [colloquium](#) was organized for graduate students working in examining water resources, climate, energy, resource-efficient production logistics, and agriculture.

Within the framework of the OSCE project "Empowering young Central Asian women in the energy transition", the first version of the policy brief "Barriers and opportunities for Central Asian women in the energy sector" was prepared based on the results of surveys of students and energy professionals, who participated in roundtables in Kyrgyzstan (April 5, Bishkek), Uzbekistan (April 28, Tashkent), and Kazakhstan (July 14, Astana).

Capacity building. The following events were organized: (1) Central Asia training course "Weather and climate services for energy sector" for experts involved in the development of relevant policies and measures, energy companies, meteorological organizations, NGOs and scientists in CA ([February 21-March 4](#)); (2) student's contest on "Sustainable Development Goals in Central Asia" (February-June) and its final stage (October 3); (3) national training

"Water-energy-food-ecosystems nexus assessment"²²⁵ for civil servants of the Republic of Kazakhstan (April 28-29, Almaty), Kyrgyz Republic ([June 2-3](#), Bishkek), Tajikistan ([May 26-27](#), Dushanbe), and Uzbekistan (June 16-17, Tashkent) and a regional seminar (October 27, online); (4) roundtable and educational trip "[Renewable Energy Trip 2022](#)" to study best practices on RES use (June 20-26); (5) roundtable and study trip to the RES polygon²²⁶ ([July 14](#), Nur-Sultan); (6) seminars "City of Active Citizens" ([March 18](#)) and Water Day (November 11), first presentation of the "Ecologization of educational institutions (schools and universities)" [Manual](#) and training "First steps towards ecological living" (November 14)²²⁷.

Additionally, the following trainings were held: (1) online course "Modern thermal power engineering - international trends and challenges for Kazakhstan" including 14 webinars ([May 17-June 15](#)); (2) CAWa Summer School "Integrating scientific knowledge of water and land management into decision making support in Central Asia" (July 11-20) and a roundtable "Global food security on a global scale" (July 19), "Central Asia Sustainable Development Program" ([August 15-20](#), GKU), Aral Sea Summer School ([August 22-September 1](#)). The International School of Green Business [#EcoTalk2022](#) was active in 2022. The Kazakhstan ClimAccelerator is implemented in partnership with [EIT Climate-KIC](#) since the beginning of 2022. It aims to mentor young entrepreneurs of Central Asia, providing an opportunity to 'accelerate' their working eco start-ups and open it up for investors.

With the support of the "Green education and science for Central Asia" project, CNRS staff had research internship at the Potsdam Institute for Climate Impact Research (PIK).

Events. The online conference "Silk Road of Knowledge: science meets green policy" held on [February 23-25](#) included 7 thematic sessions and 2 pre-sessions. These resulted in seven policy briefs.

The following events were organized: (1) public lectures as part of the "Environmental human rights and culture" project (September 15; October 31; and December 2); (2) a series "Tomorrow was too late" (June 4; September 9; and October 13); (3) "Green school" eco-festival dedicated to solving environmental problems in Kazakhstan (November 6); (4) children's art exhibition "Tomorrow was too late. Almaty glaciers: clean water and mountains" (December 10).

Achievements and awards. GKU programs have been ranked [at the top of the Atameken-Rankings for 2022](#): Logistics – 1st place out of 13; Marketing – 1st place out of 14; International Relations – 1st place out of 21; Finance – 4th place out of 65.

²²³ in 2022, the leading German accreditation, certification and quality assurance institute AQOUIN in Bayreuth awarded the program a quality certificate

²²⁴ indexed in DOAJ, EBSCO, IndexCopernicus, RSCI, Cite Factor and Google Scholar and included in the list of recommended publications by the Ministry of Education and Science of RK (Order No. 623 of July 29, 2021)

²²⁵ under the project "[Training for Government Officials from Central Asia on Water-Energy-Food-Ecosystems Nexus](#)" supported by the USAID Regional Water and Vulnerable Environment Activity

²²⁶ within the framework of the "Empowering young Central Asian women in the energy transition" project

²²⁷ under the "[Involvement of youth in solving environmental problems in Almaty](#)" project implemented by GKU with the support of the Eurasia Foundation in RK

Publications. For CAJWR publications, visit <https://water-ca.org/issues>; for CAJSCR publications, visit <https://cajscr.com/>. For collections and selected publications, visit <https://dku.kz/ru/content/view/?slug=nauchnyye-publikatsii-dku&tab=2>.

Source: GKU, <https://dku.kz/en>, www.crs.dku.kz/ru/

Nazarbayev University

Nazarbayev University (NU) was established in 2010. The University is comprised of 7 Schools, including the Graduate School of Public Policy (GSPP) and the School of Mining and Geosciences (SMG). The long-term mission of the University is to create a full range of engineering and applied science programs in land, water, energy, and ecology.

Major Events and Activities in 2022

Research. The NU Office of Sustainable Development in cooperation with the "National Conservation Initiative" Corporate Fund and with the support of Chevron company continues the Sustainability Living Lab Program to support students' green research and innovation projects in water conservation, energy, etc.

Events. NU hosted: (1) NU GSPP Conference "Public policy and good governance in a changing world", including 6 panels, with panel 4 on "Environmental Sustainability" (June 7); (2) seminar "UN's role in supporting Kazakhstan's development priorities" (September 20); (3) international workshop "Resource studies and sustainable development in Central Asia" jointly with Akita University (Japan) (September 22); (4) "Water resources policy and management" program for students of "AUA-NU Overseas Program 2022" (October 5-December 7, online); (5) international educational conference "Climate Talks", organized by UNDP jointly with the NU Office of Sustainable Development, MEGNR and "National Conservation Initiative" Corporate Fund (December 7-8, NU); (6) Seminar "Innovations. Youth. Clean and Green Energy" (December 22).

NU took part in the: (1) 2022 IRENA Youth Forum²²⁸ "Youth-led solutions to accelerate the energy transition" (January 13, online); (2) session "Water resources and water security in Central Asia" (February 24, Almaty) on the sidelines of the "Silk Road of knowledge: science meets green policy" Conference (February 22-25, online); (3) 14th International Conference on geostatistics for environmental applications (geoENV2022)²²⁹ (June 22-24, Parma, Italy). The SDSN Kazakhstan Secretariat took part in the 2nd research conference of the CAREC Institute "Resilience and economic growth in times of high uncertainty in CAREC region" (April 11-12, online) and a seminar on clean energy policy and innovation (November 30, Almaty).

Cooperation. NU has become a partner with the Columbia University Earth Engineering Center's Global Waste-to-Energy Research and Technology Council. GSPP officially launched: (1) Sustainable Development Solutions Network²³⁰ – SDSN Kazakhstan (June 8); (2) SDSN Youth Kazakhstan was inaugurated, where students were involved in discussion of projects in the field of sustainable development, youth capacity building in innovations related to water and land resource management, etc. (October 7). SDSN Kazakhstan, NU, FAO Kazakhstan and JLU Giessen University discussed potential collaboration steps on joint research on sustainable development in Kazakhstan (September 15).

Achievements and awards. NU is the only HEI included in the prestigious Center for World University Rankings (CWUR 2022-2023): 1765th place in the TOP 2,000 among 19,800 universities in the world. NU also received the Scopus Award in Research Excellence nomination, while eight NU scholars received awards for scientific achievements.

NU achievements and future endeavors are available on <https://nu.edu.kz/news/nazarbaev-universitet-itogi-za-12-let-i-zadachi-na-budushchee>

Source: Nazarbayev University, <https://nu.edu.kz/ru/>, <https://nu.edu.kz/media/RUS-Brochure-14.04.22-RUS.YAZ.pdf>

Non-profit joint-stock company "Al-Farabi Kazakh National University"

The non-profit joint-stock company "Al-Farabi Kazakh National University" (Al-Farabi KazNU) is the leading multidisciplinary institution of higher education²³¹ in the country. The multilevel system of education includes higher basic education, master's and doctoral studies program. The University has 16 faculties, 29 research institutes and Centers of natural-scientific and technical, social-humanitarian profiles. University branches have been opened in Bishkek and Istanbul.

Training in water is offered by the Geography and Nature Management Faculty, Meteorology and Hydrology Department. The Faculty opened "Geoinformation Cartography" discipline, first in the country. The Faculty also includes: (1) UNESCO Chair for Sustainable Development; (2) Center for Geographical Research and Additional Professional Education; (3) Center for Digital Cartography and Applied Geodesy; (4) COMSATS Centre for Climate and Sustainability. The University has a Center for Remote Sensing, which has capacities to conduct ground-space monitoring of water resources. The Al-Farabi KazNU was granted the status of a research university by the Resolution of the Government of the Republic of Kazakhstan No.516 of July 25, 2022.

²²⁸ IRENA is an intergovernmental organization that supports countries in their transition to the sustainable energy future and serves as the main platform for international cooperation, <https://www.irena.org/>

²²⁹ leading interdisciplinary conference where scientists from around the world share their experience in applying geostatistics to environmental problems

²³⁰ Global network of knowledge-generating institutions advancing the SDGs, https://www.unsdnsn.org/join-the-sdsn?gclid=CjwKCAjwybyJBhBwEiwAvz4G7wwjiv56_JPwUFzZDHyEObEzkndRfFdWze6n35YMe_KKKL3rbUF7MhoCf3AQAvD_BwE

²³¹ Resolution of the Government of the Republic of Kazakhstan No516 of July 25, 2022

Major Events and Activities in 2022

Research. Al-Farabi KazNU continues to lead the Global Hub of the UN Academic Impact (UNAI) Program on sustainable development, which plays an important role in achieving the goals of the national project "Zhasyl Kazakhstan"²³². The Green Technology Center functions at the University and demonstrates innovative projects in the field of green energy. The French-Kazakh Center "Geo-Energy" of the University conducts research on climate change. The UNESCO Chair for Sustainable Development is focused on education and science projects aimed at implementing green initiatives for energy and resource saving, incl. rational use of water resources, RES and environmental protection.

Capacity building. In 2022, the 14th Republican student Olympiad on discipline 5B060800 "Ecology" (April 20-21) and the 9th international student forum "Green bridge through generations" dedicated to the 30th anniversary of Kazakhstan's accession to the UN (April 21-22) took place.

Events. The workshop "Impactful research towards the 2030 Agenda" featured a presentation on ongoing research and development on SDG implementation (June 8, New York, USA). Al-Farabi KazNU took part in the international conference dedicated to the 30th anniversary of the UNESCO UNITWIN/Chairs Program on "Transforming knowledge for fair and sustainable future" (November 3, Paris, France).

The following events were held: roundtable "Implementation of Sustainable Development Goals: challenges and opportunities" (April 7) on the sidelines of the 1st International Al-Farabi Forum (April 4-15), international scientific and practical conferences "Integration for life" (September 22) and "Environmental Code of the Republic of Kazakhstan and challenges of its enforcement" (October 31).

Achievements and awards. Al-Farabi KazNU (1) was recognized as the first and best university among universities in Kazakhstan, Russia, Kyrgyzstan, Belarus, Ukraine, Azerbaijan and Moldova by the IAAR Eurasian University Ranking (IAAR EUR 2022)²³³; (2) took the 150th place in the QS World University Rankings (QS WUR 2023); (3) was ranked 1,001-1,200 among 1,799 universities in the Times Higher Education (THE) WUR-2023; (4) took the 44th place among 760 universities in the QS Asia University Rankings 2023 and 1st place among CA universities.

By the Decree of the President of Kazakhstan, Rector of Al-Farabi KazNU, Zhanseit Tuymebayev was awarded the Barys II Order. The awards of the students of

the Meteorology and Hydrology Department are available on <https://www.kaznu.kz/ru/7451/page/>; UNESCO, visit <https://www.kaznu.kz/ru/20210/news/>.

Publications. The list of publications for 2022 is available on <https://bulletin-geography.kaznu.kz/index.php/1-geo/issue/archive>, <https://pps.kaznu.kz/kz/Main/ChairPublications/101/3/0/2022>, <https://pps.kaznu.kz/ru/Main/ChairPublications/131/1/0/2022>, <https://pps.kaznu.kz/kz/Main/ChairPublications/131/3/0/2022>, <https://www.kaznu.kz/ru/22319/page/>

Source: <https://www.kaznu.kz/ru/>

Taraz Regional University named after M.Kh. Dulati

The Taraz Regional University named after M.Kh. Dulati (TarRU)²³⁴ was established by the Order of the Kazakh President No.752 of October 11, 2019 and on the basis of the order of the Ministry of Finance of the Republic of Kazakhstan No.346 of June 3, 2020. Specialists for water sector are prepared at the Institute of Water Management and Environmental Engineering²³⁵. The Institute has 11 departments, including for Land Reclamation and Agronomy; Water Resources; Ecology; Life Safety. There is the Dissertation Council for the award of the Degree of Doctor of Philosophy (PhD) in the following disciplines: (1) 8D074 – Water management (6D074400 – "Hydrotechnical construction and structure"); (2) 8D086 – Water Resources and water use (6D081000 – "Land reclamation, re-cultivation and protection").

Major Events and Activities in 2022

Events. The following events were held: (1) extended meeting of the Training and Methodological Association on "Water Management" (May 4); (2) job fair "Young Professionals-2022" (May 12); (3) meeting of the Advisor to the Minister of Ecology, Geology and Natural Resources (Kazakhstan) and the Rector of TarRU, where they discussed water sector professional development, allocation of grants for training, involvement of water experts in the educational process, joint participation in research projects of experts from the University, KazSRIWE research institute and RSE Kazvodkhoz enterprise (June 15).

Source: <https://dulaty.kz/ru/>

South Kazakhstan State University named after M. Auezov

The South Kazakhstan State University named after M. Auezov (SKSU) is a state multidisciplinary higher education institution. The University is comprised of 9

²³² Al-Farabi KazNU's green initiatives focused on goals of the national project "Zhasyl Kazakhstan" are reflected in the international rating "UI Green Metric": KazNU took the 212th place among 956 universities in the world in 2021

²³³ Independent Agency for Accreditation and Rating (IAAR)

²³⁴ Zhambyl Hydromelioration and Construction Institute celebrated its 60th anniversary in 2022

²³⁵ The Institute of Water Management and Environmental Engineering was created as a result of combining both Institute of Water Management, Ecology and Construction and the Oil and Gas Engineering faculty in the 2021-2022 academic year

faculties, Distance Learning Institute, five higher schools and a college. The Agrarian faculty has 9 departments, including “Water resources and water use” and “Water supply, sewage and water protection”. At SKSU, the New Climate Economy Center named after Rae Kwon Chung²³⁶ was opened. It will focus on the introduction of new model of economic development and green technologies, as well as mitigation of climate change impacts on agriculture (October 31).

Capacity building. The International Winter School, Auezov University-2022 “Innovative solutions in modern energy” was held online from February 21 to March 4.

Achievements and awards. The University ratings are as follows: (1) ranked 481 among 1,500 universities in the QS World University Rankings (QS WUR 2023); (2) 177th place among 757 universities in the QS Asia Ranking 2023; (3) 260th place among 1,050 universities in the UI GreenMetric.

Source: <https://auezov.edu.kz/kaz/>

9.1.2. Kyrgyz Republic

American University of Central Asia

The American University of Central Asia (AUCA) founded in 1993 is the first university in Central Asia to offer US accredited degrees in liberal arts programs through a partnership with the Bard College in the US. AUCA cooperates with many universities and organizations all around the world. Its curriculum includes the Preparatory Program (New Generation Academy), 15 undergraduate majors and 10 graduate degree programs. AUCA also includes the Technical School of Innovation, which offers seven disciplines, in particular, Ecology and Energy Efficiency, the Tian Shan Policy Center (TSPC) and the Center for Environment and Development (CED).

Major Events and Activities in 2022

Research. The International Science and Technology Center is implementing the regional project “Assessment of water and land resources in small transboundary tributaries of Amu Darya River basin using Earth Observation”, which studies climate change impact on water resources in the Amu Darya River basin – Surkhandarya (Uzbekistan) and Karatag (Tajikistan).

Teachers and students of the: (1) Environmental Sustainability and Climate Science Department monitored desert biodiversity in cooperation with the Dubai Desert Conservation Reserve (February); (2) Applied Geology Department monitored degradation of high-altitude pastures in Alay district in cooperation with the Michigan State University under the NASA L project “Atmospheric teleconnections and anthropogenic telecouplings drive land change in Central



Source: <https://green.auezov.edu.kz/ru/component/sppagebuilder/?view=page&id=443>

Asian highlands: how environmental changes, migration, and remittances threaten montane agropastoralist livelihoods and community viability”.

Events. The workshop “Modernization of curriculum towards the goals of UN SDGs for Central Asian universities – climate action and sustainability development” was organized in partnership with Pace University, Central Asia University Partnerships Program (UniCEN) and the U.S. State Department (June 12-19, Bishkek).

Jointly with the Critical Ecosystem Partnership Fund (CEPF), TSPC organized a summer environmental camp for students on “Sustainable natural resource management and GIS in Chychkan” (August 26-30, Chychkan Gorge, Kyrgyzstan).

AUCA held the international workshop “Interdisciplinary research in the field of transboundary water security as part of the transboundary water security project in Central Asia and the Middle East” (Accelnet PEER2PEER)²³⁷ (September 3-4).

Source: AUCA

Kyrgyz-Russian Slavic University named after B.N. Yeltsin

The Kyrgyz-Russian Slavic University named after B.N. Yeltsin (KRSU) was established in 1993. Education at the University is offered in 24 disciplines. Professionals for the water sector are trained at the Architecture, Design and Construction Faculty and the Physical Engineering Faculty. KRSU has the Dissertation Councils of the Higher Attestation Commission of KR,

²³⁶ Prof. Rae Kwong Chung – Advisor to the UN Secretary General on Climate Change, Nobel Prize Laureate

²³⁷ the NSF-funded project extends the network of water experts from the USA, Central Asia and the Middle East

postgraduate program (on disciplines 05.23.07 – “Hydraulic engineering” and 25.00.30 – “Meteorology, climatology, and agrometeorology”), doctoral school (05.23.07 – “Hydraulic engineering”), and the Inter-branch Scientific Research Center for High-Altitude Dam Monitoring. The Center in particular studies the effects of earthquakes and microseisms on hydraulic structures and makes forecasts of their status in order to prevent failures.

Major Events and Activities in 2022

Events. (1) international scientific and practical conference “Innovations in science and technology” dedicated to the memory of Prof. V. Yurikov (April 20). The plenary session addressed energy security, hydropower and other issues; (2) students’ scientific and practical conference “Public-private partnership in the context of faltering economy” (April 27); (3) international scientific-practical conference on green economy (May 12); (4) expedition to Lake Issyk-Kul (September).

Cooperation. The teaching staff participated in the seminar “Modernization of curriculum towards the goals of UN SDGs for Central Asian universities – climate action and sustainability development” (June 12-19, AUCA), and the “Save our Earth” festival (September 21-23, Tyumen, online).

Achievements and awards. The best University students were awarded a presidential scholarship (December 16).

Publications. 12 issues of the “Vestnik KRSU” journal were published.

Source: <https://www.krsu.edu.kg/>

Kyrgyz National Agrarian University named after K.I. Skryabin

The Kyrgyz National Agrarian University named after K.I. Skryabin (KNAU) was established on January 30, 1933. The University consists of 6 faculties, including Hydromelioration, Ecology and Land Management Faculty which trains: (1) bachelors on “Land reclamation, re-cultivation and protection”, “Engineering systems of agricultural water supply, irrigation and drainage”, “Hydraulic engineering construction”, “Land management and cadastre”, “Geodesy and remote sensing”, “Ecology and nature management”; (2) master’s students on “Hydraulic engineering construction”, “Land management and cadastre”, “Environmental management and water use”, “Geodesy and remote sensing”, and “Ecology and nature management”.

Major Activities and Events in 2022

Events. KNAU organized: (1) seminar “Water diplomacy and international water law”²³⁸ (September 22-23); (2) seminar by Aerocosmos-Agro company (October 4); (3) excursion for students to HPP-3 – one of the stations at JSC Chakan HPP (October 7); (4) exhibition

of scientific and technical developments and achievements dedicated to the Science Day (November 3); (5) scientific and practical conference “Land reclamation and water management challenges” dedicated to DAgRSc Professor B. Saipov (November 18); (6) roundtable “Green expertise/skills” as concerns the quality of higher vocational education and new green jobs (November 22); (7) training workshop on development of a national agrarian-soil data center of the Kyrgyz Republic in cooperation with scientists from the Lomonosov Moscow State University (November 23-25); (8) international conferences “Green economy and sustainable development in the Kyrgyz Republic” (November 17), “Scientific and technological development of agro-industrial complex for sustainable development” (November 21, online). The ecological club “Young environmentalist” organized an online marathon Ecoadam 2.0 (January 20-27) and eco-marathon “Ecology starts with me” (February 21-March 7).

The teaching staff took part in: (1) summer school (September 26-30, Brunel University, London, UK) and closing conference (November 3-4)²³⁹; (2) 6th Central Asian international online forum “Transnational cooperation in the global educational space” (October 7, Almaty, Kazakhstan); (3) 1st Regional conference “Regional aspects of sustainable development of vocational education: challenges and prospects” (October 27-28, Tashkent, Uzbekistan); (4) 5th Novosibirsk agrifood forum “Integration of production, science and education – basis for agro-industrial development” (November 9-10, Novosibirsk, Russia).

Cooperation. Delegations of the (1) Hungarian University of Agriculture and Life Sciences (November 21); (2) Incheon National University of the Republic of Korea (November 9); (3) Moscow State University of Geodesy and Cartography (December 15-16).

KNAU delegation visited: (1) Weihenstephan-Triesdorf University of Applied Science and discussed the possibility to get more quotas for master’s students in the International Master Course “Agricultural Management”, the double degree education and possible establishment of the Farmer Field School for students and farmers (September 19-20, Germany); (2) KazNARU to strengthen cooperation and share experiences (October 6-7, Almaty, Kazakhstan); (3) Novosibirsk State Agrarian University and discussed educational programs within the framework of network programs (November 9-10, Novosibirsk, Russia).

Achievements and awards. The best students of the University were awarded a presidential scholarship (December 16). International Master’s program “Agrarian Management” received international accreditation in the “ACQUIN” agency (September 21).

Publications. Four issues of the Newsletter were published.

Source: <https://knau.kg/>

²³⁸ as part of the USAID Regional Water and Environment project

²³⁹ under the EU Erasmus+ “Development of Doctoral Education and Research Capacities of Kyrgyzstani Academia (DERECKA)” project

9.1.3. Tajikistan

Tajik Agrarian University named after Shirinsho Shotemur

The Tajik Agrarian University named after Shirinsho Shotemur (TAU) was established in 1931. The University has 9 faculties, including the Hydromelioration Faculty, which offers education in the field of land reclamation and water management, hydraulic engineering, and rational use and protection of water resources.

Major Events and Activities in 2022

Events. TAU organized: (1) a tree planting campaign (February 4); (2) Student Olympiad “Sustainable Development Goals in Tajikistan” jointly with ESCAP, GWP, Central Asian Youth Association “CAY4W”, SDC, and GKU (May 5); (3) national scientific and practical seminar “Development of intensive orchards and modern farming methods for double-season crops” (June 23, Hissar); (4) Student Olympiad on water resources management (June 6); (5) roundtable “Industrial value for GIS application in developing new farming and land use interventions in the Republic of Tajikistan” (December 8); (6) national scientific and practical conference “Topical issues of effective use of arable land under biologization and ecologization of agricultural production” (December 15).

The teaching staff took part in the 5th international scientific and practical conference “Education. Business. Science. Culture” (February 15, online); exhibition “Tajikistan – land of golden rivers” (April 7); Forum of Rectors of the Central Asian countries (May 12-13, Almaty, Kazakhstan).

Cooperation. A meeting with the delegation of the Caritas Country Office took place at TAU to discuss the project “Utilization of weather, water and climate services for sustainable livelihoods and well-being of rural communities” (April 2).

A cooperation agreement was signed between TAU and the Kangwon National University of the Republic of Korea (November 8, Chungcheon, South Korea).

Within the framework of the academic mobility program: (1) TAU’s Rector U.M. Makhmadyorzoda visited KazNARU and was awarded the title “Honorary Pro-

fessor” of KazNARU by the decision of Academic Council (May 14); (2) students of the Kuzbass State Agricultural Academy of the Russian Federation were trained under the exchange program at TAU (September).

Delegations of the Irkutsk State Agrarian University named after A.A. Ezhevsky (March 25) and Kuban State Agrarian University named after I.T. Trubilin (April 19) visited the University.

Publications. In 2022, 3 issues of the TAU journal “Kishovarz” were published. FAO Representative Office in Tajikistan published papers of the University teaching staff.

Source: <http://www.tajagroun.tj/>,
https://www.instagram.com/_tau_official_/,
www.facebook.com/groups/683492831824366/

Tajik Technical University named after Acad. M. Osimi

The Tajik Technical University (TTU) named after Academician M. Osimi was founded in 1956. The University has 7 faculties, including Power Engineering Faculty and Construction and Architecture Faculty. The latter includes the “Hydraulic structures and water resources protection” Department, which offers education in the following disciplines: (1) “Construction and operation of HPPs” and “Rational use and protection of water resources” (Bachelor’s degree); (2) “Construction and operation of HPPs” (Master’s degree, extramural education and second higher education).

TTU is a member of the SCO University; Technical Universities Association for CIS; Technical Universities Association for CA, Urals and Siberia; Association of Engineering Universities of Islamic States.

Major Events and Activities in 2022

Events. The “Construction and Architecture” Faculty launched a Tajik-Chinese Luban Workshop, where students would be able to study in the Center for Practical Training of Geodesy and Intelligent Cartography and the Center for Practical Training of Green Energy (November 3).

TTU hosted: (1) roundtable “Industry – the basis of the country’s economic development” (April 6); (2) scientific and theoretical conference “Scientific growth and prospects in higher education of the Republic of Tajikistan” (April 21); (3) 7th scientific and practical republican conference “Science – the basis of innovative development” (April 27); (4) roundtable “Water unites us” for women and female students dedicated to the International Decade for Action “Water for Sustainable Development”, 2018-2028 (June 8); (5) international scientific and practical conference “Energy: status and prospects for development” dedicated to the World Energy Day (December 20).



The TTU's teaching staff and students took part in the: (1) regional conference "Prospects for the development of renewable energy in the Central Asian countries" (June 3); (2) events dedicated to the World Environment Day (June 3); (3) global water marathon "Run Blue" (June 4); (4) regular meeting of the Coordinating Council of the CIS Network University (June 16); (5) educational trip to study best practices of using RES "Renewable Energy Trip" (June 20-26); (7)

Student Olympiad on water resources management (July 6).

Publications. TTU publishes the academic journal "Polytechnic Bulletin" (series: [Engineering studies](#), ["Intelligence. Innovation. Investments"](#) and ["Technology and society"](#)).

Source: <https://web.ttu.tj/ru>, www.facebook.com/ttu.m.s.osimi

9.1.4. Turkmenistan

Turkmen Agricultural University named after S.A. Niyazov

The Turkmen Agricultural University of S.A. Niyazov (TAU) was founded in 1930. The University consists of 8 faculties, including the Hydromelioration Faculty, which offers education in "Hydromelioration" and "Land construction and cadastre".

Major Events and Activities in 2022

Capacity building. TAU's teaching staff and students participated in the: (1) training on land mapping²⁴⁰ (April 26-28, online); (2) international exhibition and scientific conference "Healthcare, education and sports in the revival of a new era of a powerful state" (October 10-11).

A two-day exhibition-competition of young University scientists' projects was dedicated to the World Science Day (June 8).

Events. TAU organized: (1) as part of weekly days of science, scientific and practical conferences covering a wide range of topics, including "Methods of field leveling for agricultural crops" (October 8); "Drip irrigation in orchards" (October 22), etc.; (2) a thematic session "The importance of education and science for environmental security in Turkmenistan" dedicated to the World Environment Day. In particular, the following topics were addressed during the event: environmental value of wetlands in Turkmenistan, importance of the Bereketli Garagum State Nature Reserve in protection and research of desert ecosystems in Turkmenistan, methodology for delivering ecological knowledge and education in universities of Turkmenistan, significance of Turkmen lake "Altyn asyr" for biodiversity of the country, etc. (June 5).

Achievements and awards. According to the results of the regional stage of the annual international student Olympiad on SDGs, a TAU student [took the first place](#) with the eco-project "Secondary benefits of water". The winners' projects will be presented at the

International Business Forum to be held in Bangkok in January 2023.

Source: TAU

Turkmen Agricultural Institute

The Turkmen Agricultural Institute (TAI) was established in 2010 at the Ministry of Agriculture and Environmental Protection of Turkmenistan. The Institute offers water education at the Hydromelioration and Agricultural Mechanization Faculty in the following disciplines: operation of irrigation and drainage systems, hydromelioration and, since 2022, hydraulic facilities. The Institute includes in its structure the Production and Training Farm and the Scientific and Production Center (SPC).

Major Events and Activities in 2022

Capacity building. The TAI teaching staff and students participated in training on land mapping (April 26-28). A set of field equipment for quick analysis was bought for the Institute and the NTC²⁴¹.

The teachers participated in the kick-off meeting on the project "Conservation and sustainable management of land resources and high nature value ecosystems in the Aral Sea Basin for multiple benefits" (UNDP/GEF) (November 10). The TAI students had field trips to best-performing farms in Dashoguz province.

Events. TAI hosted: (1) a thematic session "Environmental improvement in the Aral Sea region" dedicated to the World Environment Day (June 5). The topics discussed included: IFAS activities; efforts made by CA republics for environmental improvement and integrated water use in the Aral Sea basin in the face of climate change; further strengthening of partnerships to address water management, environmental, and socio-economic challenges, cooperation with international organizations; (2) Olympiads on geodesy (March) and meteorology and climatology (April).

Source: TAI

²⁴⁰ as part of the FAO/GEF project "Integrated natural resources management in drought-prone and salt-affected agricultural production landscapes in Central Asia and Turkey" (CACILM-2)

²⁴¹ as part of the FAO/GEF project "Integrated natural resources management in drought-prone and salt-affected agricultural production landscapes in Central Asia and Turkey" (CACILM-2)

9.1.5. Uzbekistan

National Research University "Tashkent Institute of Irrigation and Agricultural Mechanization Engineers"

The National Research University "Tashkent Institute of Irrigation and Agricultural Mechanization Engineers" (NRU TIAME)²⁴² is a regional academic and research university known for its leading programs in engineering (irrigation, water resources, environment, electrification and automation, agricultural mechanization), land management and agricultural economics/management and marketing. NRU TIAME consists of: a parent university with 7 faculties, Research institute for fundamental studies, Bukhara Institute of Natural Resources Management, Karshi Institute of Irrigation and Agritechology, academic lyceum "International House", Beshkent Agricultural Vocational School, and Pakhtaabad Agricultural Vocational School and Training and Research Center (Urtachirchik district, Tashkent province).

Since its foundation in 1923, the University trained more than 56 thousand graduates for water management and agro-industrial complex. In 2022, the University started offering education in the following disciplines: jurisprudence (transboundary water relations), AI, innovative technologies in remote sensing, information systems and technologies, etc.

Major Events and Activities in 2022

Research. Joint international (educational, scientific, and capacity building) projects are implemented on a wide range of topics of sustainable development: SDGnexus Network²⁴³, Hydro4U, Tashkent water security lectures²⁴⁴.

Events. In 2022, NRU TIAME hosted 6 international scientific conferences, 14 scientific seminars and roundtables, including: (1) 21st scientific and practical conference for young scientists, Masters and talented students "Current problems of agriculture and water pollution" (May 12-13); (2) international scientific conferences – "Agroecosystems, land reclamation and water resources in the context of climate change" (AgEC 2022) (March 10-11) and "Geophysical ecosystem design"²⁴⁵ and a symposium "Priorities of land reformation strategy: challenges and solutions" (May 23-24); "Construction mechanics, hydraulics and water resource engineering" (CONMEC-HYDRO 2022) dedicated to the memory of Dec. Prof. U.P. Umurzakov (August 23-24); "Environmental technologies and engineering for sustainable develop-

ment" (ETESD-2022) (October 13-15); 3rd international conference "Energy, civil and agricultural engineering" (ICECAE-2022) (October 14-16).

Cooperation. In 2022, the number of international agreements and memorandums was increased by 14 and reached 116. As part of international projects, scholars from NRU TIAME and Colorado State University (USA) jointly teach disciplines included in the curriculum for students of both universities based on international standards.

Achievements and awards. NRU TIAME ranked 1st among Uzbek HEIs and received high ratings on UN SDGs (15 out of 17). According to international ratings, (1) ranked 301st in the "QS Asia University Rankings 2023" among the universities of the Asia-Pacific ocean region, (2) ranked 603rd in the "World Green University Rankings".

Source: <https://tiame.uz/en>

National University of Uzbekistan named after Mirzo Ulugbek

The National University of Uzbekistan named after Mirzo Ulugbek (NUUZ) was officially established on May 12, 1918. The University has in its structure 16 faculties, including Geography and Natural Resources, Ecology, Geology and Geoinformation System, and Hydrometeorology²⁴⁶ Faculties. Water disciplines are taught at the "Land Hydrology" Department of the Hydrometeorology Faculty. There are also PhD and DSc programs on "Land Hydrology. Water Resources. Hydrochemistry".

Major Events and Activities in 2022

Research. The teaching staff of the Hydrometeorology Faculty is implementing the following projects: (1) "Development of a monitoring system over changes in the mass balance of mountain glaciers and the scenarios describing the future state of glaciers in the face of global climate change", jointly with the UzHydromet's Research Institute of Hydrometeorology and the Abdullaev Institute of Geology and Geophysics of the Uzbek Academy of Sciences²⁴⁷; (2) "Glacier lake outburst floods in Central Asia: knowledge management platform" (GLOFCA).

Within the framework of SDGs, the University is implementing the following projects: (1) "Evaluation of ef-

²⁴² TIAME was renamed into the National Research University "TIAME" by Resolution 42 of December 10, 2021. The proposal to establish the Bukhara Institute of Natural Resource Management and the Karshi Institute of Irrigation and Agricultural Technologies, respectively, on the basis of branches in Bukhara and Karshi and organize the Institute for Basic and Applied Research under NRU was approved. The NRU will be transferred to the self-financing system from January 1, 2022

²⁴³ SDGnexus Network is a part of the DAAD "Higher Education Excellence in Development Cooperation – exceed" program and, as such, it aims to strengthen higher education for enabling effective and innovative contributions to the UN SDGs

²⁴⁴ under the Green Central Asia Program as a platform for discussion of climate change issues among different actors

²⁴⁵ on the sidelines of traditional international scientific conferences GAT-GISCA-2022 in CA and GI-2022 on geoinformatics "Priorities for land reformation strategy: challenges and solutions"

²⁴⁶ The Hydrometeorology Department was established at NUUZ in the academic year 2021/2022 by Resolution No.4896 of November 17, 2020

²⁴⁷ Appendix No.7 to Resolution No.PP-4896 of 17.11.2020

fect of dams and climate change on water scarcity and drought in arid and semi-arid river basins of India and Uzbekistan" (2021-2023) – hydrological and meteorological data of observations in the Chirchik river basin were summarized, drought indices (SPI, SSI, Run theory) were determined and correlated. Changes in annual and seasonal variability of flow in the Chirchik River were estimated. A workshop on resource management was organized jointly with the Indian Institute of Technology Kharagpur (November 13-20, Kharagpur, India); (2) "Dynamics of glacier degradation due to climate change and its impacts on river flow in the mountain systems of Uzbekistan" (2021-2023) – the long-term changes in areal and linear characteristics of glaciers in Uzbekistan, as well as their mass balance, meteorological parameters of the high-mountain zone of Uzbekistan, and runoff from glaciers were derived from remote sensing and field observations; (3) "Combined use of ground-based observations and solar radiation data from geostationary weather satellites for the sustainable development of agriculture, water resources and energy sources" (2022-2024) – it is planned to develop a database of historical data on main meteorological variables (temperature and humidity, precipitation, and wind speed and direction) for the last 10 years for all meteorological stations in Uzbekistan.

Capacity building. The following events were organized: (1) a field trip on hydrometry for the Hydrometeorology Faculty; (2) a field trip on geodesy for the Geography and Natural Resources Faculty; (3) a field trip to the training and research polygon (Muynak district, Republic of Karakalpakstan) and expedition to the dried Aral Sea bed for the Ecology and Biology Faculties (November 3-8). As part of the academic exchange program, the NUUZ teaching staff and Leibniz University Hannover (Germany) delivered lectures and practical classes for the University students at the "Charvak" field training polygon (August 10-15). Scholars from foreign universities and research institutes delivered lectures and practical classes, seminars and trainings for the University students during the year.

The Hydrometeorology Faculty organized: (1) the online contest "Water and climate change" (contest of posters, articles and videos) dedicated to the World Water Day on March 22; (2) the contest of articles "Climate change – youth perspective" dedicated to the World Meteorological Day.

The NUUZ students took part in the: (1) 8th Green Summer School "Linking scientific evidence of water and land management with the decision making support in Central Asia" (July 11-20, Almaty, Kazakhstan); (2) 3rd international student Olympiad on "Hydrology" (April 26-27, online) and the national round of the regional Olympiad "Sustainable Development Goals" on discipline "IWRM and landscape management" (May 10-11, NUUZ) and won prizes.

In 2022, the teaching staff of the Hydrometeorology Faculty defended their dissertations on discipline 11.00.03 – "Land hydrology. Water resources. Hydrochemistry".

Events. NUUZ organized: (1) the international conference "Sustainable management of earth resources and biodiversity"/SERBEMA-2022 (April 12-13); (2) scientific and practical conference "Integrated land use and land reclamation for food security: new approaches and innovative solutions"²⁴⁸ (April 21); (3) international scientific and practical conference "Hydrometeorological research in the context of climate change: current challenges and their solutions" dedicated to the 70th anniversary of Prof. F. Hikmatov (June 3); (4) republican scientific and practical conference "Formation of ecological culture: institutional framework and organizational aspects"²⁴⁹ (September 15).

Cooperation. NUUZ and the Russian State University of Hydrometeorology launched a joint online course "Meteorology and Climatology" (3+2) since the 2021-2022 academic year.

The Hydrometeorology Faculty cooperates with the Lomonosov Moscow State University (Moscow, Russia), Potsdam Institute for Climate Impact Research (Potsdam, Germany), Leibniz Institute for Tropospheric Research (Leipzig, Germany), Russian State Hydrometeorological University (St. Petersburg, Russia), Space Research Institute of the Russian Academy of Sciences (Moscow, Russia), University of Fribourg (Fribourg, Switzerland), Indian Institute of Technology Kharagpur (Kharagpur, India), University of Reading (Reading, Berkshire, UK), Kyoto University (Kyoto, Japan), Institute of Geographic Sciences and Natural Resources Research of Chinese Academy of Sciences (Beijing, China), CAREC (Almaty, Kazakhstan), SIC ICWC (Tashkent, Uzbekistan) and many others.

Publications. Since 1997, the University has been issuing its Newsletter highlighting results of research efforts and articles of teaching staff and students.

The teaching staff of the "Land Hydrology" Department prepared 1 textbook, 1 manual, 4 monographs, more than 80 scientific articles, of which 10 were published in international journals and 18 – in national journals.

Source: NUUZ named after Mirzo Ulugbek

Samarkand State University named after Sharaf Rashidov

The Samarkand State University (SamSU) was founded in 1927. The University consists of 14 faculties. The Geography and Ecology Faculty offers education in ecology, hydrometeorology (Bachelor's degree), soil science, hydrology (Master's degree).

²⁴⁸ jointly with the Senate's Committee on Agriculture and Water Management

²⁴⁹ jointly with the Committee on Ecology and Environmental Protection of the Legislative Chamber of the Oliy Majlis of the Republic of Uzbekistan and the fraction of the Ecological Party of Uzbekistan

Major Events and Activities in 2022

Research. SamSU carries out research on: (1) **sampling and analysis** of the Zarafshan River and Siyoh Canal; (2) **monitoring and mapping** of landscapes in Aydar-Arnasay lake system using remote sensing²⁵⁰; (3) **development** of chemical and phytometric methods to detect ions in soils.

The SamSU teaching staff and students jointly with scientists of the: (1) Aligarh Muslim University arranged an expedition to the Malik Desert (Bukhara province) to study its geomorphology, climate, soils, flora and geo-ecological conditions (June); (2) University of Trier (Germany) studied plant resistance to anthropogenic and abiotic factors in the Nurata, Turkestan mountain ranges and southwestern part of the Kyzylkum desert (June).



Events. SamSU organized: (1) international scientific and practical conference "Transboundary regions of Central Asia and neighboring regions: opportunities and challenges for cooperation", including sessions on "Rational use of transboundary water and hydropower", "Scientific and practical basis for solving transboundary environmental problems" (May 5-6); (2) scientific and practical seminar "Topical issues of environmental protection" (June); (3) Aggie's Summer Camp (July); (4) international conference "Pastures of Central Asia: global challenges and opportunities", with a field trip to the pastures of Nurabad district, in Samarkand province (November 15-16).



The teaching staff and students participated in the: (1) International week of innovative ideas, **InnoWeek-2022**, where 14 University's innovation projects were presented. SamSU won in the nomination "The most active HEI" (October 17-21, Tashkent); (2) 5th International educational forum "Altay-Asia 2022: Eurasian educational space – new challenges and best practices" (September 15-17, Barnaul-Belokurikha, Russia). The 5th Congress of the **Association of Asian Universities** was held within the framework of the Forum, where SamSU's Rector was elected the president of the Association (September 15).

Cooperation. SamSU had meetings with representatives of: (1) the Hungarian University of Agriculture and Life Sciences (**MATE**) (November 12); (2) **Pomeranian Academy of Poland** and discussed the matters related to development of joint educational programs, including in geography and environmental protection, and academic exchanges (December 15, online).

Publications. SamSU publishes the following journals: "Scientific Newsletter of the Samarkand State University", "Journal of Human Capital and Social Development", and "Food Security: National and Global Challenges".

Source: <https://www.samdu.uz/en>

9.2. Regional HEIs and Professional Development Centers

9.2.1. Regional Training Center at SIC ICWC

Water sector professional development courses in Central Asia were established at SIC by the ICWC decision (ICWC Protocol No.24 of 23.10.1999).

The courses were founded by the ministries of agriculture and water resources of five CA states, SIC ICWC, BWO Amu Darya and BWO Syr Darya. Later, these vocational training courses were transformed into the Regional Training Center (RTC) at SIC ICWC.

Major Events and Activities in 2022

SIC ICWC experts delivered: (1) lectures and practical classes at NRU TIAME for the 1st and 2nd year master's students on the disciplines "Hydraulics and hydrology engineering" and "GIS in hydraulics and hydrology engineering research" at the Hydraulics and Hydro-informatics Department and for students on "Integrated water resource management", "Rural

²⁵⁰ Decree of the Cabinet of Ministers #136 "On additional measures for management of Aydar-Arnasay lake system" as of 26.03.2022

water supply" and "Water quality management" at the Ecology and Water Management Department; (2) a training workshop on accurate water accounting for hydrometry experts of the District Irrigation Divisions and specialized Water Services of Khorezm province, jointly with the Left-bank Amu Darya BISA, SIC ICWC, and the Research Center for Water Problems at the Cabinet of Ministers of Uzbekistan (June 22); (3) roundtables on "Science and innovations for water security" (April 26, Turkistan, Kazakhstan) and "Following the path of Prof. V.A. Dukhovny"²⁵¹ (August 16, online).

Two master's students of NRU TIIAME on 70530804 "Hydraulics and hydrology engineering" (Hydraulics and Hydrology Engineering Department) and 70812307 "Integrated water resource use and management" (Ecology and Water Management Department)

ment) completed their internship at SIC ICWC (June 13-July 13).

D.R. Ziganshina delivered reports/lectures: (1) on "Transboundary water use: diplomacy, law and science" at the meeting of the UWED Scientific and Methodological Council. UWED is planning to launch a new training program on water diplomacy/economics and has invited SIC ICWC to participate in developing curriculum and preparing lectures (February 18); on "Legal framework of transboundary water cooperation in the Aral Sea basin" for GKU master's students (April 6, online); (3) at the workshop entitled "Emotions in international water law" as part of planned joint research by scientists of the IHE Delft Institute for Water Education (UNESCO-IHE), University of Amsterdam, SIC ICWC and GKU (October 1-3, UNESCO-IHE, Delft).

9.2.2. University of Central Asia (Kazakhstan, Kyrgyzstan and Tajikistan)

The University of Central Asia (UCA) was founded in 2000 to promote socio-economic development in Central Asia, particularly its mountain communities, by offering an internationally recognized standard of higher education. UCA is comprised of the: (1) [School of Arts and Sciences \(SAS\)](#), offering a five-year undergraduate program in six majors, including [Earth and Environmental Sciences](#); (2) Graduate School of Development (GSD), which includes the [Mountain Societies Research Institute \(MSRI\)](#); (3) [School of Professional and Continuing Education \(SPCE\)](#).

Major Events and Activities in 2022

Research. In cooperation with colleagues from the University of Potsdam, SAS experts [developed](#) the [Terra Antiqua](#) software to make paleogeographic maps for visualization in all areas of Earth science and to generate boundary conditions for climate models to predict climate change in the near and distant future. The software was presented to the General Assembly of the European and American Geoscience Unions. Training sessions were held for students from universities in Europe and UCA (November, Khorog campus, Tajikistan <https://www.youtube.com/@terraantiqua8840/videos>)

Experts of MSRI and the [Meteorological Research Institute](#) (Tsukuba, Japan) will be [conducting](#) research on dynamical downscaling for Central Asia using MRI regional climate model known as non-hydrostatic regional climate model. They will run a satellite high-resolution (5 km) climate model over Central Asia.

Capacity building. UCA organized: (1) in cooperation with partners, Summer Schools in Kyrgyzstan: on

"Knowledge transfer and data exchange" for meteorologists, hydrologists, glaciologists and ecologists of Central Asia ([August 5-11](#)) and in Issyk-Kul for civil servants in CA to discuss the integration of environmental factors in infrastructure development²⁵² ([September 21-23](#)); (2) a seminar on "New research on history, environment, society and development in the Pamirs" ([October 1-2](#)); (3) a training on remote sensing and GIS ([November](#), Khorog, Tajikistan); a [seminar](#)²⁵³ and field trip in Kulob (Khatlon district, Tajikistan).



Open lectures were delivered on: "Modern agriculture, food and rural development policy: environment, food security and nutrition, agri-food business, agri-food trade and social cohesion" ([November](#)), "Energy transition – away from fossil fuels to renew-

²⁵¹ see the event report on <http://cawater-info.net/expert-platform/pdf/16-08-2022/report-en.pdf>

²⁵² see the summary report on https://sipa-centralasia.org/wp-content/uploads/2022/12/SIPA-SS-2022-report_eng.pdf

²⁵³ results were presented for the Kulob Botanical Garden (KBG) sub-project implemented under the THRIVE GDA Tajikistan project, <https://ucentralasia.org/media/zs1j1hc2/2022-12-uca-news-eng.pdf>

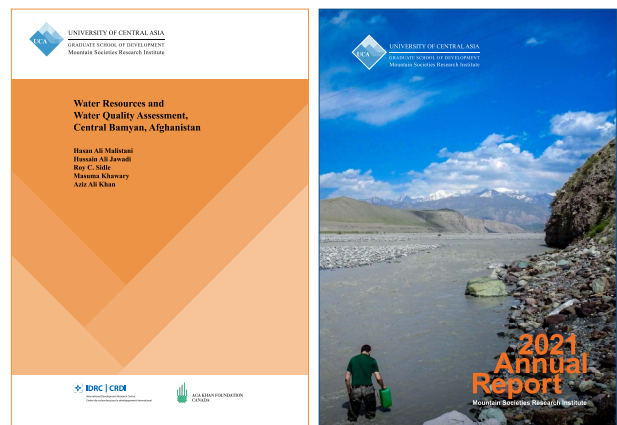
able energy sources" (November), and "Climate change as problem-solving" (December 12). Movie series entitled "Voices from the Roof of the World!"²⁵⁴ was created.

UCA participated in a number of international conferences, including those titled "Can agroecological farming feed the world? Farmers' and academia's views" (September, Prague, Czech Republic) and "Cryosphere and related hazards in high mountain Asia in a changing climate" organized by UNESCO (November 1-4, Almaty, Kazakhstan); 6th North and Central Asia multi-stakeholder forum on implementation of Sustainable Development Goals organized by ESCAP (November, Almaty, Kazakhstan).

Publications. A. Azarov, M. Kulikov, R.S. Sidle / Classification of Mountain Silvopastoral Farming Systems in Walnut Forests of Kyrgyzstan: Determining Opportunities for Sustainable Livelihoods / Agriculture 2022, 12(12), 2004 <https://www.mdpi.com/2077-0472/12/12/2004>; H.A. Malistani, H.A. Jawadi, R.C. Sidle, M. Khawary, A.A. Khan / Water Resources and Water Quality Assessment, Central Bamyan, Afghanistan / Water 2022, 14(19), 3060. <https://doi.org/10.3390/w14193060>, <https://ucentralasia.org/media/qegb4jpk/uca-msri-water-resources-eng.pdf>; A. Caiserman, R.C. Sidle, D.R. Gurung / Snow Avalanche Frequency Estimation (SAFE): 32 years of monitoring remote avalanche depositional zones in high mountains of Af-

ghanistan / The Cryosphere, 16, 3295-3312, <https://doi.org/10.5194/tc-16-3295-2022>; K. Tilekeyev, D. Kirbasheva / Rehabilitating the Irrigation Canals in Southern Kyrgyzstan: An Impact Evaluation Study / WORKING PAPER #69, 2022 <https://ucentralasia.org/media/4a1klhoz/uca-ippa-wp69-irrigation-project-engfinal.pdf>.

MSRI's Annual Report available on <https://ucentralasia.org/media/sc0nazhc/uca-msri-annualreport-2021-eng-2.pdf>



Source: <https://ucentralasia.org/ru/glavnaya>, <https://www.facebook.com/ucentralasia/>

9.3. Professional Development Courses and Trainings

9.3.1. Professional Development Courses and Trainings in 2022

February 14-18; March 14-18 and May 23-27 – trainings in GIS and remote sensing²⁵⁵

February 21-March 4 – Central Asia training course: weather and climate services for energy sector

February 21, 22, 24; March 1-3; May 16-18; August 17, 22, 25 and 31 – series of training courses²⁵⁶ on modeling tools for Water Evaluation and Planning (WEAP) and Low Emissions Analysis Platform (LEAP)

March 14 – capacity development workshop on science and policy interfaces for climate and disaster resilience by ESCAP

March 24; November 24 – webinars "Operationalizing the water-food-energy nexus in the context of climate-smart agriculture"

March 28 – "FutureDAMS Central Asia" stakeholder workshop on applying the Python Water Resources ("Pywr") model in Central Asia

March 31; May 31; July 5, 26; September 30; October 27 and November 23 – media trainings and a series of lectures²⁵⁷ on building capacity and promoting the water-energy-food-environment nexus (WEFE Nexus)

April 8 – Central Asia Regional Information Network (CARIN) Research Webinar /GOFC-GOLD CARIN # 5

May 18-30 – Summer school for water professionals in CA – expedition from the zone of the Syr Darya River flow formation to the Aral Sea

June 6-17 – online course on "Water security for policy makers and practitioners"

October 10-December 11 – course on "International Water Law and the Law of Transboundary Aquifers" (University of Geneva, EUG)

December 6-7 – workshop on the use of IWRM tools for officials involved in the development of the National Water Strategy of Uzbekistan for 2024-2026

²⁵⁴ as part of the joint initiative of the Aga Khan University, Aga Khan Agency for Habitat, Aga Khan Foundation, and UCA in preparation for COP26

²⁵⁵ within the regional project "Ecologically Oriented Regional Development in the Aral Sea Region" (ECO-ARAL)

²⁵⁶ within the framework of the USAID Regional Water and Vulnerable Environment Project

²⁵⁷ within the framework of the USAID Regional Water and Vulnerable Environment Project

NASA Applied Remote Sensing Program Trainings (ARSET):

Trainings: (1) Monitoring and modeling floods using Earth observations ([September 14-21](#)); (2) Selecting climate change projection sets for mitigation, adaptation, and risk management applications ([September 19-20](#)); (3) Climate change monitoring and impacts assessment using NASA Earth observations ([October 24](#)), etc. (visit <https://appliedsciences.nasa.gov/join-mission/training>).

ber 19-20); (3) Climate change monitoring and impacts assessment using NASA Earth observations ([October 24](#)), etc. (visit <https://appliedsciences.nasa.gov/join-mission/training>).

GOFC-GOLD CARIN webinar series, visit <https://lcluc.umd.edu/content/gofc-gold-carin-webinar-series>

9.3.2. Professional Development Courses and Trainings in 2023

Programs (UNESCO-IHE):

February-June – [course](#) on water policy and strategic planning in the context of climate change organized by IFAS and UNESCO-IHE:

– [on campus](#)

May 1-19 – [course](#) “Groundwater resources and treatment”

May 1-12 – [course](#) “Water infrastructure asset management”

May 15-26 – [course](#) “Citizen science water management and sustainable development”

July 3-14 – [course](#) “Water resource planning under changing climate and environment”

– [online](#)

February 27-June 16 – [course](#) “Public and environmental health in emergencies”

March 1-April 30 – [course](#) “Water policy analysis: a systems approach”

March 6-June 30 – [course](#) “Water and sanitation in urban humanitarian context”

September 4-October 13 – [course](#) “Irrigation management and development”

[Course](#) “Water productivity and accounting using WaPOR”

[Course](#) “Understanding climate change basics”

[Course](#) “Introduction to Modflow and Model Muse”

Programs at the University of Geneva (EUG):

February 23-March 31 – [course](#) “Water resources management and policy”

July 3-14 – [summer school](#) “Water governance: frameworks and negotiations”

<https://lcluc.umd.edu/content/gofc-gold-carin-webinar-series>

Within the framework of the USAID Regional Water and Vulnerable Environment Project:

February 23 and throughout the year – [media trainings and a series of lectures](#)²⁵⁸ on building capacity and promoting the water-energy-food-environment nexus (WEFE Nexus)

March 9-12 – [training](#) on the RDS process (Almaty, Kazakhstan)

March 13 – [regional seminar](#) on the RDS process (Burabay village, Kazakhstan)

NASA Applied Remote Sensing Program Trainings (ARSET), visit https://appliedsciences.nasa.gov/join-mission/training?program_area=All&languages=All&source=All&page=0

GOFC-GOLD CARIN webinar series, visit <https://lcluc.umd.edu/content/gofc-gold-carin-webinar-series>

IWMI webinar series, visit <https://www.iwmi.cgiar.org/events/early-career-researchers-webinar-series-by-iwmi-in-india/>

The International Water Training Institute (<https://hydroschool.org/>) provides trainings on surface water hydrology, surface water hydraulics, water quality, and groundwater

The Institute has also a webinar series for 2023 <https://hydroschool.org/webinars/>

September 10-19 – [summer field school](#) (hybrid) on mountain ecosystems and resource management (Igman, Bosnia and Herzegovina)

<https://www.grassrootsglobal.net/mer2023/?fbclid=IwAR1mZwWtyNEl6GetNsij-87NcPd7j5wa04vSyrK75Vff651qA00Czqd7ok>

²⁵⁸ within the framework of the USAID Regional Water and Vulnerable Environment Project