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Nexus solutions for a climate resilient Central Asia



SIC ICWC

Scientific-Information Center
of the Interstate Commission
for Water Coordination
of Central Asia

WATER YEARBOOK

CENTRAL ASIA AND AROUND THE GLOBE

20 23

Tashkent 2024

WATER YEARBOOK

**CENTRAL ASIA AND
AROUND THE GLOBE**

**20
23**

Tashkent 2024

Under the general editorship of Dinara Ziganshina

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List of Abbreviations

ACN	Academic Community Network
ADB	Asian Development Bank
AIIB	Asian Infrastructure Investment Bank
ALRI	Agency for Land Reclamation and Irrigation (Tajikistan)
ASB	Aral Sea Basin
ASBmm	Aral Sea Basin model
ASBP	Aral Sea Basin Program
AWC	Asia Water Council
BISA	Basin Irrigation System Administration
BWA	Basin Water Authority
BWO	Basin Water Organization
CA	Central Asia
CALPESD	Central Asian Leadership Program of Education for Sustainable Development
CAREC	Regional Environmental Centre for Central Asia
CDW	Collector-drainage water
CIS	Commonwealth of Independent States
CMC ICWC	Coordination Metrological Center of ICWC
CSTO	Collective Security Treaty Organization
CTWC	Chu-Talas Water Commission
DWRLR	Department for Water Resources and Land Reclamation at the Ministry of Agriculture, Food Industry and Land Reclamation (Kyrgyzstan)
EBRD	European Bank for Reconstruction and Development
EC IFAS	Executive Committee of IFAS
ECOSOC	UN Economic and Social Council
ED IFAS	Executive Directorate of IFAS
EECCA NWO	Eastern Europe, Caucasus, and Central Asia Network of Water Management Organizations
EIA	Environmental Impact Assessment
EIB	European Investment Bank
ESCAP	Economic and Social Commission for Asia and the Pacific
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographic Information System
GIZ	German Agency for International Cooperation (Gesellschaft für Internationale Zusammenarbeit)
GWP	Global Water Partnership
ICID	International Commission on Irrigation and Drainage

ICSD	Interstate Commission for Sustainable Development of Central Asia
ICWC	Interstate Commission for Water Coordination of Central Asia
IFAD	International Fund for Agricultural Development
IFAS	International Fund for Saving the Aral Sea
IFCA	Investment Fund for Central Asia
INBO	International Network of Basin Organizations
IsDB	Islamic Development Bank
IUCN	International Union for Conservation of Nature
IWAC	International Water Assessment Center
IWMI	International Water Management Institute
IWRA	International Water Resources Association
IWRM	Integrated Water Resource Management
KR	Kyrgyz Republic
MAEP	Ministry of Agriculture and Environmental Protection (Turkmenistan)
MEGNR	Ministry of Ecology, Geology and Natural Resources (Kazakhstan)
MFA	Ministry of Foreign Affairs
MPHSTF	UN Multi-Partner Human Security Trust Fund for the Aral Sea region in Uzbekistan
MWM	Ministry of Water Management (Uzbekistan)
NASA	National Aeronautics and Space Administration
NHMS	National Hydrometeorological Services
NGO	Non-governmental organization
OECD	Organization for Economic Cooperation and Development
OIC	Organization of Islamic Cooperation
OPEC	Organization of the Petroleum Exporting Countries
OSCE	Organization for Security and Co-operation in Europe
RCH	Regional Center of Hydrology
REAP	Regional Environmental Action Plan for Central Asia
REP4SD-CA	Regional Environmental Program for Sustainable Development in Central Asia
RES	Renewable Energy Sources
RK	Republic of Kazakhstan
RMCCA	Regional Mountain Centre of CA
RT	Republic of Tajikistan
Ruz	Republic of Uzbekistan
RWG	Regional Working Group
SCO	Shanghai Cooperation Organization
SDC	Swiss Agency for Development and Cooperation
SDG	Sustainable Development Goal
SIC ICSD	Scientific-Information Center of the Interstate Commission for Sustainable Development
SIC ICWC	Scientific-Information Center of the Interstate Commission for Water Coordination
SIWI	Stockholm International Water Institute
SPECA	Special Program for the Central Asian countries

UN	United Nations
UNDP	United Nations Development Program
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNESCO-IHP	UNESCO's Intergovernmental Hydrological Program
UNFCCC	United Nations Framework Convention on Climate Change
UNGA	UN General Assembly
UNIDO	United Nations Industrial Development Organization
UNRCCA	United Nations Regional Centre for Preventive Diplomacy for Central Asia
UNSC	UN Security Council
UN SPAS	UN Special Program for the Aral Sea Basin
USAID	United State Agency for International Development
VNR	Voluntary national review
WB	World Bank
WCA	Water Consumer Association
WHO	World Health Organization
WMO	World Meteorological Organization
WUA	Water User Association
WWC	World Water Council

Preface

Dear readers,

The seventh edition of the Water Yearbook: Central Asia and Around the Globe is now available, featuring key events, initiatives, and achievements in 2023 across 17 dedicated thematic sections.

A landmark event in the region in 2023 was the 30th anniversary of the International Fund for Saving the Aral Sea (IFAS), a unique intergovernmental organization fostering water and environmental cooperation among Central Asian countries. To commemorate this milestone, an [international conference](#) titled "Central Asia: Towards Sustainable Future through a Strong Regional Institution" was held in Dushanbe in June. The conference served to showcase the Fund's achievements and define key priorities for future cooperation (see [2023 Calendar of Events](#)). Throughout the year, a series of national and regional events was organized to raise awareness about the critical issues facing the Aral Sea basin. The Council of Heads of IFAS Founding States convened to discuss strategies for strengthening IFAS's role and enhancing its international profile. During the meeting held in Dushanbe on September 15, the chairmanship of IFAS was transferred to the Republic of Kazakhstan for the 2024-2026 term.

Numerous meetings and activities were undertaken to strengthen bi- and multilateral cooperation. These included meetings of the IFAS Board, the Interstate Commission for Water Coordination (ICWC), and the Interstate Commission for Sustainable Development (ICSD), along with the work of various bi- and trilateral working groups and commissions (See [IFAS and other regional organizations in Central Asia; Cooperation between the Countries of Central Asia on Water and Other Matters](#)).

The [UN 2023 Water Conference](#) was a landmark event held in New York from March 22-24. This conference, the second of its kind, resulted in over 700 [voluntary commitments](#) from governments and stakeholders worldwide. Notably, the Central Asian countries at the conference [reaffirmed](#) their dedication to collaborative actions ([Section 6.1](#)).

The Yearbook highlights significant water developments in Central Asian countries ([Section 5](#)) and globally ([Section 11](#)), while also documenting the activities of the United Nations and other international development partners ([Sections 6-8](#)). The Yearbook also systematizes the information on education and training programs ([Section 9](#)) and highlights innovative approaches in water, energy, and agriculture, along with the activities of research institutions within the EECCA region ([Section 10](#)).

The [Thematic Reviews](#) provide insights into climate change, progress towards the Sustainable Development Goals (SDGs), the growing influence of Artificial Intelligence (AI), and global and Central Asian developments in green hydrogen.

In concluding, we express our gratitude to all contributors to this edition. We hope this Yearbook will serve as a valuable resource for practitioners, researchers, and anyone interested in advancing sustainable water management in the region and globally.

Editorial Team





1

SECTION

2023 Calendar of Events

January

- **January 15-19** – [13th IWA International Conference](#) on Water Reclamation and Reuse: Overcoming the Challenges of Growth and Climate Change, Chennai, India
- **January 16-18** – [World Future Energy Summit](#), Abu Dhabi, UAE
- **January 17-19** – [UNESCO-IWRA Online Conference](#) “Emerging Pollutants: Protecting Water Quality for the Health of People and the Environment”
- **January 19-28** – International Green Week 2023, Berlin, Germany
- **January 25-26** – WWT Wastewater Conference & Exhibition 2023, Birmingham, UK
- **January 25-27** – 10th ICID International Micro Irrigation Conference, Dakhla, Morocco

February

- **February 2** – World Wetlands Day
- **February 7-10** – 2nd WASAG International Forum on Water Scarcity in Agriculture, Praia, Cape Verde
- **February 9-10** – 7th International Conference on Climate Change, Colombo, Sri Lanka
- **February 14** – International Scientific and Practical Conference on Environment, Natural Resources and Sustainable Water Use, [EnREM 2023](#), online
- **February 15-16** – Kick-off meeting of the 10th World Water Forum, Jakarta, Indonesia
- **February 16-17** – 15th [meeting](#) of the Implementation Committee of the Water Convention, Geneva, Switzerland
- **February 17-18** – 82nd Board of Governors meeting of the World Water Council, Denpasar, Indonesia
- **February 22-24** – [International Conference](#) “Silk Road of Knowledge: Science meets Green Policy”, Almaty, Kazakhstan, online
- **February 23-24** – 7th EU-Central Asia High Level Conference, Rome, Italy

March

- **March 3** – World Wildlife Day
- **March 8-9** – [Earth Summit 2023](#), Doha, Qatar
- **March 9-10** – [International Conference](#) “Cooperation on Food Security in the context of Climate Change”, Ashgabat, Turkmenistan
- **March 14** – World Rivers Day
- **March 14-16** – ASIA 2023: Water Resources and Renewable Energy Development in Asia, Kuala Lumpur, Malaysia

- **March 16-17** – 2nd International Conference on Dam Safety Management & Engineering, Kuala Lumpur, Malaysia
- **March 18** – Conference "Water Resources in Central Asia: Challenges and Prospects", Bishkek, Kyrgyzstan
- **March 21** – International Day of Forests
- **March 21-23** – Water Korea Exhibition 2023, Seoul, South Korea
- **March 22** – World Water Day
- **March 22-24** – UN Water Conference, New York, USA
- **March 23** – World Meteorological Day
- **March 26** – Aral Sea Day
- **March 27-30** – Asia-Pacific Forum on Sustainable Development 2023, Bangkok, Thailand
- **March 29-30** – Regional Forum on Sustainable Development, Geneva, Switzerland

April

- **April 7** – International Student Conference "Modern Global Trends: Challenges and Risks for Central Asia", Almaty, Kazakhstan
- **April 15-16** – G7 Ministerial Meeting on Climate, Energy and Environment, Sapporo, Japan
- **April 16-22** – 4th World Irrigation Forum (WIF4), Beijing, China
- **April 19-21** – International Trade Fair for Environmental Technologies: Solutions for Water, Wastes, Air and Soil, Shanghai, China
- **April 19-21** – International Conference on Climate Risks, Vulnerability and Resilience Building, Paris, France
- **April 22** – International Mother Earth Day

May

- **May 8-10** – Global Water Summit 2023, Berlin, Germany
- **May 15-16** – 2nd World Conference on Environment and Earth Sciences, Paris, France
- **May 15-17** – Exhibition on Green Energy Technologies in Central Asia (GETCA), Tashkent, Uzbekistan
- **May 16-17** – Central Asia Climate Change Conference (CACIC-2023), Dushanbe, Tajikistan
- **May 17-19** – Uzbekistan Energy Forum, Tashkent, Uzbekistan
- **May 23-25** – 22nd International Congress and E-World Energy & Water 2023, Essen, Germany

- **May 24-26** – International Energy and Environment Conference and Fair (ICCI 2023), Istanbul, Turkey
- **May 25-26** – [X Nevsky International Ecological Congress](#), Saint Petersburg, Russia
- **May 28-June 6** – 18th IWA Leading Edge Conference on Water and Wastewater Technologies, Daegu, South Korea

June

- **June 1-2** – Regional round-table “Aarhus Convention: Effective Public Participation for Good Governance, Healthy Environment and Sustainable Development”, Tashkent, Uzbekistan
- **June 4-6** – Singapore International Water Week, Republic of Singapore
- **June 5** – [World Environment Day](#)
- **June 5-7** – [International Conference](#) “Central Asia: Towards Sustainable Future through Strong Regional Institution” dedicated to the 30th anniversary of IFAS, Dushanbe, Tajikistan
- **June 5-7** – Aquatech China 2023, Shanghai, China
- **June 5-15** – [Bonn Climate Change Conference](#), Bonn, Germany
- **June 6-8** – [Ecosperity Week 2023 – Breakthroughs for Net Zero](#), Singapore
- **June 7-8** – 7th Annual International Congress and Exhibition “Hydropower of Central Asia and Caspian”, Astana, Kazakhstan
- **June 7-9** – 44th International Exhibition on Environmental Technology & Green Energy (ENVEX 2023), Seoul, South Korea
- **June 8** – World Ocean Day
- **June 8-9** – Eurasian Congress'2023 under the slogan 'Eurasia of the Future: from Challenges to Solutions', Sochi, Russia
- **13-16** – Asia Clean Energy Forum 2023, Manila, Philippines
- **June 17** – World Day to Combat Desertification and Drought
- **June 20** – International conference “Financial and Investment Support of Measures for the Sound Water Management”, Ashgabat, Turkmenistan
- **June 20-21** – 7th All-Russian Water Congress, Moscow, Russia
- **June 27-29** – 7th International Conference “Energy and Meteorology” (ICEM), Padova, Veneto, Italy
- **June 27-29** – High-Level Summit and International Scientific Symposium “Fundamental Life Science meets Climate, Environment and Sustainability: New Bridges – New Partnerships – New Opportunities”, Paris, France

July

- **July 1-7** – 43rd Session of the FAO Conference, Rome, Italy
- **July 3-8** – 17th International Scientific and Practical Conference of the Russian Society of Ecological Economics (RSEE-2023) “Global Challenges and National Environmental Interests: economic and social aspects”, Novosibirsk, Russia

- **July 6-7** – 3rd International Conference on Water and Climate, Fez, Morocco
- **July 10-15** – 11th World Congress of the International Association for Landscape Ecology (IALE), Nairobi, Kenya
- **July 10-19** – High Level Political Forum on Sustainable Development (HLPF), New York, USA

August

- **August 12** – Caspian Sea Day
- **August 16-17** – Zanzibar Water Conference, Zanzibar, Tanzania
- **August 20-24** – Stockholm World Water Week, Stockholm, Sweden
- **August 22-24** – 2nd International Specialized Ecological Exhibition “Ecology Expo 2023”, Minsk, Belarus
- **August 28-September 1** – 8th Asia-Pacific Climate Change Adaptation Forum (APAN), Incheon, Republic of Korea

September

- **September 5-7** – International Exhibition and Conference for Environmental Technologies 2023, Mexico City, Mexico
- **September 7-8** – International Conference on Food Security, Samarkand, Uzbekistan
- **September 9-10** – 84th Board of Governors meeting of the World Water Council
- **September 11-15** – [XVIII IWRA World Water Congress](#), Beijing China
- **September 12-14** – 17th International Exhibition of Technologies and Equipment for Municipal and Industrial Water and Wastewater Treatment “Ekvatek”, Moscow, Russia
- **September 12-15** – 20th International Conference on Dam Management, Chorzów, Poland
- **September 14-15** – [Meeting of the Council of Heads of IFAS Founding States](#), Dushanbe, Tajikistan
- **September 18** – Climate Ambition Summit, New York, USA
- **September 18-19** – SDG Summit, UN Headquarters, New York
- **September 20** – World Cleanup Day
- **September 21-22** – Second High-Level Dialogue on Climate Change and Resilience in Central Asia “Early warning systems for climate resilience”, Bishkek, Kyrgyzstan
- **September 26** – World Environmental Health Day
- **September 28** – World Maritime Day

October

- **October 2-3** – 10th OECD Forum on Green Finance and Investment, Paris, France
- **October 12-13** – 2nd Stakeholder Consultation Meeting of the 10WWF, Bali, Indonesia
- **October 12-13** – International Forum “Sustainable Development of Mountain Territories”, St. Petersburg, Russia
- **October 15** – International Day of Rural Women
- **October 16-18** – HYDRO 2023 International Conference and Exhibition, Edinburgh, UK
- **October 16-19** – 20th Europe-INBO International Conference, Valencia, Spain
- **October 23-27** – Global Green Growth Week
- **October 23-28** – 14th Meeting of the Conference of the Parties to the Convention on the Conservation of Migratory Species of Wild Animals, Samarkand, Uzbekistan

November

- **November 1-8** – 25th International Congress on Irrigation and Drainage and 74th International Executive Council Meeting on “Tackling Water Scarcity in Agriculture”, Visakhapatnam, India
- **November 6-8** – 3rd Almaty Energy Forum, Kazakhstan
- **November 7-13** – International Week of Science and Peace
- **November 7-9** – 19th World Lake Conference, Balaton, Hungary
- **November 10** – World Science Day for Peace and Development
- **November 13-17** – 21th session of the UNCCD Committee for the Review of the Implementation of the Convention (CRIC21), Samarkand, Uzbekistan
- **November 15-17** – Water, Energy, Technology, and Environment Exhibition (WETEX) 2023, Dubai, UAE
- **November 30-December 12** – Climate Conference (COP28), Dubai, UAE

December

- **December 5** – World Soil Day
- **December 7-8** – 8th meeting of the Task Force on the Water-Food-Energy-Ecosystems Nexus, Geneva, online
- **December 10-14** – IWA Water Development Congress&Exhibition, Kigali, Rwanda
- **December 11** – International Mountain Day
- **December 11-12** – 16th meeting of the Implementation Committee of the Water Convention, Geneva, Switzerland
- **December 14-15** – International Scientific and Practical Conference “Reclamation of Land to Address Geo-ecological Problems in Eurasia”, Moscow, Russia

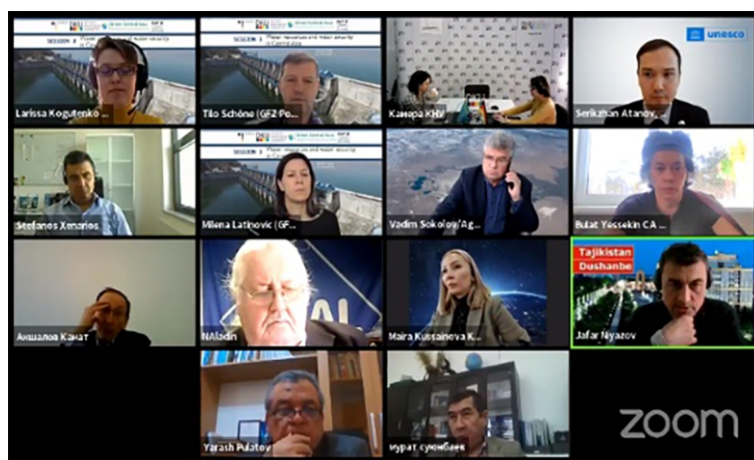
Major Events in Central Asia

International conference “The Silk Road of Knowledge: Science meets Green Policy”, Almaty, Kazakhstan, online, February 22-24

The conference “The Silk Road of Knowledge: Science meets Green Policy” aimed to provide innovative solutions for the five Central Asian economies was organized by the Kazakh-German University (DKU)¹, with the financial support of the Federal Foreign Office of Germany. The conference was preceded by (1) [Central Asian Youth Session](#) “Youth for Youth: Sustainable Development and Innovation” (December 13, online); and (2) Colloquium “Cooperation on Sustainable Development and Climate Change Response in Central Asia and Afghanistan” (January 17, online).

The conference [agenda](#) included a [high-level session](#)² on “Bridging the Gap between Science, Education and Policy Practice” and 6 thematic sessions: (1) “Innovations in Climate Change Adaptation and Mitigation in Water Management in Central Asia”; (2) “Climate Change Adaptation and Sustainable Rangeland Management in Central Asia”; (3) “Sustainable Land Management under Climate Change”; (4) “Ensuring Climate Resilient Infrastructure Development”; (5) “Women’s Empowerment in Energy in Central Asia”; (6) “[International Hydrodiplomacy](#): Strengthening Regional Water Institutions in Central Asia”.

The conference served as a platform to strengthen cooperation and networking among scientists, policy makers and practitioners, facilitating the exchange of experiences and the development of knowledge in areas such as water management, food security, infrastructure development and energy efficiency practices in the context of climate change.



International Conference “Cooperation on Food Security in the Context of Climate Change”, Ashgabat, Turkmenistan, March 9-10

The Conference was organized by the Government of Turkmenistan in partnership with FAO, with the support from the UNDP office in Turkmenistan. Its primary objective was to address the issues related to regional and global cooperation on food security. Participants included representatives from Central Asia countries, Iran, Turkey, the United Nations, international and regional organizations accredited in Turkmenistan, diplomatic corps, financial institutions such as the World Bank (WB) and USAID, as well as representatives from Turkmenistan's ministries and agencies. Additionally, academia, students and mass media media from both Turkmenistan and abroad attended the Conference.

The agenda included a plenary meeting and several thematic sessions. Participants discussed the relationship between climate change and its direct impact on the agricultural systems and food security in Central Asia and Iran, as well as the regional dimensions of cooperation in these areas. A separate session was



Source: <https://turkmenistan.un.org/en/226382-international-conference-ashgabat-discusses-ways-ensure-sustainable-food-systems-context>

¹ DKU has been holding the conferences since 2020 as part of the “Green Central Asia initiative.”

² for recordings of the high-level and thematic sessions, please, follow the links



Source: <https://turkmenistan.un.org/en/226382-international-conference-ashgabat-discusses-ways-ensure-sustainable-food-systems-context>

dedicated to the Turkmenistan's initiative on the establishment of a regional climate technology center for Central Asia under the auspices of the United Nations.

The Conference concluded with the adoption of a Communiqué, in which the participants: "emphasized that for Central Asian countries, climate impacts on ecosystems are transboundary in nature, espe-

cially with regard to water and land degradation; agreed that the efforts of each country and the joint efforts of countries and international and regional organizations are important in ensuring food security in the context of climate change; underscored the importance of multisectoral cooperation, in particular between ministries of agriculture and the environment ...". The Communiqué also noted the importance: (1) with regard to providing the economic, social and environmental foundations for food security and nutrition for future generations – "...of incorporating climate change adaptation and mitigation into countries' medium-term programs for inclusive growth, ... of considering the links between human mobility, the environment, climate change and food security, ... of promoting increased investment in environmental solutions to meet climate change, biodiversity and land degradation goals..."; (2) with regard to strengthening regional cooperation – "...of water diplomacy as a tool that promotes water efficiency and improves transboundary water management in Central Asia, ... of opening and operating a regional climate technology center for Central Asia, under the auspices of the United Nations, ... of adopting a regional climate change adaptation strategy and developing its action plan."

The communiqué of the International Conference was published³ in the six official languages of the UN (A/77/837) as an official document of the 77th session of the UN General Assembly.

Conference 'Water Resources in Central Asia: Challenges and Prospects', Bishkek, Kyrgyzstan, March 18

The goal of the Conference was to discuss water challenges, focusing on the achievement of SDG6, and explore prospects for mutually beneficial cooperation and sustainable development in the region.

The event was organized by Green Alliance Kyrgyzstan, Open Innovations, and Green4, with support from UNDP and the European Union, as part of the UN Water Conference.

Participants included representatives of the Kyrgyz Parliament, line ministries, civil society organizations, women's and youth groups, as well as experts from research organizations and international development partners.

The agenda featured a plenary session and three panel sessions: (1) Water for Sustainable Development; (2) Water, Science, Gender and Cooperation; (3) Water, Environment and Resilience to Climate Change.



Source: <https://green-alliance.kg/environmental-organizations-discussed-prospects-of-water-action-for-climate-resilience/>

³ The document was published under agenda items 18 "Sustainable Development", 24 "Agricultural Development, Food Security and Nutrition" and 61 "Zone of Peace, Trust and Cooperation of Central Asia"

The 5th Central Asia Climate Change Conference (CACCC-2023), Dushanbe, Tajikistan, May 16-17

The aim of the Conference was to promote enhanced regional and inter-sectoral dialogue, facilitate the exchange of information and knowledge in support of climate-smart decisions, and identify opportunities for synergies between climate projects across Central Asia. The Conference held under the motto "Climate Change and Development" was organized by CAREC in partnership with the Committee for Environmental Protection under the Government of the Republic of Tajikistan⁴. Participants included authorized representatives of line ministries of the Central Asian countries, business representatives, the expert community, international development partners, multilateral development banks, youth unions, non-governmental institutions, civil society organizations working in the field of climate change.

Pre-Conference events included: (1) trainings for mass media "Media and Climate Change: Theory and Practice" (May 11-12, online and May 15, Dushanbe); (2) youth pre-Conference session (May 15); (3) meeting of the Regional Network of Climate NGOs for Central Asia to discuss preparations for COP28 (May 15).

The [agenda](#) included (1) plenary session "Climate Change and Development in Central Asia"; (2) three panel sessions: "National Policies, Strategies and Programs on Climate Change Mitigation and Adap-



tation", "Harnessing the Potential of Regional Cooperation in a Changing Global Policy Environment", "Climate Finance: Needs and Opportunities"; (3) three parallel sessions: "Water Security, Energy Security and the Water-Energy-Food Nexus: Potential for Youth Participation".

A [Nexus game](#)⁵ was organized on the margins of the Conference, along with an exhibition of sustainable consumption and production practices⁶. A post-Conference regional practical training⁷ "Improving data collection and analytical tools for forecasting greenhouse gas emissions in Central Asian countries" was held on May 18-19.

International Conference "Central Asia: Towards Sustainable Future through Strong Regional Institution" dedicated to the 30th anniversary of the International Fund for Saving the Aral Sea, Dushanbe, Tajikistan, June 5-7

The [Conference](#) was organized by EC IFAS, with the support of the Government of the Republic of Tajikistan, in cooperation with development partners. Participants included high-ranking officials, policy makers, experts, scientists, civil society, international organizations, financial institutions, youth and other stakeholders from Central Asian countries.

Seven side events were organized before the Conference: (1) "Building resilience in Tajikistan: an upstream approach to climate risk assessment", organized by ADB; (2) "Hydropower and gender equality for effective water resources management under climate change: challenges and opportunities for Cen-



tral Asia" organized by UNRCCA CA in collaboration with DPPA; (3) "Sustainable development of Central Asia: integration of small hydropower and analysis of trade-offs in the water-energy and food nexus of

⁴ within "Climate Adaptation and Mitigation Program in the Aral Sea Basin AF" (CAMP4ASB AF), "Central Asia Nexus Dialogue Project: Fostering Water, Energy and Food Security Nexus and Multi-Sector Investment" (NEXUS), PROGREEN, and "Central Asia Water and Energy Program" (CAWEP)

⁵ as part of the EU project "Nexus Dialogue in Central Asia"

⁶ as part of "Resource Efficiency in Agricultural Production and Processing"/REAP

⁷ as part of the ReCATH project, the Initiative for Climate Action Transparency (ICAT) is being implemented to support countries in strengthening their capacity to develop and manage a robust, transparent framework. This framework aims to enable the effective implementation of the Paris Agreement and facilitate the transition to the new reporting requirements under the Enhanced Transparency Framework



Source: <https://www.facebook.com/ec.ifas/>

transboundary rivers", with the support of IWMI, National Research University "TIIAME", Tajik Research Institute of Hydraulic Engineering and Land Reclamation (Tajik NIIGiM), and SIC ICWC; (4) "Water security problems in Central Asia: bridging knowledge gaps and developing action plans", organized by IWMI and the Institute of Water Problems, Hydropower and Ecology of the National Academy of Sciences of Tajikistan; (5) "MODSNOW⁸ – operational system for monitoring water resources in Central Asia", co-organized by the German Research Centre for Earth Sciences (GFZ Potsdam) and Innovative Water and Environmental Solutions (IWES); (7) "Regional Conference on strengthening networking and cooperation on water across research institutes in Central Asia: scientific Innovation for sustainable future" organized by USAID (June 5, Dushanbe).

As part of the Conference, a regular meeting of the IFAS Board was held on June 5 in Dushanbe, along

with a meeting of the EC IFAS Coordination Platform with international development partners.

The [Conference agenda](#) included: (1) plenary session "Key achievements and developments over the last 30 years and a strategic vision for the future of IFAS"; (2) four interactive dialogue sessions: "Inter-basin", "Intergenerational", "Public-Private" and "Policy and Science Dialogue"; (3) two cooperation workshops: "Innovative solutions for strengthening regional co-operation" and "Building a stronger institutional and legal framework to improve IFAS".

On the margins of the Conference, a number of events were held: (1) an awarding ceremony for IFAS veterans, members of the Fund's Board, Executive Committee, ICWC, ICSD, structural subdivisions, employees of the Executive Committee's branches and IFAS bodies, who made a significant contribution to IFAS activities ([June 6](#)); (2) International Exhibition "Water – the basis for regional cooperation and sustainable development in Central Asia" (June 5-7); (3) field trips to Nurek HPP and Hisar fortress (June 7).

The Conference adopted the [Resolution](#), in which the participants appealed: (1) to the governments of CA countries: "to make additional efforts to improve institutional and legal mechanisms, raise awareness and take action to mitigate water-related risks, attract and apply new progressive technologies, increase funding, introduce other innovative tools and approaches, encourage research and exchange, as well as strengthen water and environmental cooperation and water diplomacy to solve the above problems and implement the proposed measures"; (2) to the financial institutions, international organizations, donor countries and other development partners to provide "...support, including financial, technical, technological, to the countries of Central Asia to solve the main tasks of achieving sustainable development, especially in rural areas, including the implementation



Source: <https://www.facebook.com/ec.ifas/>



Source: <https://www.facebook.com/ec.ifas/>

⁸ MODSNOW – an operational tool for daily snow cover monitoring and river flow forecasting

of the Action Program to Assist the countries of the Aral Sea basin (ASBP-4) by 2030 and the Regional Environmental Protection Program for the Sustainable Development of Central Asia"; (3) to the representatives of private sector "...to promote the solution of water problems and the introduction of "green" techno-

logies..."; (4) to the civil society of the region "to actively participate in discussions of water problems and generation of ideas, proposals for joining efforts with the government, private sector and international organizations to solve them."

International Forum "Children and Youth in Action – Climate Change in Central Asia"⁹, Tashkent, Uzbekistan, November 9

The Forum was organized by UNICEF and the International Public Foundation "Zamin" in partnership with the Ministry of Ecology, Environmental Protection and Climate Change, the Ministry of Pre-school and School Education, and the Agency for Youth Affairs under the Ministry of Youth Policy and Sports of the Republic of Uzbekistan.

The Forum was attended by the First Ladies of the Republic of Turkey, the Islamic Republic of Iran, the Kyrgyz Republic, the Republic of Uzbekistan, representatives of the Government of Uzbekistan, UNICEF, heads of UN agencies, heads of relevant ministries and departments of Central Asian countries, international and regional organizations, national institutions, civil society and young eco-activists of Central Asian countries.

Youth of Central Asia: (1) stressed the right of children to participate in the development of policies and programs, as well as in monitoring and evaluation of progress on climate actions; (2) called on the governments to fully support environmental youth initiatives; (3) expressed the wish that business in Central Asia become "green" to preserve limited natural resources and environment in the region; (4) proposed building capacities of children and youth through conti-



**Международный форум:
«Дети и молодежь в действии —
изменение климата в Центральной Азии»,
приуроченный ко Всемирному дню ребенка**

nuous green education and promotion of environmental culture since early childhood; (5) noted the need to increase knowledge of both pre-school and school teachers in this area.

The Forum led to the signing of the Regional Strategy for Promoting a Culture of Sustainable Development and Engaging Children and Youth in the Climate Agenda. The document outlined recommendations on environmental education, including:

- Introduction of the concept of eco-scouting (eco-volunteering) as part of lifelong learning;
- Promotion and encouragement of eco-volunteering through awards and the recognition of volunteer activities in university admissions and employment;
- Development of the animation industry to include ecological messages;
- Involvement of school-age children and youth in the work of government bodies and institutions dealing with climate change, providing them with opportunities to contribute to climate policies;
- Organization of environmental campaigns and competitions among schoolchildren and students to foster active participation in addressing climate change;
- Provision of grant programs and subsidies from governments to support youth start-ups in the field of ecology;
- Organization of "green corners" in kindergartens, among other initiatives.



Source: <https://kun.uz/ru/news/2023/11/09/v-tashkente-proshyol-mejdunarodnyy-forum-deti-i-molodej-v-deystvii-izmeneniye-klimata-v-tsentralnoy-azii>

⁹ timed to coincide with World Children's Day and COP28



2

SECTION

Water Management Situation in the Aral Sea Basin

2.1. Water Management Situation in the Amu Darya and Syr Darya River Basins

Water Resources

In 2023, the **total annual runoff in the Amu Darya and Syr Darya river basins** amounted to 106.06 km³, which is 90% of the average long-term runoff.

Amu Darya River Basin

The annual runoff in the Amu Darya basin (Amu Darya and Zerafshan rivers) was 70.78 km³, of which 56.5 km³ is the runoff of the Amu Darya River at the nominal "Kerki" section (upstream of the water intake for the Garagumdarya canal). The flow of the Amu Darya River was 92% of the norm in the first quarter, 93% during the growing season, and 76% in October-December.

The total water storage in the Nurek and Tuyamuyun reservoirs was 12.82 km³ as of January 1, 2023.

Syr Darya River Basin

In the Syr Darya basin, the annual runoff, including the Naryn, Karadarya, Chirchik rivers, as well as small rivers, is equal to 35.28 km³, of which 20.76 km³ is the total inflow to the 3 reservoirs – Toktogul, Andijan and Charvak.

By January 1, 2023, the total water storage in the basin's reservoirs was 20.13 km³, including 12.88 km³ in large reservoirs (Toktogul, Andijan, Charvak) located in the flow formation zone.

Operation of Reservoir Hydrosystems

The annual inflow to the Nurek reservoir was 21.01 km³, including 16.8 km³ (80%) during the growing season. The annual outflow from the reservoir was 21.15 km³, with 13.28 km³ released during the growing season.

Due to insufficient inflow from the Panj River, the annual flow into the Tuyamuyun Hydrosystem was only 20.08 km³, which was 4.33 km³ less than forecast. During the growing season, the inflow was 14.09 km³. The annual outflow from the reservoir was 19.54 km³, or 85% of the schedule set by the BWO Amu Darya, including 13.31 km³ during the growing season, which is 75%.

The annual inflow to the Toktogul reservoir, located on the Naryn River, was 12.24 km³, including 9.18 km³ during the growing season, or 75% of the annual inflow. The annual outflow from the reservoir amounted to 12.86 km³, of which 5.35 km³ (42%) was released during the growing season. The Toktogul Reservoir was drawn down by 0.62 km³, and its volume at the end of the year was 10.42 km³.

Water Allocation and Water Shortage

Water resources are allocated by the ICWC between the riparian states of the Amu Darya and the Syr

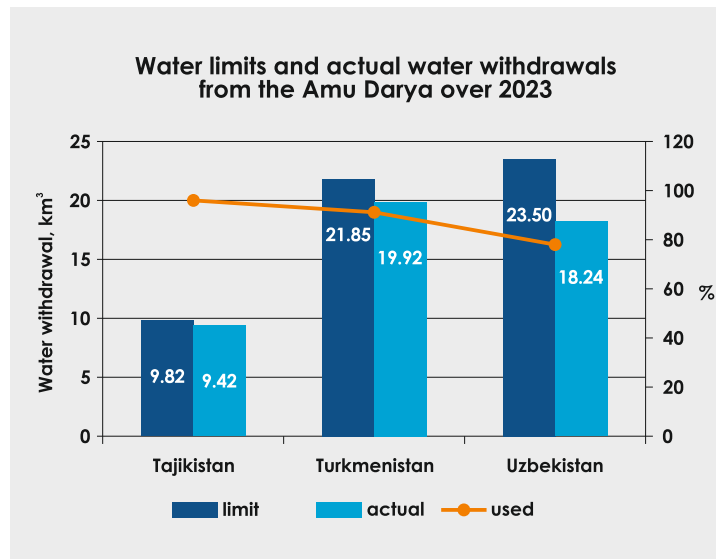
Darya (allocation of water withdrawal limits/quotas) on a hydrological year basis, i.e. for a period from October to September. However, the analysis below presents water allocation data for a calendar year (January-December).

Amu Darya Basin

In 2023, the water withdrawal limit for the Amu Darya river basin was set at 55.17 km³, of which 47.58 km³ was actually withdrawn. During the growing season, 33.19 km³ was withdrawn. Overall, 86% of the annual limit was utilized, including 84% during the growing season.

The distribution of water withdrawals among the countries was as follows:

- Tajikistan: limit – 9.82 km³; actual withdrawal – 9.42 km³
- Turkmenistan: limit – 21.85 km³; actual withdrawal – 19.92 km³
- Uzbekistan: limit – 23.5 km³; actual withdrawal – 18.24 km³



During the growing season, water shortages in the river reach between the Nurek hydropower plant and the Tuyamuyun reservoir (Darganata site) amounted to 3% for Tajikistan and 13% for Uzbekistan, while Turkmenistan experienced no shortages in this section. However, in the reach between the Darganata and the Samanbay site, Turkmenistan and Uzbekistan faced undersupplies of 30% and 38%, respectively, during the same period. These increasing water shortages along the river during the growing season can be attributed to uneven distribution across the territory.

Syr Darya Basin

The total water withdrawal in the Syr Darya Basin (up to the entry point of the Shardara reservoir) reached 13.65 km³, including 9.81 km³ during the growing season, which represents 82% of the canal water withdrawal limit. Additionally, 500 million m³ was discharged from the Syr Darya into the Arnasay Lake system.

Overall, 85% of the water allocation plan set by the BWO Syr Darya was implemented. Water shortages in the reach between the Toktogul reservoir and the Shardara reservoir amounted to 25% for Tajikistan, 30% for Kyrgyzstan, 23% for Kazakhstan, and 15% for Uzbekistan.

Inflow to the Aral Sea Region

According to the Committee for Water Resources of the Kazakh Ministry of Water Resources and Irrigation, the inflow into the Northern Aral Sea from the Syr Darya amounted to 2.04 km³ in 2023. No water was discharged from the Northern Aral Sea into the Large Aral Sea (Eastern Basin).

Based on research by SIC, the South Aral region shall receive 8 km³ of water from the Amu Darya River in

wet years and 3.5 km³ in dry years. However, in 2023, only 2.71 km³ of water was delivered to the South Aral region.

Meeting Water Demands

The table below illustrates how water demands were met for the Central Asian states during the growing season.

CA countries	Meeting water demands in growing season, by basin in %	
	Amu Darya	Syr Darya
Kazakhstan	–	77
Kyrgyzstan	–	70
Tajikistan	97	75
Turkmenistan	90	–
Uzbekistan	72	85

Source: SIC ICWC, based on the data from BWO Amu Darya and BWO Syr Darya

2.2. Large Aral Sea and the Amu Darya Delta

This section was prepared using data from the BWO Amu Darya, the Aral Sea Region Delta Authority, and the Uzbek Hydrometeorological Service (UzHydromet).

The data was gathered also through remote sensing (RS) monitoring of the Eastern and Western sub-basins of the Large Aral Sea (LAS) and the lake systems in the Amu Darya River delta using Landsat 8 OLI images (http://cawater-info.net/aral/data/monitoring_amu.htm).

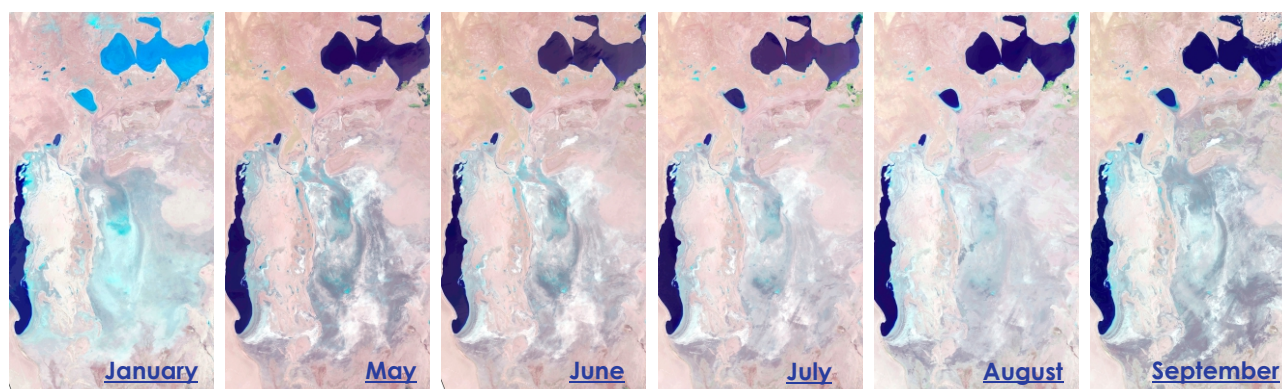
Since 2022, refined threshold values have been used for NDVI for satellite imagery analysis to identify **three**

surface categories: (1) open water surface, (2) wetland, and (3) dryland.

Previously, the total water surface area was determined as the sum of open water surface and wetland areas. However, the challenge of distinguishing wetlands from dry, degraded land remained unsolved.

The information for 2021 and 2022 on <http://cawater-info.net/aral/data/index.htm> has been updated using this improved methodology. Therefore, some discrepancies may be found when comparing this data with information from previous years.

Figure 1. Satellite images of Western and Eastern sub-basins of the Large Aral Sea, Landsat 8 OLI (2023)

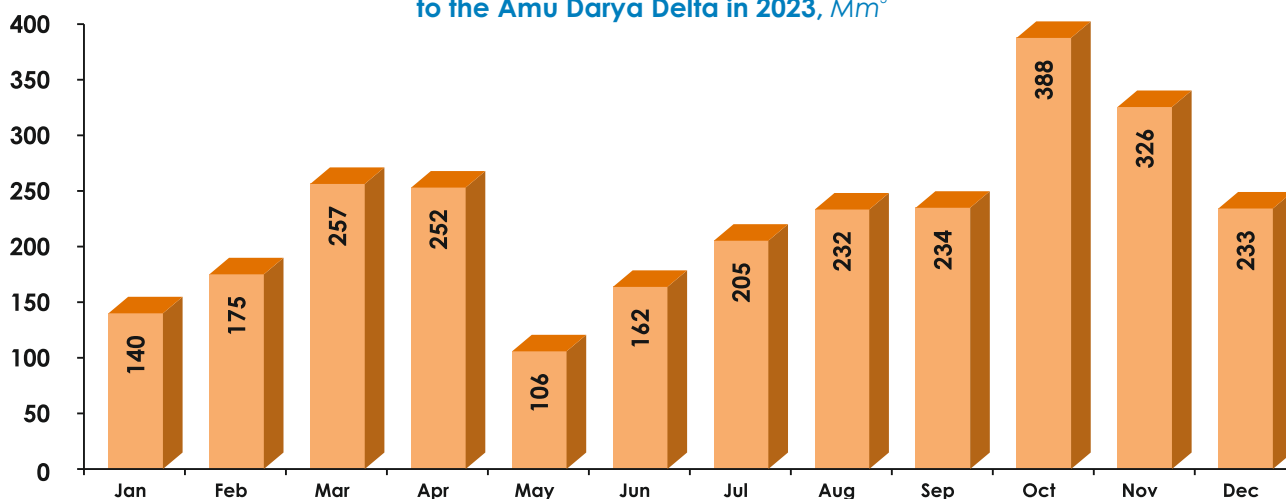


2.2.1. Water Supply to the Amu Darya Delta and the Large Aral Sea

Water Supply to the Amu Darya Delta

According to BWO Amu Darya, in 2023, 2,710 Mm³ of water (including river flow and water discharged from canals and collecting drains) reached the Amu Darya delta. This is 655 Mm³ more than in 2022.

Figure 2. Dynamics of total water supply to the Amu Darya Delta in 2023, Mm³



Source: BWO Amu Darya

Flow from the Main South-Karakalpak collecting drain towards the exposed bed of the Large Aral Sea

Bypassing the Amu Darya delta, 602 Mm³ of collector-drainage water flowed towards the exposed bed of the Large Aral Sea from the Main South-Karakalpak (Right-bank) collecting drain (Table 1). This is 98.5 Mm³ more than in 2022 (503.5 Mm³).

Table 1. Flow from the Main South-Karakalpak collecting drain towards the exposed bed of the Large Aral Sea in 2023, Mm³

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	YEAR
26	17	63	64	49	53	64	70	66	52	44	34	602

Source: Aral Sea Region Delta Administration at the Ministry of Water Management of Karakalpakstan

Total inflow into the Large Aral Sea

In 2023, the total inflow into the Large Aral Sea (LAS) increased from 503.5 Mm³ (2022) to 602.0 Mm³. The LAS got water from the Main South Karakalpak collecting drain (SKCD) only. No water was discharged from the Amu Darya River Delta and the Northern Aral Sea (NAS) (Table 2).

Table 2. Total inflow into LAS, Mm³

Year	Northern Aral Sea*		South Aral Region		Total discharge into LAS
	Total inflow into NAS from the Syr Darya, Karateren site	Discharge from NAS into LAS	Total inflow into the Amu Darya Delta	Discharge from the Amu Darya Delta into LAS, including flow from Main South Karakalpak coll.drain**	
2022	816	0	2,055	503.5	503.5
2023	2,042	0	2,710	602	602

* Committee for Water Resources of the Kazakhstan Ministry of Water Resources and Irrigation;

** Aral Sea Region Delta Administration at the Ministry of Water Management of Karakalpakstan

2.2.2. Open Water Surface and Wetlands in Eastern and Western Sub-basins of the Large Aral Sea

Based on monitoring and GIS data from January to November 2023, (1) in **Western sub-basin** of LAS: water surface area slightly decreased from 209.7 to 200.8 thousand ha, while wetland area significantly increased from 250.2 to 331.2 thousand ha, and dryland area decreased threefold from 101.3 to 29.3 thousand ha; (2) in **Eastern sub-basin** of LAS: water

surface area decreased dramatically from 0.364 to 0.032 thousand ha, fluctuating between a maximum of 2.59 thousand ha in May and a minimum of 0.012 thousand ha in August. Wetland area increased slightly from 1,386.7 to 1,470.9 thousand ha (Table 3).

Table 3. The area of wetlands and open water surface in the Western and Eastern parts of LAS, 2023

Date	Jan 18	Mar 15	May 26	Jun 27	Jul 13	Aug 22	Sep 23	Oct 17	Nov 2
Western part of the Large Aral Sea, ha									
Total area	561,350**								
Wetland	250,244	335,725	335,540	336,388	271,323	311,505	318,556	324,587	331,197
Water surface	209,733	213,212	210,294	206,861	208,318	203,458	201,970	200,855	200,819
Dryland*	101,373	12,413	15,516	18,101	81,709	46,387	40,823	35,908	29,334
Eastern part of the Large Aral Sea, ha									
Total area	1,496,824**								
Wetland	1,386,722	1,342,826	1,405,970	1,446,935	1,430,500	1,445,526	1,457,765	1,462,390	1,470,950
Water surface	364.2	1,129	2,588	699	406	12	26	15	32
Dryland*	109,737.8	152,869	88,266	49,190	65,918	51,286	39,033	34,419	25,842

* bare soil, rare or dense vegetation

** taken as control as of 2016 (Monograph "Aral Sea and the Aral Sea Region". UNESCO, "Complex Print", Tashkent, 2020, <http://cawater-info.net/library/rus/aral-sic-icwc-2020.pdf>)

Source: SIC ICWC using GIS data derived from Landsat 8 OLI images, http://cawater-info.net/aral/data/monitoring_amu.htm

2.2.3. Lake Systems in the Amu Darya Delta

Small local water bodies in the South Aral region comprise the lake systems of the Amu Darya delta. The hydrological situation improved in 2023 compared to 2022.

The open water surface area of the lake systems decreased from 35.1 to 25.5 thousand ha, while the wetland area increased from 64.7 to 74.5 thousand ha since January to November (Table 4).

Delivering 2,710 Mm³ to the delta is insufficient for fisheries and ecosystem preservation in lakes Sudoche, Rybacha, Muynak and Djiltirbas.¹⁰

The decreased inflow of water from collecting drains into local lakes in the South Aral region was caused by reduced water supply to the Amu Darya delta during the growing season (Figure 2, Table 5).

¹⁰ research by SIC indicates the South Aral region needs an average of 8 cubic kilometers of water annually from the Amu Darya in average and wet years, and 3.5 cubic kilometers in dry years (like 2020), <http://cawater-info.net/biblio/Publicationview.php?KodItem=1179>

Table 4. The area of open water surface, wetlands and dryland* within the lake systems in South Aral region in 2023¹¹, ha

Water body	TAWB*, ha	Jan 18			Mar 15			May 25			Jun 27			Jul 13			Aug 22			Sep 23			Oct 17			Nov 2		
		WS	WL**	DL***	WS	WL	DL	WS	WL	DL	WS	WL	DL	WS	WL	DL	WS	WL	DL	WS	WL	DL	WS	WL	DL	WS	WL	DL
Sudoche	72,697	6,906	22,244	43,546	7,325	21,213	44,159	9,473	21,413	41,811	5,394	22,415	44,889	3,101	23,579	46,017	2,491	17,993	52,213	4,562	2,111	66,024	4,981	23,576	44,140	9,686	33,807	29,204
Mejdureche	37,784	6,539	4,443	24,802	7,929	6,118	23,737	1,827	2,249	33,708	856	1,629	35,299	1,104.5	1,320	35,359	1,478	294	36,012	1,057	211	36,516	2,817	353	34,615	9,017	2,118	26,650
Rybacha	11,493	1,575	1,144	8,775	2,120	1,711	7,662	1,871	805	8,817	1,292	975	9,226	531	1,044	9,918	0	43	11,450	0.1	16	11,477	0	41	11,452	0.2	2,481	9,012
Muynak	16,164	2,755	753	12,656	1,300	2,277	12,587	129	310	15,725	38	221	15,905	16	188	15,959	6	94	16,064	6.8	79	16,078	11.9	185.7	15,966	24	2,538	13,602
Djilybas, dam-terminated	47,472	10,924	8,270	28,278	6,653	17,639	23,180	5,300	3,606	38,566	3,747	2,024	41,701	2,891	2,024	42,557	2,180	875	44,418	2,169	1,013	44,291	2,326	1,553	43,597	5,374	9,371	32,728
Djilybas (together with former right and left streams)	98,951	451	22,669	75,831	162	30,864	67,925	175	23,991	74,785	14	13,948	84,989	11	15,009.7	83,931	8	1,868	97,075	434	2,443	96,074	383	5,034	93,534	483.5	17,307	81,160
Dumalak	16,050	0	1,366	14,684	0	2,447	13,603	0	1,184	14,866	0	841	15,209	0.5	741	15,309	0	24.3	16,026	0	14.9	16,035	1.5	21	16,028	0.1	342	15,708
Makpalkul	8,684	3,971	651	4,063	2,005	2,467	4,212	409	778	7,497	149	239	8,296	61	142	8,481	135	67.4	8,482	3	22	8,659	7.5	23	8,653	308	488	7,888
Mashan Karadjar	27,201	1,718	2,288	23,195	1,351	4,158	21,692	663	2,638	23,900	206	1,595	25,400	161	1,256	25,784	77	319	26,805	348	1,041	25,812	490	1,169	25,542	545	3,029	23,627
Water surface southward of Muynak	9,605	62.6	524	9,018	5	1,116	8,484	0	823	8,782	0	609	8,996	0	595	9,011	0	83	9,522	0	7	9,598	0	272	9,332	0	2,949	6,656
Water surface along Kazakhdaya river course	4,752	0.3	356	4,395	0	589	4,162	0	172	4,580	0	163	4,588	0	84	4,667	0	1.2	4,750	0.1	3.5	4,748	0.1	4.5	4,747	1.2	93	4,657
Zakirkol Lake	2,791	293.1	48	2,450	282	151	2,359	22	21	2,748	0	3	2,788	0	2.3	2,789	0	0.1	2,791	0	0.6	2,791	0	1.8	2,789	139	26	2,626
Total:	353,644	64,756	64,756	253,693	29,132	90,750	233,762	19,869	57,990	275,785	11,696	44,662	297,286	7,877	45,985	299,782	6,375	21,662	325,608	8,580	6,962	338,103	11,018	32,234	310,392	25,578	74,549	253,518

* TAWB – Total area of water body within the boundaries of water surface (WS) and wetlands (WL) of 2016 as mentioned in the “Aral Sea and the Aral Region” monograph

** WL – wetlands

*** DL – dryland

¹¹ Source: SIC ICWC using the GIS data derived from Landsat 8 OLI images, http://cawater-info.net/aral/data/monitoring_amu.htm

Table 5. Inflow into local lakes in South Aral region during 2023, Mm³

Lake	Inflow by month												Total over 2023
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Sudoche	17.77	22.80	41.76	45.64	31.85	34.63	39.48	47.56	54.77	53.55	32.94	19.24	441.99
Mejdureche	76.88	68.86	45.45	11.85	8.56	20.19	49.46	38.01	33.06	99.18	143.70	64.39	659.59
Djiltirbas	20.16	21.15	42.19	36.09	20.59	30.91	39.02	53.99	68.60	94.63	65.61	8.54	501.48

Source: Aral Sea Region Delta Administration at the Ministry of Water Management of Karakalpakstan

Conclusion

In 2023, increased water supply to the Amu Darya delta and higher discharge of drainage water from the Main South-Karakalpak Collecting Drain (SKCD) compared to 2022 led to a 98.5 Mm³ increase in inflow to the Large Aral Sea (LAS), from 503.5 to 602 Mm³. However, this total inflow still did not exceed the 650.35 Mm³ recorded in 2021.

By the end of 2023, the Western sub-basin of the LAS experienced a slight decrease in water surface area, while wetland area increased significantly.

In contrast, the Eastern sub-basin saw a considerable reduction in water surface area and a minor increase in wetland area. Small local lakes in the South Aral Region continue to face challenges due to unstable water supply.

2.3. Results of Multidisciplinary Expeditions to the Exposed Bed of the Aral Sea in 2019-2023

In 2023, two multidisciplinary expeditions were conducted by SIC ICWC in partnership with the International Innovation Center for the Aral Region (IICAR) under the President of Uzbekistan to study the status of the exposed bed of the Aral Sea^{12,13}.

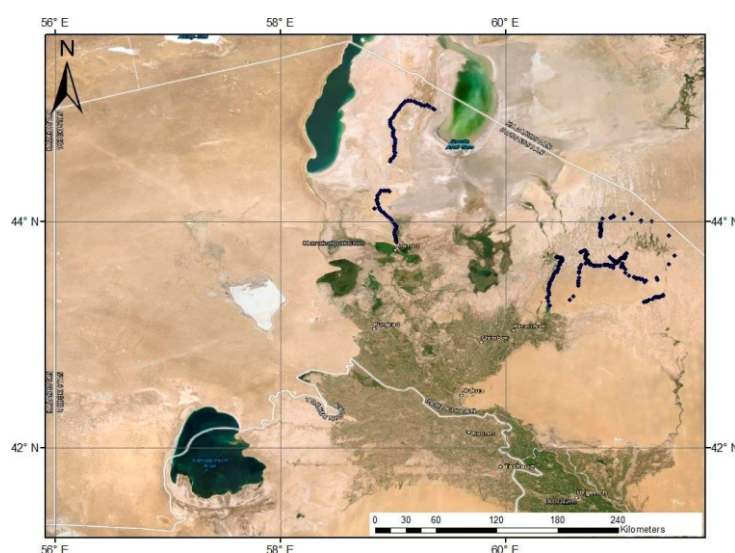
These expeditions covered 1.5 million ha and were part of the UNDP Joint Program "Empowering youth towards a brighter future through green and innovative development of the Aral Sea region" funded by the UN Multi-Partner Human Security Trust Fund (MPHSTF) for the Aral Sea region.

The expeditions took place from April 25 to May 23 and from September 20 to October 10. Routes were selected based on unsupervised image classification and aligned with prior expeditions conducted in 2019 and 2020.

These covered the Akpetka Island system, Lake Karateren, Vozrozhdeniya (Rebirth) Island, the old and new afforestation area, and the zone adjacent to South Karakalpak collecting drain. The team comprised hydrogeologists, soil scientists, geo-botanists, geographers, foresters, and environmentalists.

Their work focused on integrated monitoring, including soil and hydrological surveys, geobotanical

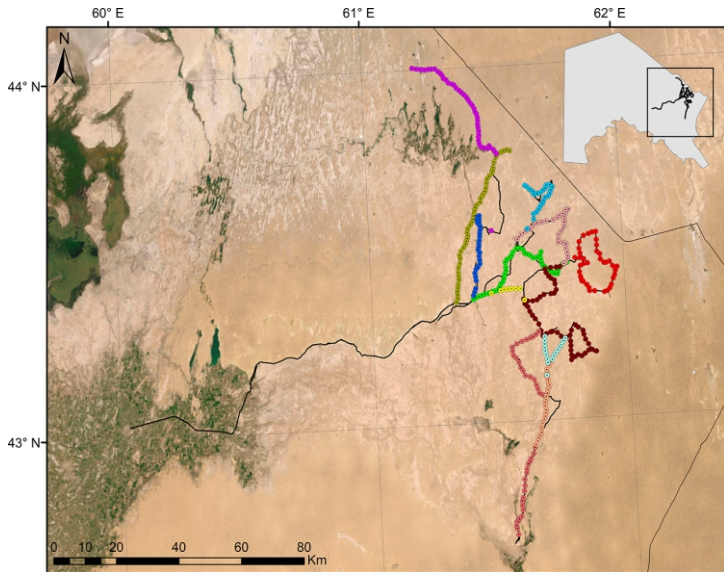
characterization of vegetation, and remote sensing-based sea landscape decoding and mapping.



Spring expedition route of 2.5 thousand km (25 April-23 May 2023). Coverage: former archipelago, Akpetka Island system, and the exposed seabed in the Muynak territory of new afforestation area up to Vozrozhdeniya (Rebirth) Island (800 thousand ha)

¹² In 2019-2020, SIC ICWC, together with IICAR, conducted two similar expeditions covering 1.2 million hectares, as part of a UNDP-UNESCO project funded by the MPHSTF. See details in the 2020 Water Yearbook, http://www.cawater-info.net/yearbook/pdf/02_yearbook2020_ru.pdf

¹³ The total area of the exposed Aral Sea bed in Uzbekistan is 2.7 million hectares



Autumn expedition route of over 2.5 thousand km (20 September-10 October 2023). Coverage: the area stretching to the border with Kazakhstan, including the adjacent zone of the South Karakalpak collecting drain.

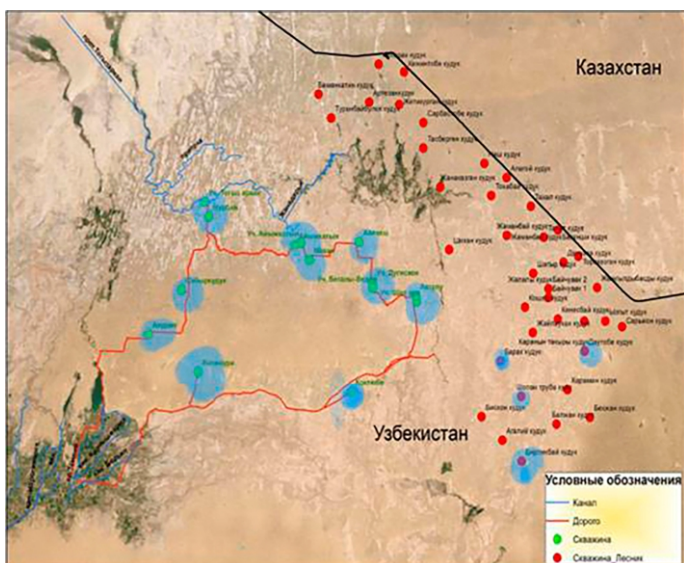
During ground-based expeditions, the following activities were undertaken: (1) over 2,000 points were documented for image analysis; (2) botanical descriptions and identification of plant formations were conducted; (3) the status of natural vegetation and afforestation was assessed; (4) the overall environmental condition of the study area was evaluated; (5) 49 soil profiles were described and sampled for detailed analysis; (6) the operational hydrological network, including observation wells, pressure wells, and groundwater monitoring points, was monitored; (7) soil and water samples were analyzed in the laboratory.



Documentation of a soil profile



Vegetation description



Location of wells. Groundwater measurements



Key findings¹⁴

1. Geobotanical studies have shown that plant cover on saline soils is increasing due to natural processes that favor the replacement of halophilous plants¹⁵ with psammophilous plants¹⁶.

During the expeditions, a method for afforestation of the exposed seabed using potentially productive plant species was developed to stabilize shifting sands and solonchak. Additionally, the potential of these plant species as a resource base for the republic's pharmaceutical industry was identified.

2. Hydrogeological conditions of the dried seabed are dynamic, influenced by the ongoing decline in sea level and the expansion of the exposed area.

Groundwater levels are affected by local water bodies like Lakes Sudoche, Djiltirbas, Muynak, and Rybacha, as well as the South Karakalpak collecting drain, Akchadarya, Toguzarkan and other watercourses.

Groundwater levels change from the south to the north: from 0.2 to 0.5 m near water bodies and watercourses and gradually decrease towards the current shoreline due to the natural decline in sea level.

Groundwater salinity varies from 1.5 to 10 g/l, increasing to 35-75 g/l in the western region. The water chemistry is predominantly chloride-sodium.

Recommendations: (1) establish a comprehensive database documenting all water sources in the region; (2) utilize water from existing self-discharging wells for purposes such as distant-pasture cattle rearing and forestry; (3) develop a roadmap to equip self-discharging wells with regulating devices (gate valves), assign responsible user, and establish a water use regime; (4) increase the number of distant-pasture cattle rearing farms utilizing groundwater with salinity of 2-3 g/l; etc.

3. Afforestation conditions. Afforestation efforts have been undertaken on 1.73 million hectares of the former Aral Sea bed between 2018 and 2023. The success of these efforts varies depending on factors such as planting method (manual, aerial seeding, or machine planting), soil type, groundwater level and salinity, and adherence to afforestation schedules.

Root establishment rates for new plantations range from 55-64% in slightly saline soils to 25-30% in moderately saline soils in the Muynak zone. Natural regeneration of saxaul trees has been observed in areas afforested between 2018 and 2020.

In the Akpetka zone, where the Suchoche-Akpetka Nature Reserve has been established, root establishment rates reach 65-70%. However, in the Kyzylkum pastures, root establishment rates are lower, around 20%.

Recommendations: (1) implement measures to combat diseases and pests affecting desert forests; (2) establish two research stations for laboratory research and ecological risk assessment on the dried Aral Sea bed; (3) identify suitable areas for sowing seeds of halophyte and xerophyte plants based on comprehensive surveys.

4. Soil cover. The arid climate has led to significant changes in the soil cover since 1990.

Hydromorphic salt marshes have decreased by 15.1%, while auto-morphic salt marshes and sandy areas have increased by 14.6% and 3.5%, respectively.

Desert-sandy soils with signs of fertility have expanded by 5.7%. Several areas have been identified as potential sources of dust and salt. Approximately 47% of the total area is characterized by medium to high ecological hazard. This hazard is associated with the fine-grained nature of the soils, which predisposes them to aeolian erosion and accumulation.

Recommendations: (1) implement a differentiated approach to afforestation, selecting plant species based on specific soil conditions; (2) given the relationship between vegetation and soil, a phased approach to developing the drained seabed is recommended. This involves initially planting salt-tolerant plants, followed by the introduction of trees and shrubs.

5. Remote sensing research. An innovative mapping method and strategy have been developed to interpret and map the landscapes of the exposed Aral Sea bed.

Over 2,800 field samples were collected, documenting coordinates, vegetation types, dominant species, plant layers, soil morphology, and other relevant data.

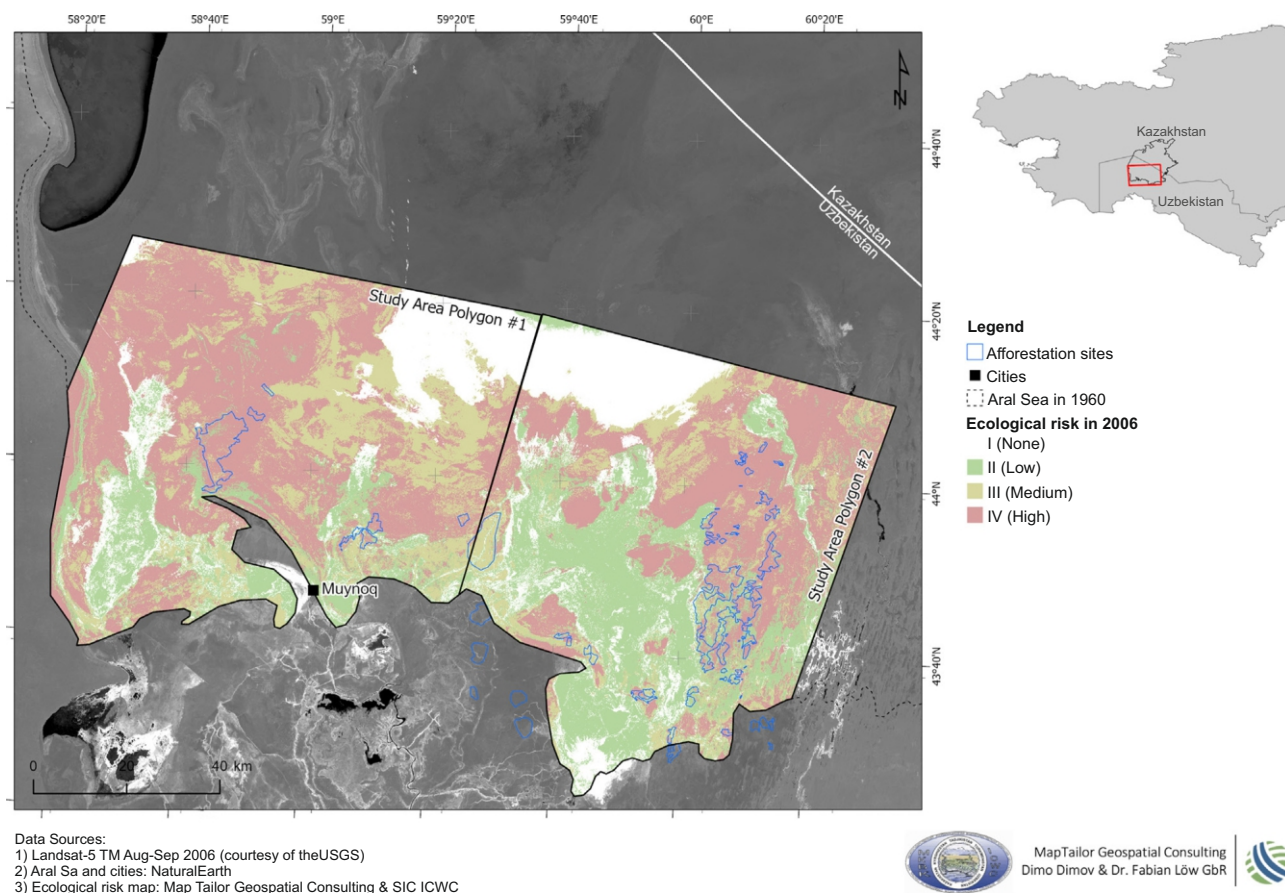
By combining desk studies in ArcGIS 10.8 with the analysis of Landsat 8 OLI images and field observations on geobotany, environment, and soil, **maps of ecological hazard** were generated, and **trends** were assessed.

Expedition findings indicate that self-overgrowing processes have led to vegetation covering approximately 10% of the exposed seabed.

¹⁴ See details in the Results of the Final Expedition on the Dried Bed of the Aral Sea. Executive Summary. UNDP, 2024, <http://www.cawaterinfo.net/library/rus/expedition-aral-2024-en.pdf>

¹⁵ Highly salt-tolerant plants

¹⁶ Plants of sandy soil (Haloxylon, Calligonum, Ephedra, Astragalus, Salix acutifolia, Salix daphnoides, Salix caspica Pall.)



Expedition	Ecological risk class	Area	
		%	thsd.ha
I	None	16.9	110.41
	Low	30.2	197.29
	Middle	30.3	197.95
	High	22.6	147.64
TOTAL			653.29
Self-overgrowth		16.6	96.6
II	None	25.5	152.72
	Low	30.7	183.74
	Middle	34.0	203.42
	High	9.42	56.67
TOTAL			596.55
Self-overgrowth		10.7	64.3

Conclusion

1. The exposed seabed represents an unsustainable ecosystem that poses significant risks to both the natural environment and public health. The re-

gion faces a range of environmental challenges, including aridization, desertification, soil degradation caused by heavy machinery, wind erosion, and the formation of salt sources. However, the landscape is also undergoing natural processes of self-overgrowth and the formation of desert-sandy soils.

To effectively address these issues, regular monitoring is essential to provide up-to-date information on the status of the exposed seabed. This information can then be used to inform timely management decisions.

2. Groundwater plays a crucial role in shaping the environmental conditions of the exposed seabed. In this context, it is imperative to continue monitoring groundwater through a network of observation wells and maintain and expand this network.

3. Afforestation efforts are contributing to the transformation of the exposed seabed's soil cover from salt marshes to more fertile and environmentally stable desert-sandy soils.

4. Natural vegetation is undergoing a transition from migratory to stabilizing species. This shift is evident in the replacement of halophytes, which thrive

in wet salt marshes, with psammophytes, which are adapted to saline sand environments.

5. The exposed seabed could potentially serve as a resource base for pharmaceutical industry.

6. A significant amount of data, including statistical, cartographic, satellite, and ground-based spatial data, has been collected over the years through expeditions and research on the Aral Sea. To effectively utilize this information, it is necessary to systematize it and create a database and a geo-information platform to support decision-making regarding the natural environment of the exposed seabed.

Prepared by SIC ICWC on the basis of the final report on the expeditions and the Executive Summary "Results of the Final Expedition on the Dried Bed of the Aral Sea", UNDP, 2024, <http://www.cawater-info.net/library/rus/expedition-aral-2024-en.pdf>



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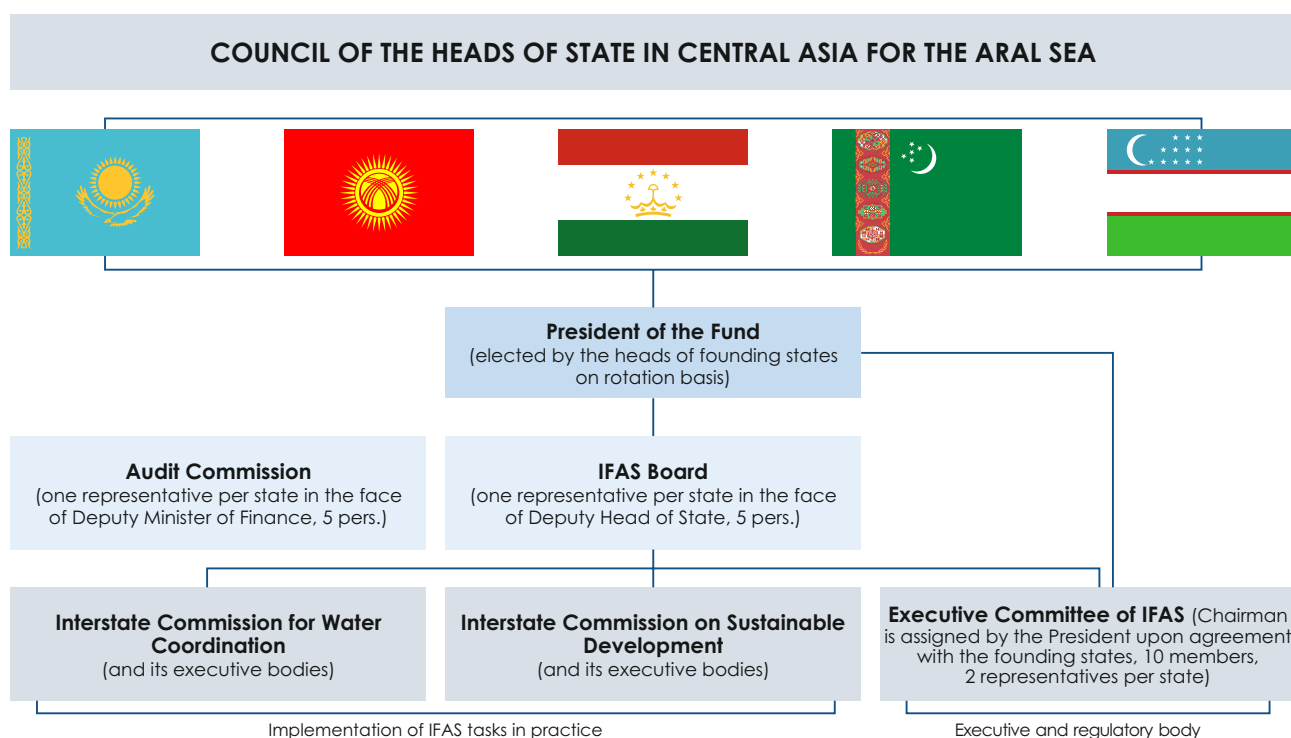
SECTION

IFAS and Other
Regional
Organizations
in Central Asia

3.1. International Fund for Saving the Aral Sea



The International Fund for Saving the Aral Sea (IFAS) was established by the decision of the Heads of the Central Asian states on the 4th January of 1993 with the aim of developing and funding the environmental and applied research projects and programs in order to improve the ecological situation in the areas affected by the Aral Sea catastrophe and to address the socio-economic issues in this region. The organizational setup of IFAS is depicted in the diagram below.



The chairmanship in IFAS is rotated every three years. In the period from 2019 to 2023 Tajikistan chaired¹⁷ IFAS and the President of IFAS was the President of Tajikistan Emomali Rahmon.

In 2023, IFAS celebrated its 30th anniversary. In the CA countries, with the purpose to promote the IFAS activities and to draw a greater attention of the world

community to the existing problems of the Aral Sea basin and, respectively, to their solution, series of national and regional events and a virtual photo exhibition were organized, short video films were produced, and the collections of articles, posters, calendars, booklets and other products were published on the occasion of the anniversary.



¹⁷ Decisions made during the 2nd (November 29, 2019, Tashkent, Uzbekistan) and 4th (July 21, 2022, Cholpon-Ata, Kyrgyz Republic) consultative meetings of the Heads of CA States

3.1.1. Meeting of the Council of Heads of IFAS Founding States

On the 15th September, in the city of Dushanbe, the meeting of the Council of the Heads of IFAS Founding States was held under the chairmanship of the President of Tajikistan E. Rahmon, with the participation of the President of Kazakhstan K. Tokayev, the President of Turkmenistan S. Berdimuhamedov, the President of Uzbekistan Sh. Mirziyoyev, the First Deputy Chairman of the Cabinet of Ministers of the Kyrgyz Republic¹⁸ A. Kasymaliev and the Special Representative of the UN Secretary General – Head of the UN Regional Centre for Preventive Diplomacy for Central Asia K. Imnadze.

A range of issues were addressed during the meeting such as the deepening of cooperation for the improvement of water-related, environmental and socio-economic situation in the Aral Sea basin, strengthening the IFAS role in solving the water-energy problems in the region, and enhancing the IFAS image in the international arena, plus the issues of widening the range of potential partners for implementation of target programs within the framework of the Fund.



Following the results of the meeting, the participants signed a number of documents, including the Dushanbe statement and the decisions of the Heads of IFAS Founding States – “On the results of the chairmanship of the Republic of Tajikistan in IFAS”, “On the activities to improve the institutional and legal framework of IFAS”, “On the election of the President of Kazakhstan Kassym-Jomart Tokayev as the IFAS President for 2024-2026”.

Thus, the IFAS chairmanship for 2024-2026 was moved on to the Republic of Kazakhstan.

We give below the extracts from the speeches¹⁹ of participants of the above meeting.

The President of Tajikistan, opening the meeting, highly appreciated the thirty-year activity of IFAS, but believes there is still much work to be done, especially taking into account the growing population in the region, to ensure economic development and combat the negative effects of climate change on water resources. “It is obvious that the climate change dictates the need to strengthen our cooperation and coordination in order to counter these challenges and, first of all, our cooperation in the water-energy sector,” he said.



As far as it concerns the issue of improving the institutional and legal framework of the IFAS, the Head of State pointed out that “... in the process of IFAS reformation, energy issues were included in the mandate of the Fund, and it is proposed to create a separate commission on energy within its framework... More coordinated actions, as well as modernization of the relevant infrastructure become essential in this context.”

The President of Kazakhstan noted that “IFAS is one of few successful mechanisms of regional cooperation demonstrating that Central Asia may be considered as an agent on the international arena”.

The Head of State turned attention of the participants to the challenges and problems facing the region and brought to notice of them that, in forming their water policy, the CA countries “should proceed from the fact that water is a limited natural resource which affects directly the well-being and sustainable development of the entire region”. He called for the accelerated completion of the process of improving the IFAS, proposing to expand, among others, the powers and responsibilities of the Board and Executive Committee of the Fund, to transform the Interstate Commission for Water Coordination into the

¹⁸ The Kyrgyz delegation took participation only as an observer.

¹⁹ For the full text of speeches, refer to <http://icwc-aral.uz/pdf/98-en.pdf>



Interstate Commission for Water and Energy and, finally, to elaborate the issue of equitable distribution of IFAS working bodies among the participating countries and to staff them with representatives of these countries.

The President emphasized the need to create a mechanism for long-term and sustainable cooperation for the effective use of water and energy in Central Asia, taking into account the interests of all countries in the region. He proposed to develop a work plan for the adoption of a unified automated system for water accounting, monitoring, management and distribution of resources in the Aral Sea basin; to establish a Central Asian project office on climate.

The President of Turkmenistan noted that "this is IFAS that has become an important regional platform for dialogue and cooperation to address the environmental and socio-economic problems caused by drying-up of the Aral Sea..." and proposed to "intensify the work on improving the legal framework of the Fund and to determine the goals and objectives of further work."



The Head of State proposed to establish a "Regional Center for Climate Technologies in Central Asia"; noted the need to develop and adopt "international documents aimed at the conservation and rational use of water resources in Central Asia"; proposed to enshrine "the basic principles and rules of political and diplomatic interaction between our states on water issues, based on mutual respect, equal partnership and taking into account the interests of all the countries" in the Central Asian Water Strategy, the development of which was earlier initiated by Turkmenistan. According to the Head of Turkmenistan, the Central Asian Water Strategy in the future could become the basis for the development of the UN Global water strategy.

The President of Uzbekistan noted that the role and significance of IFAS "has becoming even greater in the context of new emerging challenges and threats due to global climate change."



The head of state specified the tasks to be fulfilled under umbrella of the Fund in the future. In particular: (1) as part of the further improvement of the IFAS, it is proposed to "develop "Rules and Procedures" that clearly govern the matters related to cooperation and activities of the Fund"... "on the basis of the principle of intersectorality – water-energy-food nexus, taking into account the current environmental challenges"; (2) concerning the implementation of ASBP-4²⁰ it is proposed to entrust the Fund's Board "with the critical review of the current program and further preparation of "road maps" for implementation of each regional project"; (3) as part of strengthening interactions on systems basis, it is proposed that each of the countries "makes commitments to attract external assistance to regional projects, defining specific target values" and "to convene a special regional conference to accelerate the implementation of joint projects"; (4) it seems advisable to "develop long-term basin plans for the Amu Darya and the Syr Darya...", providing for "modeling various

²⁰ program of action for assistance to the countries of the Aral Sea basin

development scenarios in the basins of these rivers"; (5) it is proposed to organize the work "with youth at the regional level to build the culture of water and other natural resource care, support youth initiatives and start-ups through the adoption of a special program".

Regarding strengthening cooperation between the countries in the area of water conservation, it is proposed to "establish a Regional Platform for regular meetings of water, energy, environment and economy ministers". As to the construction of the Qosh-Tepa Canal in Northern Afghanistan, it seems advisable to "form a joint working group to study all aspects related to the construction of the Canal and its impact on flow regime of the Amu Darya River" and "to consider the possibility of involving representatives of Afghanistan in the regional water dialogue."

The First Deputy Chairman of the Cabinet of Ministers of the Kyrgyz Republic noted that the Kyrgyz Republic remains committed to development of constructive and mutually beneficial regional cooperation as having no alternative, "promotes initiatives at the international level which are aimed at sustainable mountain development, glacier and flow formation zone preservation."



The Kyrgyz side proposed to join efforts in the effective use of water and energy resources, increasing the resilience of this sector to various natural and anthropogenic impacts; and also emphasized the importance of reforming the IFAS, so that this process ensures the formation of a highly effective and transparent activity of the new regional structure, taking into account the interests of all CA countries.

3.1.2. Implementation of initiatives of the Presidents of CA States voiced at XII Summit of the Heads of IFAS Founding States

The Presidents of CA states voiced important initiatives and proposals, duly mentioned in the final document – a joint communique at the Summit of the Heads of IFAS Founding States (held on August 24, 2018 in the city of Turkmenbashi, Turkmenistan).

Information on implementation of these initiatives in 2023 is given in [Executive Committee of IFAS and its National Branches, ICWC of Central Asia and Key Water Developments in the Countries of Central Asia](#).

3.1.3. IFAS Board

In 2023 in Dushanbe, the IFAS Board had its regular meeting and addressed the following issues: (1) achieved outcomes of the Working Group on improvement of institutional and legal framework of the IFAS; (2) progress made in implementation of ASBP-4; (3) activities of EC IFAS for the period of

Tajikistan chairmanship; (4) results of participation in the UN 2023 Water Conference; (5) preparation for the meeting of the Council of the Heads of IFAS Founding States (held on September 14-15 in Dushanbe). As a result, the IFAS Board signed 8 decisions (June 5).

3.2. Executive Committee of IFAS and its National Branches

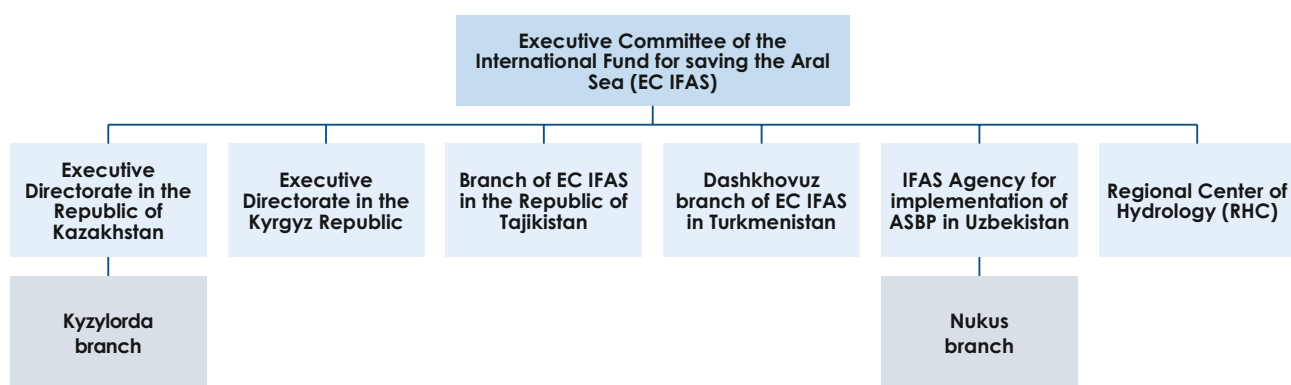
3.2.1. Executive Committee of IFAS

The Executive Committee of the International Fund for Saving the Aral Sea (EC IFAS) was formed by a decision of the Interstate Council on July 13, 1993. It serves as a platform for dialogue between the CA countries and the international community.

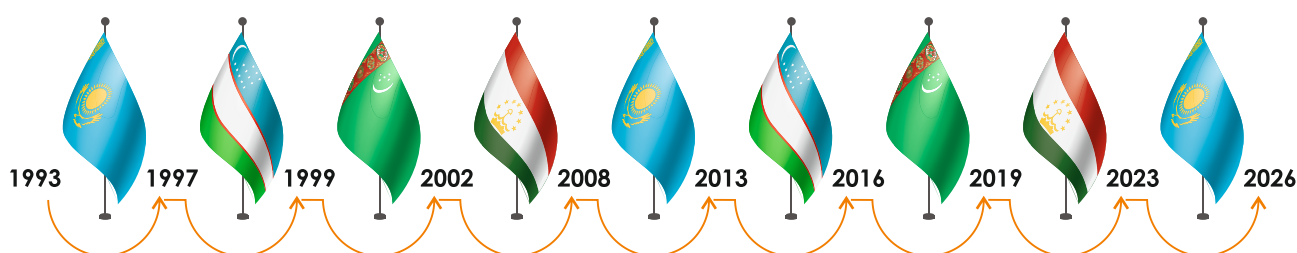
The chairman of EC IFAS is Rakhimzoda Sulton Nur-Makhmadpur. He was appointed on September 28, 2020 by the Decree of the President of IFAS – the President of the Republic of Tajikistan.

Activity of EC IFAS in 2023

IFAS: 30 years of regional cooperation. The main event dedicated to the anniversary became the International Conference "Central Asia: Towards Sustainable Future through Strong Regional Institution", which summarized the IFAS accomplishments over the past 30 years, as well as the challenges and opportunities for future activities. As part of the Conference, 7 side events were held on the following



Location of EC IFAS by Country and Year



subjects: (1) Building resilience in Tajikistan: upstream climate risk assessment approach; (2) Hydropower and gender equality for effective water governance in context of climate change: challenges and opportunities for Central Asia; (3) Sustainable development of Central Asia: small hydropower integration and trade-off analysis in the water-energy-food nexus of transboundary rivers; (4) Water security challenges in Central Asia: addressing the knowledge gaps and developing the action plans; (5) MODSNOW – an operational system to monitor water resources in Central Asia; (6) Increasing the capacity of the Interstate Commission for Sustainable Development (ICSD), the International Fund for Saving the Aral Sea (IFAS) and its institutions in matters of environmental protection and sustainable development; (7) Regional conference on strengthening networking and water cooperation among scientific institutes in Central Asia: scientific innovation for a sustainable future (June 5-7, Dushanbe). As a result, the participants adopted the Resolution.

At the Conference, veterans and staff of the Fund, as well as persons who contributed to the establishment of IFAS and development of regional cooperation were awarded commemorative medals (see [Central Asia Awards in Water-Related Fields](#)).

Improvement of the institutional and legal framework of IFAS. In 2023, three meetings of the Working Group (WG) on improvement of institutional and legal framework of IFAS were held: (1) **9th meeting** (online, January 17-19); (2) **10th meeting**, where options for more active interaction between IFAS and its institu-

tions were discussed (Laos, hybrid format, April 5-6); (3) **11th meeting**, during which a new option of the future institutional structure, issues of the permanent location of the EC IFAS in one of the CA countries and the new name of IFAS were discussed (Dushanbe, August 7-10).

As of the end of 2023, 2 stages of work were completed, within which the geographical scope of IFAS, areas of cooperation (water, energy, environment, socio-economic development), main goal, main and general tasks and sub-tasks of the Fund were agreed upon. An updated structure of the Fund has been prepared (for Stage 3) and is reviewed by the parties. The work have been started on the 4th stage, the purpose of which is to develop and agree upon the proposals on improved funding of IFAS management structure. An important point in the whole process was the active participation of the Kyrgyz Republic in activities of the Working Group.

ASBP-4²¹. According to the summary report of EC IFAS, as of the end of the year, 35 projects with a total budget of \$175.5 million and €54.135 million are implemented by international development partners in the Central Asian Region in support of ASBP-4. Some of them are listed below: "Central Asia Water and Energy Program"/CAWEP (WB, EU, Switzerland, Great Britain); "Climate Risk Management"; "Water Resources Management under Climate Change"; "Green Central Asia"; "Ecologically-oriented regional development in the Aral Sea region (Eco-Aral)" (GIZ); "USAID Regional Water and Vulnerable Environment Activity Project"/WAVE; "European Union-

²¹ this program was developed by the decision of the IFAS Board on 30.01.2018 and approved by the IFAS Board decision on 29.06.2021. It includes 34 project proposals in 4 areas: (1) integrated use of water resources; (2) environmental; (3) socio-economic; (4) improvement of institutional and legal mechanisms. The implementation period is scheduled for 2020-2030

Central Asia: Water, Environment and Climate Change Cooperation"/WECOOP III; "Sustainable Energy Connectivity in Central Asia"/SECCA; "Central Asia Nexus Dialogue Project: Fostering Water, Energy and Food Security Nexus and Multi-Sector Investment" and others (EU); "Blue Peace Central Asia" Initiative; "Cryospheric Observation and Modeling for Improved Adaptation in Central Asia"/CROMO-ADAPT; "Groundwater Resources Governance in Transboundary Aquifers" Project/GGRETA (SDC); "Improving Access and Strengthening Innovations for Water, Sanitation and Hygiene in Selected CAREC Countries and the Caucasus" (ADB), and others. Activities for more than \$16.25 million and €28.97 million have been completed under the ongoing projects.

National projects with a total budget of more than \$700 million are implemented in the IFAS founding states, including: Kazakhstan – approximately \$190 million; Tajikistan – \$52.76 million; Turkmenistan – \$4.7 million; and, Uzbekistan – \$195.5 million.

Events. EC IFAS organized: (1) jointly with the IHE Institute of Water Education, "Advanced training course in water policy tools and strategic planning under conditions of climate change" for EC IFAS staff and professionals of the CA countries (February-June); (2) with the support of the Government of the Republic of Tajikistan and the World Bank within the framework

of the UN 2023 Water Conference (New York, March 22-24), a high-level side event entitled "Central Asia: commitments to Water Action Agenda" (New York, March 23). During the event, the Chairman of the EC IFAS presented a joint statement of CA states (Republic of Kazakhstan, Republic of Tajikistan, Turkmenistan, Republic of Uzbekistan); (3) expedition²² for young professionals and scientists from the CA countries, with a visit of water facilities in the Amu-Darya River basin (April 25-May 4) and others.

Publications. In 2023, EC IFAS published: brochure "International Fund for Saving the Aral Sea: 30 years at the service of the people of Central Asia"; brochure "International Conference "Central Asia: Towards Sustainable Future through Strong Regional Institution" dedicated to the 30th anniversary of IFAS"; booklet "International Fund for Saving the Aral Sea celebrates its 30th anniversary"; book "30th anniversary of IFAS (main documents)", Dushanbe, 2023; "Regional Cooperation in Central Asia (collection of articles dedicated to the 30th anniversary of IFAS)"; photo album "International Fund for Saving the Aral Sea: 30 years at the service of the people of Central Asia".

Source: EC IFAS,
https://pt-br.facebook.com/ec.ifas/?ref=page_internal

For more details, see the report on IFAS activities for the period of 2020-2023, <http://cawater-info.net/library/eng/ifas/report-ifas-2020-2023-en.pdf>.

3.2.2. Regional Center of Hydrology

The Regional Center of Hydrology (RCH) of EC IFAS was founded on August 23, 2002 by the decision of the IFAS Board in order to improve the system of

hydrometeorological forecasting, environmental monitoring and data exchange between the National hydrometeorological services in the region.

3.2.3. IFAS Executive Directorate in Kazakhstan

The IFAS Executive Directorate in Kazakhstan renders assistance in solving the topical issues and coordinating practical measures to improve water-related, socio-economic and environmental situation in the Kazakhstani part of the Aral Sea basin.

The focus areas of its activities and actions are directly aligned with those of EC IFAS and the ongoing operations are coordinated with the authorized representatives of Kazakhstan in EC IFAS.

Activity in 2023

Projects. With direct involvement and under the leadership of ED IFAS in Kazakhstan, the following international grant projects are in progress in the Kazakhstani part of the Aral Sea Basin (hereinafter – ASB). In particular:

■ "North Aral Sea (NAS) Development and Revitalization" Project in Kazakhstan (WB and the Government of Kazakhstan, the project will cover the Kazakhstani part of the Aral Sea region and the territory of Kyzylorda region) – the main project which is to be implemented within the years of Kazakhstan chairmanship in IFAS. The final goal is to fill the Saryshyganak Bay so that the sea reaches the coastal city of Aralsk. At this stage, one of 4 options described below are under selection: 1 – one-level water body in the NAS by raising the height of the existing Kokaral dam to 48 m; 2 – two-level sea system of the NAS/Saryshyganak Bay by constructing a new 52-meter-high dam in the NAS in the Saryshyganak Bay; 3 – one-level water body in the NAS by raising the height of the existing Kokaral dam and constructing a supply canal; 4 – without raising the water level in the NAS. The remaining part of the project implies restoration of wetlands to reduce dust and salt transfer from the Aral Sea bed;

²² with the support of the "USAID Regional Water and Vulnerable Environment activity" Project

■ as part of the project “Environmental Restoration of the Aral Sea”²³ (USAID, 430,000 USD, 2021–2024), 30 test plots (5 hectare each) are planned to be formed, where 200,000 black saxaul seedlings will be planted, plus fences and irrigation system for these seedlings – constructed. In 2023, an oasis of plantations was created at a distance of 50 kilometers to the west of Karateren village in the Aral district of the Kyzylorda region, where 110,000 seedlings were planted²⁴. For the first time, saxaul was grown with the use of hydrogel and closed root system methodology. The rooting rate was up to 60%. A well (500 m deep, water temperature 33°C, salinity 3.8 g/l) was drilled²⁵ to irrigate the plantings and to provide water for cattle and wild animals.

With the financial support of the “Freedom Finance” JSC, for the first time in Kazakhstan, a carbon certi-

fication process was initiated at the site, and the outcomes of this process will allow creating a Kazakhstani model of carbon credit that could be scaled-up throughout the country and to neighboring countries also.

Regional and international cooperation. Numerous meetings were held in the ED IFAS office in Kazakhstan with the representatives of the following organizations: (1) UNESCO global geoparks evaluator R. Hogan to discuss establishing a UNESCO²⁶ global geopark in the Aral Sea region and the “Service-procurement center Aral” LLP, within which the project proposal for “Development of lake-commercial farms for commercial fish cultivation” was submitted (February 15); (2) EKOROST. KZ, on application of bio-humus for forest reclamation on the dried bed of the Aral Sea (April 20); (3) Kazphosphate, during which the prospects of research efforts on the use of phosphogypsum in the Kazakhstani part of the Aral Sea region and on the dried bed of the Aral Sea were carefully examined. Following the outcomes of this meeting, an agreement was signed on a pilot research project (June 22); (4) the “Grass-Roots” program of the Japanese Embassy in Kazakhstan, within which the continuation of work on forest protection strip in Aralkum settlement was reviewed (September 26).

Agreements were signed between the ED IFAS in Kazakhstan and (1) Climate Global Control Trading LLC, under which “Climate CRON” is to be used as a payment instrument in connection with climate regulation and water management in the region (January 25); (2) and “Freedom Finance” JSC on rendering the financial assistance to the project “Environmental Restoration of the Aral Sea”.

Media outreach. An interview was given to the correspondent of MIA “Kazinform” on building a stable ecosystem in the Aral Sea (February 28).



Source: <https://kazaral.org/usaid/news-and-press-releases/>

Source: <https://kazaral.org>

3.2.4. Agency for implementation of IFAS projects in Uzbekistan

The GEF Agency of IFAS, established in 1998, is an IFAS working body with the status of an international organization, which is accredited by the Ministry of Foreign Affairs of RUz as a representative office of EC IFAS in Uzbekistan²⁷.

Activity of GEF Agency in 2023

Activity in 2023 was in line with the financing plan of actions aimed at mitigation of the consequences of

the Aral Sea ecological catastrophe, comprehensive socio-economic development in the Aral Sea region and assistance to ASB countries for 2022–2024 (Resolution of the Cabinet of Ministers of RUz No.42-F²⁸ dated 07.02.2022).

Projects in the Southern Aral Sea Region are implemented jointly with the Nukus branch of EC IFAS at the expense of the state budget and investment funds of Uzbekistan as a contribution to IFAS, and also

²³ within the framework of the “USAID Regional Water and Vulnerable Environment activity” Project/WAVE

²⁴ 60 thousand seedlings were planted in 2022

²⁵ for the first time, water exploration works for agriculture needs and ecosystem improvement are carried out on the dried bed of the Aral Sea

²⁶ by 2024, the UNESCO global geoparks network includes 195 territories in 48 countries of the world. China occupies the leading position by the number of global geoparks, with 41 UNESCO global geoparks registered

²⁷ accreditation certificate No.7 dated 16.02.2023 and valid until 16.02.2026

²⁸ in fulfillment of the Resolution of the Cabinet of Ministers of RUz No.149 dated 19.03.2021 “On organizational matters of the Permanent Representative of the Republic of Uzbekistan in the EC IFAS”, <https://lex.uz/ru/docs/5338744>

by attracting the grant funds from donors. Based on the financing plan adopted by the Resolution of the Cabinet of Ministers of RUz No.42-F dated 07.02.2022, the resources were distributed among the following projects:

- "Construction of small local water bodies in the Amu-Darya Delta. Phase II" for two facilities: (1) "Reconstruction of the Muynak canal from PK 0+00 to PK 250+00 in Muynak district" (total project cost the - UZS 32.432 billion, contractor – SUE "Zarafshon Maxsus Suv Qurilish"). Reconstruction of 21.3 km of earthen channel and construction of 3 km of a new section to increase the flow capacity from 25 to 44 m³/s have been fully completed. The state commission has started its work for acceptance of this facility (the first quarter of 2024); (2) "Completion of construction of diversion canals, enforcement of tail-water and repair of mechanical equipment at the existing outlets of the Rybachie reservoir, plus reconstruction of the tail part of the dam of the Rybachie reservoir and construction of a new dam from PK 71+00 to PK 122+00 to prevent canyon-formation processes" (total project cost – UZS 20.511 billion, contractor – "Ellikkala Maxsus Suv Pudrat" LLC). As of 31.12.2023, UZS4.394 billion has already been disbursed.

- Afforestation in two sites: (1) "Protective afforestation in Akhantai site by local trees and shrubs" to the north-east of Muynak town on an area of 8,703 ha (total cost – UZS3,374.640 million, contractor – Muynak State Hunting Forestry). In 2023, works on the site have been completed. Drawing-up of the state acts for the acceptance commission is underway; (2) "Protective afforestation in Akkum side by local trees and shrubs" to the north of the Sudoche lake system on an area of 2,082 ha (total cost – UZS3,384.085 million, contractor – Kungrad State Forestry). In 2023, works for UZS655.169 million have been completed, and since the start of work UZS2,660 million were disbursed.

- At the expense of investment funds of Uzbekistan, the project "Reconstruction of a road dam (10.6 km) around Maipost Lake and construction of a spillway structure (capacity 1250 m³/s) on the Amu Darya River (Akdarya) and measures to prevent canyon-formation processes in Domalak Lake" (general contractor – Ko'prik Qurilish JSC) is underway. In 2023, works worth of UZS52.808 billion were completed, other costs of the client were estimated at UZS1.575 billion. All works shall be completed by the end of 2024, but only upon allocation of the essential funds.

A new project²⁹ "Construction of an irrigation system on the bottom of the dried Aral Sea for protection of green cover, development of cattle breeding and

improvement of its forage base, and also for provision of the essential conditions for wildlife" (UZS4 billion from "Almalyk Mining and Metallurgical Complex" JSC, UZS3 billion from Uzneftegaz JSC, contractor – Ko'prik Qurilish JSC) was launched. Some amendments were made in the initial project with the purpose to preserve trees and shrubs along the route, namely, the start point of the route was displaced to PK223 of the dam of the Rybachie reservoir. As of 31.12.2023, preparatory work for UZS478.675 million have been completed.

Projects under coordination by the GEF Agency of IFAS:

- "National Water Resources Management Project in Uzbekistan", Phase 2 (01.01.2020-31.12.2023, SDC grant, project area – 13 Basin Irrigation System Administrations (BISA), 13 land reclamation field offices, 48 Irrigation System Administrations (ISA) and 156 district irrigation departments). The project outcomes include:

(a) *regarding the strategic, regulatory and institutional framework*: with the assistance of the MWM Uz (Ministry of Water Management of the Republic of Uzbekistan), (1) a comprehensive strategic and regulatory IWRM-based framework for this sector was developed, approved and adopted (Water Concept³⁰, Water Strategy³¹, draft Water Code and draft Water Strategy 2024-2026 were prepared); (2) the Concept of an integrated National Information System for Water Resources Management is gradually implemented. The following was developed: (1) land reclamation information system. It was adopted in day-to-day practices of land reclamation field offices of the Ministry of Water Management of the Republic of Uzbekistan; (2) Smart Water system. Training sessions on using the system were conducted for the staff and it was introduced in activities of water management organizations;

(b) *regarding water management organizations and water users*: the mobile application TOMCHI was updated to provide access to knowledge on water saving technologies (WST) for more than 10,000 users and integrated with other ministries; 156 district irrigation departments were fully equipped and authorized to function as a link between the state support system and water users; new courses and guidelines on WST were delivered to 9 professional colleges related to water management, and demonstration sites were arranged and laboratories were equipped. The WST guidelines were used in training more than 80,000 farmers in the country within the framework of the "Farmers School" initiative of the Ministry of Agriculture of RUz. The gender assessment was conducted and a Gender mainstreaming action plan was drafted for IWRM training.

²⁹ by Order No.151-F/13 dated 28.03.2023 of the CM RUz and under the instruction of the President of Uzbekistan given in the course of his visit to the Republic of Karakalpakstan on February 23-24, 2022

³⁰ Decree of the President of RUz No.UP-6024 dated 10.07.2020 "On approval of the concept of development of the water sector in the Republic of Uzbekistan for 2020-2030", <https://lex.uz/ru/docs/4892946>

³¹ Decree of the President of RUz No.PP-5005 dated 24.02.2021 "On approval of the strategy for water management and irrigation sector development in the RUz for 2021-2023", <https://lex.uz/docs/5307921>

The external evaluation of Phase II (February 2023) demonstrated a high efficiency of project activities. A Mandate for implementation of the project 3rd phase was signed between the Swiss Confederation and GEF Agency of IFAS for 2024-2027 (December 12);

■ “Monitoring of biodiversity of wetlands in the South Aral Region (jointly with the Karakalpak Natural Science Institute under OSCE’s support): two expeditions were conducted along Sarbaska Bay (Rybachie) – Mezhdurechie Reservoir (Shege and Kuksu lakes) and Daukara settlement – East Karateren Lake (Takh-takupyr district) and South Usyurt National Park – Sary-kamysh Lake routes. Based on their findings, a rapid assessment of the state of plant and animal biodiversity of wetlands in the South Aral Region was made and relevant recommendations were provided.

Cooperation through regional projects. (1) “USAID Regional Water and Vulnerable Environment Activity Project”/WAVE (October 2020-September 2025, \$24.5 million), a contribution was made to the subproject “Training for Government Officials from Central Asia on Water-Energy-Food-Ecosystems Nexus”³²; (2) “Environmental Restoration of Aral Sea II”/ERAS II (USAID, October 2022-September 2025), the GEF Agency took part in the meeting of Uzbek-Kazakh Working Group (Tashkent, October 19).

The GEF Agency of IFAS (1) provided assistance³³ for the projects “Ecologically-Oriented Regional Development in the Aral Sea Region”/ECO-ARAL (2021-2024, BMZ, GIZ) and “Development of Innovative Climate Resilient Technologies for Monitoring and Controlling of Water Use Efficiency and Impact of Salinization on Crop Productivity and Livelihood in Aral Sea region” (2021-2025, JICA); (2) prepared a feasibility study for Component I “Coordinated water resources management as a basis for achieving land degradation neutrality (LDN) in critical areas of the ASB biodiversity” under the project “Conservation and Sustainable Management of Lakes, Wetlands and Riparian Corridors as Pillars of a Resilient and Land Degradation Neutral Aral Basin Landscape Supporting Sustainable Livelihoods” (2022-2026, UNDP-GEF, \$3,552,968). Negotiations with the UNDP office in Uzbekistan are in progress to get a mandate for implementation of Component I.

The GEF Agency signed: (1) a Memorandum of Understanding with the ED IFAS in Kazakhstan and the company “International Center of Climate Change Technologies” (Abu Dhabi, UAE) that implies a possibility to cooperate for development of proposals regarding the feasibility and implementation of the project on adoption of the “Clear Sky Manager New Generation” climate system; (2) a Memorandum of Cooperation with the “ASTANA – MEREY ADAM” International Foundation (Kazakhstan-Turkey) to expand joint activities under the “Environmental Restoration of the Aral Sea” project; (3) a Memorandum of Cooperation with the group of companies “BASALT UZBEKISTAN”.

Activities in support of IFAS. The GEF Agency took part in briefings and coordination meetings of EC IFAS and its branches in the countries, as well as in activities of the working group on improvement of institutional and legal framework of IFAS (see details in “EC IFAS”).

Political and civil engagement. The GEF Agency took part in: (1) meetings of the Expert Group of the Committee on the Aral Sea region development and ecology (May 1, May 29, November 22); (2) 16th Plenum of the Central Council (May 11), conference of the Tashkent City Party Organization (May 19), IV Congress of the Ecological Party of Uzbekistan (May 30).

In the course of the year, at the request of ministries and agencies, the GEF Agency of IFAS prepared proposals and analytical materials on the improvement of regional cooperation in water sharing in ASB; situation in water management in the Aral Sea region; transboundary water cooperation and the importance of strengthening the IFAS role; water-energy issues; problems of the Aydar-Arnasay system of lakes; water use situation and trends in Afghanistan, etc.

International cooperation. The GEF Agency of IFAS cooperated with the Uzbek branch of SIC ICSD; KOICA and GGGI on “Green Rehabilitation Investment Project for Karakalpakstan to address impacts of the Aral Sea crisis”; ADB and CAREC in preparation of the Water Pillar under the 2030 CAREC Strategy, etc.

In support of the Global Water Partnership (GWP), the GEF Agency of IFAS provides administrative management and facilitates implementation of the annual work program of the National Water Partnership (NWP) of Uzbekistan. The following events took place: (1) a general meeting of the NWP, where a new coordinator A. Tulyaganov was elected (May 23); (2) roundtable dedicated to the 30th anniversary of IFAS (May 23).

The GEF Agency of IFAS is an active member of the Asia Water Council (AWC). Mr. V.I. Sokolov took part in the 17th and 18th meetings of the AWC Board, 4th General Assembly of the AWC, as well as in the events for launching the 3rd Asia International Water Week (AIWW) (Songsan, Republic of Korea, July 5-8).

The Agency also took part in the Asia-Pacific Session “Enhancing Local Resilience through Water-Culture-Innovation Nexus” in the second day of the 32nd Stockholm World Water Week (online, August 21).

At the 25th International Congress on Irrigation and Drainage, Mr. V.I. Sokolov was elected a Vice-President (Vishakhapatnam, India, November 1-4).

For more details on events with involvement of the GEF Agency of IFAS, refer to <https://aral.uz/wp/category/event/>.

³² launched on December 2, 2021 under coordination of the Kazakh-German University

³³ Head of the GEF Agency of IFAS V.I. Sokolov is a member of the Steering Committee

Media outreach. Events organized by the GEF Agency of IFAS were covered in media and on the web, namely: tv-channels "Uzbekistan 24" (February 24, September 19, October 20), "Khabar 24" (March 4), Poytaxt (May 22), "Problems of the day" specially for the TV channel "Around Uzbekistan" (June 21), "Dunyo bo'ylab" (June 5, September 19, September 21, October 10, October 26, December 30); web portals "Third Pole" (May 18), "Sreda.uz" (May 25, May 27, June 6); "Al-Yamama Press" (May 25, June 1),

CABAR.asia (October 31); data portal "Karavansaray" (May 30), UzTREND (November 15); newspapers "Ishonch-Doverie", No.27 (1288) (June 23), "Vremya" (November 6, December 6), "Pravda Vostoka", No.252 (30289) (December 3).

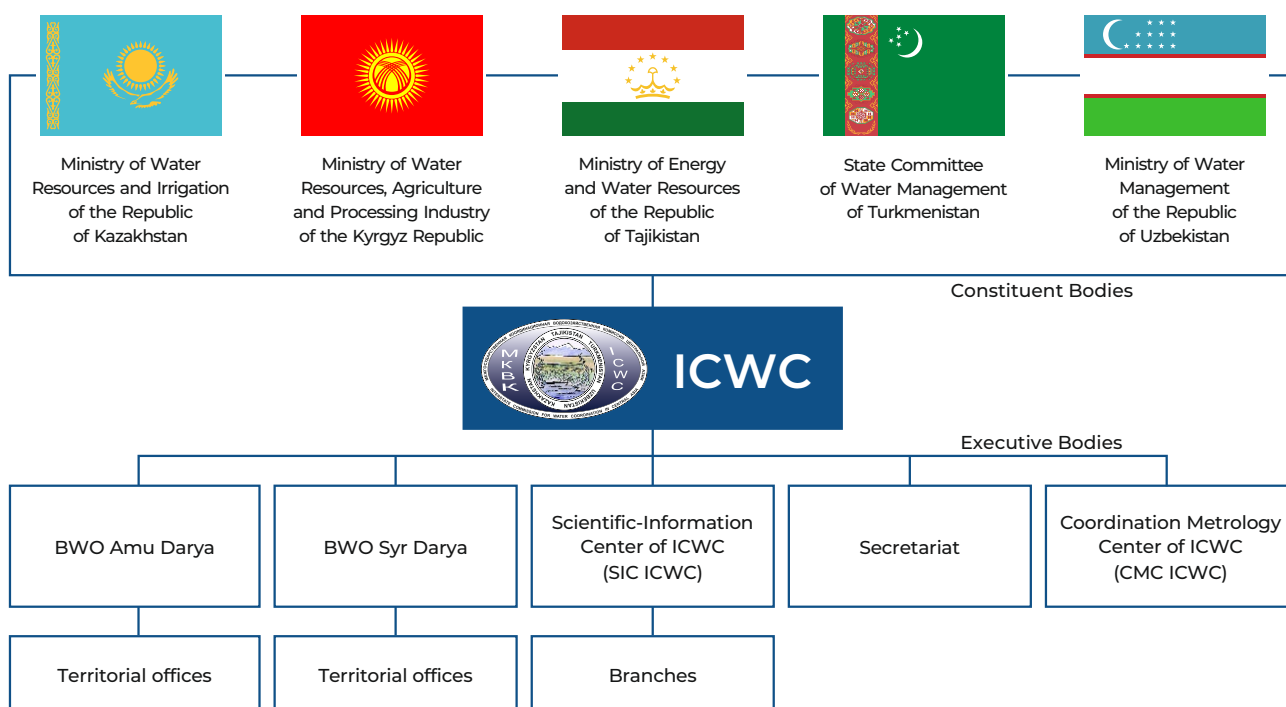
For publications, see the links: <https://aral.uz/wp/publications/>, <https://aral.uz/wp/publications/p3/>.

Source: GEF Agency of IFAS

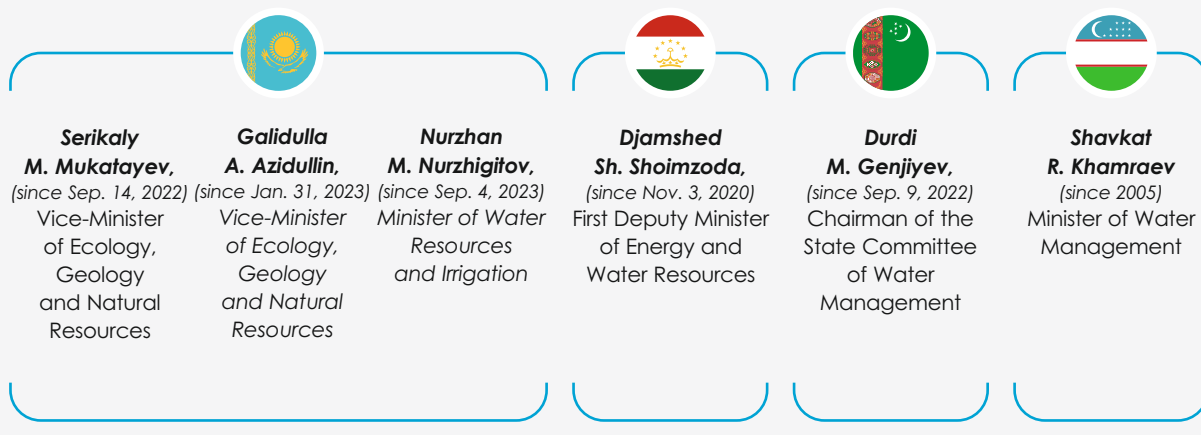
3.3. ICWC of Central Asia



The Interstate Commission for Water Coordination in Central Asia (ICWC) is a regional body of the CA states that deals with the issues related to management, efficient use and protection of water in the interstate sources of the Aral Sea basin and implements the jointly developed programs on the basis of cooperation and mutual respect for the parties' interests. The Commission was formed on February 18, 1992. The organizational set-up of ICWC is shown in the diagram below.



ICWC members in 2023



3.3.1. ICWC meetings

In 2023, ICWC held two meetings: 84th meeting (May 10, Dushanbe, Tajikistan) and 85th meeting (November 1-2, Tashkent, Uzbekistan). ICWC members from Kazakhstan, Tajikistan, Turkmenistan and Uzbekistan³⁴, as well as executive bodies (SIC ICWC, Secretariat of ICWC, BWO Amu Darya, BWO Syr Darya) and invited persons took part in those meetings.

Agenda. The main items on the agenda of the meetings were the **limits/quotas of water withdrawals and the operation regimes of reservoir cascades** in the basins of the Amu Darya and the Syr Darya (use of such quotas in the past period and their **approval** for the next period).

The information provided by BWO Amu Darya and BWO Syr Darya on the **results of water quota use** in the *non-growing season 2022-2023* (84th meeting) and the *growing season 2023* (85th meeting) was reviewed and taken into consideration. The members made decision that the Kazakh and Uzbek parties shall continue working "to have most updated data from hydrometeorological services on inflow to the Shardara reservoir" (84th and 85th meetings). "ICWC executive bodies shall strengthen work on application of new methods of forecasting the hydrological and water management situation..." (85th meeting).

For the growing season 2023 (84th meeting), the **limits/quotas of country water withdrawals** were approved and the proposed by BWO Amu Darya and BWO Syr Darya **forecast operation regimes for the reservoir cascades** were **taken into account**. "The Uzbek party requests the Tajik and Kazakh parties to speed up the process of reaching agreement on operation regime of the Bakhri Tojik reservoir for June-August 2023 by the end of May 2023."

For the non-growing season 2023-2024 (85th meeting), the **limits/quotas of country water withdrawals** were approved for river basins. "BWO Syr Darya shall monitor the operation regime of the Naryn-Syrdarya reservoir cascade and, in case of deviation from the forecast regime, inform immediately all the Parties."

The meetings recognized the work done by ICWC executive bodies on implementation of proposals and initiatives put forward by IFAS Founding States in Turkmenbashi as satisfactory. It was decided that ICWC members shall assist SIC ICWC in summarizing the outcomes of implementation of initiatives put forward at the Summit in Turkmenbashi and the fulfillment of the tasks set before ICWC as a result of the IFAS Summit in Dushanbe.

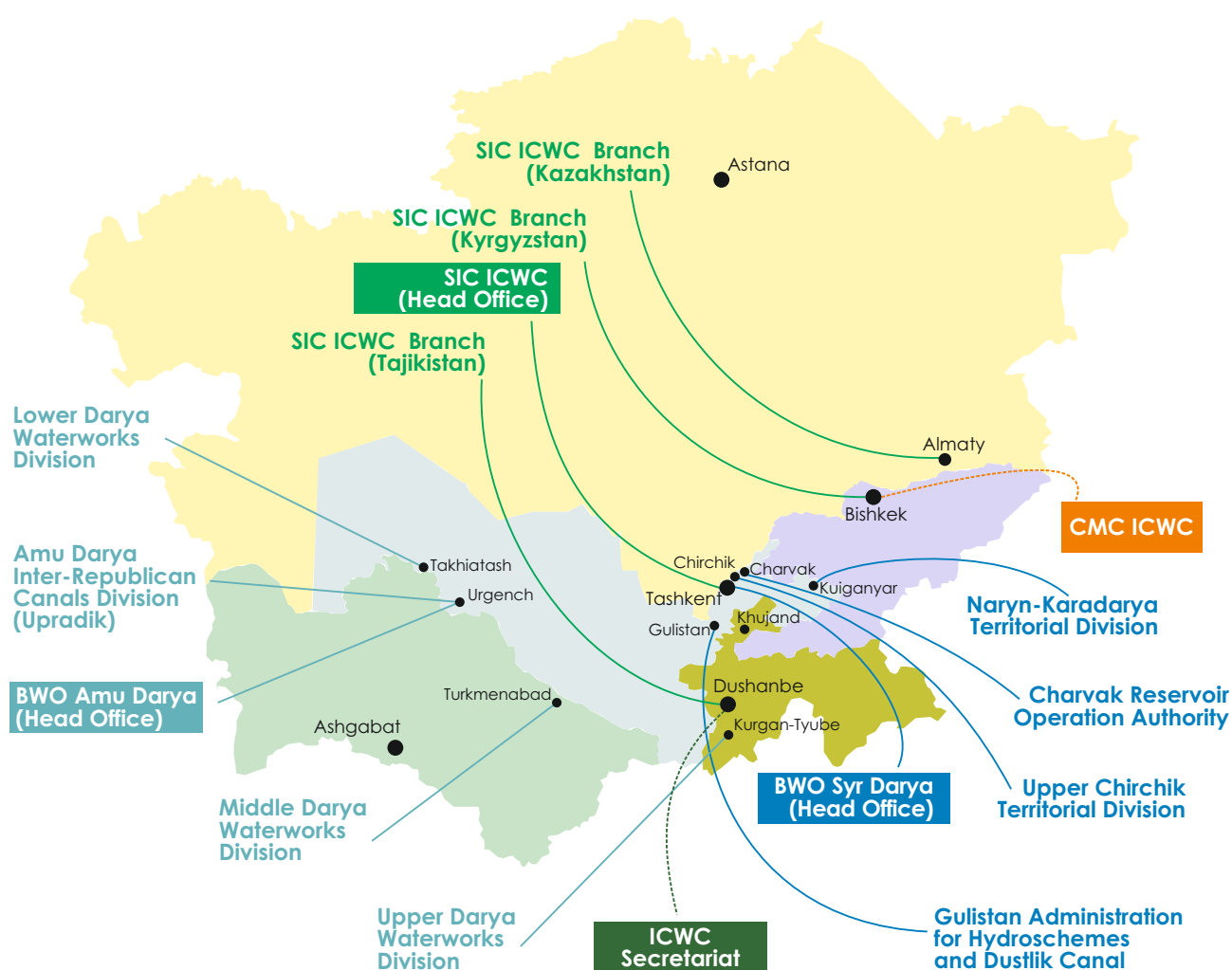
3.3.2. Activities of ICWC Executive Bodies in 2023

Executive bodies of ICWC

BWO Amu Darya	Responsible for routine management and distribution of water resources among the riparian states, timely and reliable delivery of water, according to the agreed limits, to users, and provision of sanitary and environmental flow for Prearalie and the Aral Sea. Established in September 1, 1987, with the headquarters in Urgench and four territorial divisions.
BWO Syr Darya	Responsible for routine management and distribution of water resources among the riparian states, timely and reliable delivery of water, according to the agreed limits, to users, and provision of sanitary and environmental flow for Prearalie and the Aral Sea. Established in September 1, 1987, with the headquarters in Tashkent and four territorial divisions.
ICWC Secretariat	Responsible for fulfillment of ICWC assignments, preparation, together with other executive bodies, of programs, measures and draft decisions for ICWC meetings, control over the flow of funds from ICWC founding states for financing of ICWC executive bodies (allocated for field operations, capital repairs, etc.), and coordination of international contacts. Established by the decision of the 6 th ICWC meeting on the 10 th of October 1993 in Dushanbe.
SIC ICWC	Responsible for backstopping of ICWC activities on regional and global stages. Contributes to transboundary water cooperation and sustainable water management in Central Asia through information support, training, networking, research, and expertise. Established on the 5 th of December 1992, with the headquarters in Tashkent and 3 branches.
CMC ICWC	Coordinates and implements technological policy in the field of metrological support to ICWC programs and decisions on the use, protection and accounting of water resources in sources and systems. Established on the 23 rd October 1999, with the headquarters in Bishkek.

³⁴ since the 68th meeting, representatives of the Kyrgyz Republic have not taken part in the ICWC activity

Location of Executive Bodies



BWO Amu Darya

Activity in 2023

BWO Amu Darya continued working on: (1) distribution of water among the states and control in real-time regime of observance of the water withdrawal limits/quotas approved at ICWC meetings (see [Water management situation in the Amu Darya and Syr Darya River Basins](#)); (2) improvement of the technical state and operation of waterworks facilities of BWO Amu Darya; (3) preparation of materials and participation in two ICWC meetings (see [ICWC meetings](#)). 15 meetings were held among the heads of water management organizations responsible for the river's lower reaches to address water allocation matters. Within the year, BWO Amu Darya maintained cooperation with water agencies of Tajikistan, Turkmenistan and Uzbekistan, hydrometeorological services, SIC ICWC, IWMI, and GIZ.

Source: BWO Amu Darya

BWO Syr Darya

Activity in 2023

BWO Syr Darya and its territorial branches kept maintaining waterworks facilities, including canals, gau-

ging stations, communication facilities, buildings and other structures under responsibility of the organization to ensure the sound use of water resources and trouble-free and sustainable supply of water to user-states.

Collective governance. BWO Syr Darya, in coordination with the CA members of ICWC and other stakeholders, have been developing the forecast operation schedules of the Naryn-Syrdarya reservoir cascade (NSRC) and water withdrawal limits for non-growing and growing seasons, and also coordinating the water allocation among water-user states in the Syr-Darya basin within the approved limits.

Representative of the MWRI (Ministry of Water Resources and Irrigation) of the Republic of Kazakhstan, Mr. M.E. Imangaliyev works as a deputy head in BWO Syr Darya and, according to his official duties, deals with the matters related to transboundary water management.

ICWC meetings. BWO Syr Darya took part in preparation of the 84th and 85th ICWC meetings. The reports on forecast and actual operation regimes of the Naryn Syrdarya cascade of reservoirs and the limits/quotas of country water withdrawals for: (1) the growing season 2023, with account of the expected water

availability (forecast and actual), and (2) the non-growing season 2022-2023 (actual) and 2023-2024 (forecast) were submitted for consideration and approval. BWO Syr Darya used in their reports the forecast and actual data from UzHydromet, CDC "Energy", Ministry of Water Management of Uzbekistan, and Ministry of Water Resources and Irrigation of Kazakhstan.

Repair and rehabilitation. Territorial branches of BWO Syr Darya performed the repair and rehabilitation of hydraulic structures, restoration of dams and mechanical cleaning of canals in line with the approved plan.

Reconstruction and modernization. As part of an investment program based on Presidential Resolution PP-465 of 30.12.2022 "On measures for development of social and production infrastructure of the Republic of Uzbekistan in 2023-2025", the construction work under Reconstruction and modernization of the Dustlik Canal headwork in Bekabad district of Tashkent Province, Stage 2 was completed and Stage 3 of this project was started.

ASBP-4. The financing is sought for implementation of the following project proposals included in the ASBP-4: (1) 1.3. "Provision of dam and large hydraulic structure safety in Central Asia: capacity building and regional cooperation"; (2) 1.6. "Automation of water distribution, accounting and monitoring in the Syr Darya Basin. Development of national water information systems as the basis for the regional information system."

Source: BWO Syr Darya

ICWC Secretariat

Activity in 2023

The ICWC Secretariat jointly with other executive bodies took part in organization of the two meetings of ICWC (see [ICWC meetings](#)), fulfillment of decisions and assignments of ICWC.

In the course of the year, the Secretariat took part in: (1) events of the UN 2023 Water Conference (March 22-24, New York, USA); (2) International Conference "Central Asia: towards sustainable future through strong regional institution" (Dushanbe, June 5-7); (3) Conference "Financial-economic instruments of water management improvement for sustainable development of Tajikistan" (Dushanbe, August 6); (4) practical training on development of a strategic plan for the Basin Women's Forum of the Kafarnigan River (August 7-9); (5) VI International Scientific and Practical Conference "The Role of women scientists in development of science, innovations and technologies", the proceedings of which contained three articles of the Secretariat's experts – "Use of APHRODITE and TRMM-3B42V7 PERSIAN-CDR products as the effective tools for climate change assessment", "Use

of SPI and SPEI indices for drought assessment in the context of climate change: Kafarnigan River basin of Central Tajikistan case study", and "Sustainable development and environmental consciousness in economy of Tajikistan" (Khujand, August 15-17); (6) professional development and experience sharing with Technoparks of Kazakhstan and "Scientific and Production Center for Ecological and Industrial Biotechnology" LLP (November); (7) UN Climate Change Conference/COP28 (Dubai, UAE, November 30-December 12); (8) training workshop "Capacity building and sharing of experience of ZRBA³⁵ staff and RBC representatives", within which the consideration was given to such topical issues, as management of basin organizations, technical aspects of basin maintenance and safety, marketing strategies (December 3-4).

The ICWC Secretariat maintains active cooperation with the Russian-Tajik Slavic University (RTSU), an interstate higher educational institution. In particular, it took part in the workshop "Strengthening the role of women and youth in water management in the Kafarnigan River Basin" and working meeting of representatives of the Basin Women's Forums of the Kafarnigan and Syr Darya Rivers (Sughd Province, February 27); roundtable "International significance of the initiatives of the President of Tajikistan to declare 2025 as the International Year of Glacier Preservation and to proclaim 21 March of each year as the World Day of Glaciers" (Dushanbe, May 26).

Source: ICWC Secretariat

Scientific-Information Center of ICWC

Activity in 2023

IFAS. SIC ICWC took part in anniversary events dedicated to the 30th anniversary of IFAS. In particular, SIC ICWC (1) held a roundtable in memory of Prof. V.A. Dukhovniy (online, August 16) and 2 training workshops for experts of BWO Syr Darya (Tashkent, February 23-24) and BWO Amu Darya (Urgench, September 28); (2) published an article "The role of ICWC in IFAS structure: 30 years of joint efforts for strengthening cooperation" in the Collection devoted to IFAS Anniversary; "Collection of selected agreements on water management in the Amu Darya and Syr Darya river basins", Tashkent, 2023; a newsletter "IFAS turns 30"; (3) participated in the roundtable (Tashkent, May 23) and international conference "Central Asia: Towards Sustainable Future through Strong Regional Institution" (Dushanbe, June 5-7).

SIC ICWC also took part in the activities of the working group on the improvement of institutional and legal framework of IFAS. For more details, please, refer to [Executive Committee of IFAS](#).

ICWC meetings. SIC jointly with other ICWC bodies contributed to preparation of two ICWC meetings

³⁵ Zerafshan River Basin Authority at the Ministry of Energy and Water Resources of Tajikistan

(84th and 85th), fulfillment of ICWC decisions and instructions. For more details, please, refer to [ICWC meetings](#).

SIC ICWC was involved in implementation of activities following the joint communique adopted at the Summit of the Heads of IFAS founder states (August 24, 2018) and the initiatives of Presidents of CA states and reported on SIC's contribution at ICWC meetings, starting from the 77th meeting, in part of automation of gauging stations in the Amu Darya and Syr Darya river basins, possible modalities of regional water-energy cooperation, development of methodologies and analytical materials on water conservation and measures for adaptation to climate change, organization of field expeditions and RS-based monitoring of the Aral Sea exposed bed, mechanisms of regional cooperation, water diplomacy and scientific cooperation, on participation in activities of working groups for implementation of ASBP-4 and improvement of IFAS.

Regional Information System on Land and Water in the Aral Sea Basin (CAWater-IS). In 2023, the IS was populated by the information on: (1) Amu Darya, Syr Darya, Kashkadarya, Surkhandarya, Chirchik, and Karadarya rivers for 2022-2023; (2) inflow to the Aral Sea and the Amu Darya delta for the growing season 2023 and the non-growing season 2022-2023; (3) analysis of the water situation in the Amu Darya and Syr Darya river basins for the growing season 2023 and non-growing season 2022-2023; (4) results of RS-based monitoring of water surface of the Eastern and Western parts of the Large Aral Sea, Small Aral Sea and lake systems of the Amu Darya River. See details in [Section 2](#).

A test version of the online interface was developed for the regional IS and connected to the GIS application of the Google Maps, which was used to visualize layers of reservoirs, weather stations in the Aral Sea basin and borders of states and regions in the CA countries. Databases for 34 reservoirs in the Aral Sea basin were developed using the Microsoft OneDrive application. It is planned to transfer the Regional IS to a new internet-platform (www.icwc-datatoolkit.net).

Analytics and assessments. Every ten days, analysis reports on water-related situation in the basins are posted on the SIC ICWC web-site in sections "Water-related situation in the Amu Darya River Basin" and "Water-related situation in the Syr Darya River Basin". The analytical reports on water-related situation in the Amu Darya and Syr Darya river basins were prepared for the growing season (2023) and non-growing season (2022-2023) and included an assessment of water allocation and operation regimes of reservoir hydrosystems, assessment and justification of water losses; key figures of these analytical reports were brought in line with the data presented by BWO Amu Darya and BWO Syr Darya (river water content, operation regimes of hydrosystems, water withdrawals), and comments to the BWO reports were produced.

Technical, information and expert assistance is rendered to national and regional organizations through timely provision on their request of relevant materials on key water issues: preparation of the meeting of the Council of Heads of IFAS Founder States, water-energy cooperation of the CA countries, development of cooperation between the CA countries and Afghanistan, construction of the Qosh-Tepa canal by Afghanistan in the north of the country, construction of the Rogun HPP, water conservation and measures for adaptation to climate change, mitigation of consequences of the Aral Sea catastrophe, environmental requirements for water protection, the draft Water Code of Uzbekistan and the draft Strategy for Water Management and Irrigation Sector Development in the Republic of Uzbekistan for 2024-2026, etc.

Information and publication activity. The Center continued providing support to ICWC by publishing and disseminating information materials and by further developing databases and the knowledge base, and regional web-resources, including the CA water and environment knowledge portal (CAWater-Info), ICWC, SIC ICWC, and EECCA NWO web-sites.

Information on the CAWater-Info web-portal exceeded 75 Gb, over 2 million visits were registered in 2022, and 1,456 new entries were added to the knowledge base. SIC has issued 31 publications and 52 information bulletins. See [Publications in 2023](#).

The web-page dedicated to scientific heritage of Prof. V. Dukhovnyi is updated on a regular basis (http://sic.icwc-aral.uz/scientific_heritage_of_prof_dukhovny.htm). A telegram channel was opened on "water-energy-food-ecosystem nexus" (<https://t.me/+Defxu-5Jq0RkNmVi>) and contains media publications and messages on water-ecological issues.

Research and development. SIC staff carried out research and developed tools in support of decision making as part of its research activity and within the framework of projects. In 2023, the work with the Innovative Development Agency of Uzbekistan was continued, 7 contracts for new projects were signed, 3 projects (under contracts with the UNDP Uzbekistan, UNRCCA, Potsdam Institute for Climate Impact Research) were implemented and 4 projects were launched (with the UNDP Turkmenistan, IHE Delft Institute for Water Education and OECD). A number of research efforts and assessments were conducted with the involvement of CA experts under umbrella of the Expert Platform on Water Security, Sustainable Development and Future Studies. Based on the research results, 13 articles, including 7 ones in international journals and 6 ones in Uzbekistan, were published by SIC staff. The research was carried out in the following key areas:

(1) Transboundary cooperation, international law and water diplomacy

Close cooperation has been established with the International Water Law Academy at Wuhan Univer-

sity (China)³⁶, the official launch of which took place on September 15-16, 2023. SIC ICWC presented at the conference "Charting a Path to Enhanced Transboundary Water Cooperation: Innovative Water Law to Tackle Hard Challenges and to Meet the UN Sustainable Development Goals" organized by the Academy. The policy brief "Transboundary Waters. The Role of Water Law in achieving the Sustainable Development Goals" was prepared by SIC ICWC in cooperation with the Academy, the Center for Water Law, Policy and Science of the University of Dundee (Scotland), and the Kazakh-German University, for its further presentation at the UN 2023 Water Conference.

The analytical-information materials were prepared for the national reports on SDG 6.5.2 (transboundary water cooperation), including the summary "Progress in Integrated Water Resources Management and Transboundary Water Cooperation in Central Asia (SDG 6.5)".

The legal and institutional frameworks for the operation, maintenance and construction of water infrastructure of interstate use in the Central Asia were carefully examined and measures for their improvement were proposed. The findings were published in an international journal³⁷.

The analytical work and expert discussions are underway on cooperation with Afghanistan on water, particularly with regard to construction of the Qosh-Tepa Canal. The exchange of views, among others, took place at the workshop "Water Issues between Central Asia and Afghanistan: evolution and contemporary challenges" (Institute for Advanced International Studies at the UWED, Tashkent, June 26); the expert roundtable "Water Disputes and Water Diplomacy between Afghanistan and its Neighbors" organized by the Konrad-Adenauer Foundation (Brussels, September 18).

(2) Water planning and regulation through improved data and tools

SIC assists the CA countries and international partners in regular monitoring of transboundary rivers and provision of early warning. As part of UNRCCA project "Drafting of Aral Sea Basin Transboundary Water Early Warning Bulletins", 4 e-bulletins containing the information on the current situation in the Syr Darya and Amu Darya basins and the forecast for next month were issued (May-June, June-July, July-August, August-September).

Practical tools were developed in support of decision making. In particular, the computer program "E-rules of Intra-Annual Flow Regulation in the Amu Darya River Basin" developed under contract with the Innovative Development Agency at the Ministry of Higher Education, Science and Innovation of Uzbekistan in 2022 was tested (February 23-25, May 5-8, Urgench) and adopted in BWO Amu Darya practices.

Monitoring of glacier condition in the Vakhsh and Zaravshan river basins was conducted to forecast the river water content using the MODSNOW tool. The comparison of results with the processed data from Landsat 8 showed the benefits of using the tool.

SIC has become a member of the Expert consultative council for the project "Water Efficient Allocation in a Central Asian Transboundary River Basin"/WE-ACT,³⁸ the kick-off meeting of which was held in Munich on January 26-27.

(3) Water-energy-land-ecosystem nexus

With the OECD support and involving experts from the CA countries, SIC ICWC prepared a discussion paper "Rethinking Institutional and Financial Mechanisms on Water and Energy Cooperation in Central Asia"³⁹. Jointly with the OECD and the EU, SIC ICWC organized a workshop "Innovative Solutions for Strengthening Regional Cooperation"⁴⁰ on water-energy management in the context of climate change (Dushanbe, June 7).

The issues of improvement of regional water and energy cooperation were summarized in proceedings of the roundtable in memory of Prof. Dukhovniy (August 16) and discussed at several meetings, in particular during the Eurasian Congress'23 "Eurasia of the Future: from Challenges to Solutions" (Sochi, June 8-9) and the SPECA Economic Forum (Baku, November 20-24).

(4) Adaptation of water and land use to the changing context

The Center continued the research on adaptation of a modern system for water and land resources monitoring and water balance (water requirement) modeling in the conditions of the Aral Sea region with a view of combating salinization and increasing land productivity⁴¹. In particular, based on field and desk studies, a map of hydromodule zoning of Ellikkala

³⁶ <https://iwla.whu.edu.cn/>

³⁷ Ziganshina D. (2023) Water infrastructure in Central Asia: legal and institutional frameworks. *Front. Clim.* 5:1284400. <https://doi.org/10.3389/fclim.2023.1284400>

³⁸ implemented as part of the Horizon Europe Program by 13 organizations under the overall coordination of the Technical University of Munich

³⁹ prepared within the Expert Platform on Water Security, Sustainable Development, and Future Studies by SIC ICWC and invited experts from the CA countries. This research was completed with the support of OECD as part of preparation for the project "Regional mechanisms for the low-carbon, climate-resilient transformation of the energy-water-land nexus in Central Asia" of the German International Climate Initiative (IKI)

⁴⁰ as part of the IFAS International Conference "Central Asia: Towards Sustainable Future through Strong Regional Institution" dedicated to the 30th anniversary of IFAS

⁴¹ as part of the project with the Innovative Development Agency at the Ministry of Higher Education, Science and Innovation of the Republic of Uzbekistan under the Japanese government program "SATREPS"

district (Republic of Karakalpakstan) was generated to include the changed climatic conditions. Work was continued in pilot site (Tik-Uzyak in Muynak district) to test the research version of the REQWAT model for calculation of crop water requirements and monitoring of cotton and sesame development and growth.

(5) Environmental issues

SIC ICWC completed the assessment of the conditions of the exposed bed of the Aral Sea and in the Aral Sea region as part of 2 expeditions⁴²: 1st spring expedition (April 26-May 19) covering the route 2,500 km long (Akpetki island system, Karateren Lake, Vozrozhdeniya (Renaissance) Island) and 2nd autumn expedition (September 20-October 12) on an area of 5,650 km², including the zone around the South Karakalpak collecting drain.



Source: <http://sic.icwc-aral.uz/releases/rus/435.htm>

In 2023, SIC ICWC studied the effectiveness of regulatory documents and programs applicable in the Republic of Uzbekistan to the water quality management and submitted proposals for their improvement based on international practices; completed an assessment of the state of hydrological and hydrochemical regimes of the Amu Darya River at the Kelif,

Kerki, Birata, Kipchak and Samanbai gauging stations; determined the mineral composition of water vs. prevalent chemical components and the chemical composition of water in the Amu Darya River at the above gauging stations; conducted an analysis of the level of pollution of the Amu Darya River at the Termez, Tuyamuyun (downstream of the dam), Kipchak, Samanbai, and Kzyl-Jar river sections and also of quantitative and qualitative indicators of CDW (collector-drainage water) and determined the impact caused by CDW from upper and middle reaches on water quality in the river; produced GIS maps that demonstrate the trends of changes in qualitative composition of water, expressed as water salinity and prevalent chemical components in the Amu Darya River for a multi-year period (1991-2022).

Thematic review "Biodiversity: major events in 2022 and activities of CA countries" was prepared.

(6) Water financing

SIC ICWC reviewed the world experience in irrigation water charging (policy brief 2), prepared an article titled "Payment for and policies on irrigation water use in developing countries", a thematic review "Public-private partnership in irrigation: what are the lessons for Central Asia?", and a discussion paper "Rethinking Institutional and Financial Mechanisms on Water and Energy Cooperation in Central Asia".

(7) Water, heritage and culture

SIC ICWC continued research in the sphere of water heritage in Central Asia. The possibilities of joint work were discussed at the meeting organized by the International Scientific Committee on Water and Heritage of the International Council for the Conservation of Monuments and Sites/ICOMOS (Delft, April 12). Reports on water heritage in CA and its role in regional water management were presented at the UN 2023 Water Conference (New York, March 23) and the side event "Water, Culture and Heritage:



Source: <http://sic.icwc-aral.uz/releases/eng/433.htm>

⁴² project "Empowering youth towards a brighter future through green and innovative development of the Aral Sea region" (MPHSTF for the Aral Sea region, UNDP, UNICEF, FAO), component 3.1. "Establishment of a data repository for evidence-based monitoring of the dried Aral Sea bed" (UNDP)

Connecting water management challenges with water related heritage" during the International Water Week (online, Amsterdam, November 8), etc.

Capacity building. The web-site developed by SIC on capacity building and training was further enriched and populated. SIC ICWC held: (1) jointly with the IHE Delft Institute for Water Education and Konrad Adenauer Foundation, **thematic session** "Water diplomacy: strengthening regional organizations in Central Asia"⁴³ as part of the international conference "Silk Road of Knowledge: Meeting of Science and Green Policy" (February 24); (2) IWMI, training workshops as part of IFAS 30th anniversary events: "Efficient allocation of water resources in the Syr Darya River Basin in the context of climate change" for BWO Syr Darya and water management organizations in the Fergana Valley (Tashkent, February 23-24) and "Efficient allocation of water resources in the Amu Darya River Basin in the context of climate change" for BWO Amu Darya (Urgench, September 28); (3) the Potsdam Institute for Climate Impact Research (PIK), a training workshop "From climate modelling to river flow: high-resolution scenarios and hydrology in Central Asia's climate change context" for climate experts from the CA countries (Tashkent, October 24-26); (4) SIC ICSD, trainings⁴⁴ on integration of climate change adaptation into water planning – 4 workshops for members of the coordination mechanism and decision-makers and 2 workshops for experts of city and district municipalities of Ashgabat and Dashoguz (Turkmenistan).

SIC ICWC experts (1) took the floor as guest lecturers at the IHE Institute of Water Education, KNU, Institute of Middle East, Central Asia and Caucasus Studies, University of St Andrews, etc.; (2) improved their qualifications by attending training workshops during the reporting period. See [Higher Education Institutions and Professional Development Centers](#).

Collaboration is maintained with the editorial boards of the "Central Asian Journal of Water Resources Research" and the electronic journal "Actuarial finance and accounting" (Tashkent State University of Economics).

Regional and international cooperation. SIC ICWC leadership and staff represented their organization at more than 35 national, regional and international conferences, workshops, roundtables. See [2023 Calendar of Events](#).

SIC ICWC actively **cooperated with the UN on water issues**. At the invitation of the President of the UNGA 77th session C.Körösi, Dinara Ziganshina made a report at the informal plenary meeting, the purpose of which was to hear the leading scientists on how to ensure the sustainable development in the modern context. On the threshold of the UN Water Conference, SIC ICWC has committed to work closely with the CA countries and other partners in order to develop



the evidence-based transboundary water cooperation. SIC ICWC took part in 7 events of the Conference.

Dr. Ziganshina continued her work as a vice-chair of the Implementation Committee under the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention).

SIC ICWC as a **member of the WWC Board of Governors**⁴⁵ took part in the following events: (1) kick-off meeting of the 10th World Water Forum and WWC Board meetings: 82nd (Jakarta, Denpasar, Indonesia, February 15-16, 17-18); 83rd (online, June 15); 84th (Beijing, China, September 9-10); 85th (online, November 28); (2) work of the coordination group on strengthening intersectoral cooperation and diplomacy in the process of preparation to the 10th WWF and of the task force "Water for Human and Nature" within the triennial strategic framework of the Council.

SIC ICWC participated in the SPECA events, activities of EECCA NWO, INBO, IWRA. In 2023, Dr. Ziganshina was elected a member of the Organizing Committee and International Scientific Committee for preparation of the XVIII World Water Congress "Water for All:

⁴³ submitted the key findings and recommendations stated in the policy brief "Strengthening Transboundary Water Institutions in Central Asia"

⁴⁴ within the framework of the contract with the UNDP on the project "Developing a National Adaptation Planning Process in Turkmenistan" (UNDP, GCF)

⁴⁵ www.worldwatercouncil.org/en/board-mandate-2023-2025

Harmony between Humans and Nature" and made reports on: "Guaranteeing basic human rights – ensuring access to safe drinking water for all" at the 3rd Global Water Security Seminar and on "Implementation of national and international law – a look at the role and work of the Implementation Committee under the Water Convention" at special session SS-6-7 (Beijing, September 11-15). SIC ICWC has received a Certificate of Honor for the contribution to the preparation of the Congress as a member of the International Scientific Committee.

SIC ICWC (1) provided an expert support to **OECD** in assessing the investment environment in the water sector of Uzbekistan and in sharing the experience in similar assessments with Armenia and Georgia; (2) collaborated with the **ADB** staff and consultants on such issues as enhancing the water availability in the Amu Darya River (July 26), in the projects for climate change adaptation and risk mitigation (October 18), and also in water-energy modeling under the CAREC⁴⁶ Water Pillar (August 18, online); (3) discussed approaches to water-energy modeling with the **WB** for building future development scenarios (October 24, November 28); (4) took part in discussions of **EDB** publications on "Regulation of the Water and Energy Complex in Central Asia", "Transboundary Public-Private Partnerships", and "Efficient Irrigation and Water Conservation in Central Asia".

In the course of the year, a number of meetings were held with the leadership and staff of the French Development Agency/**AFD**, **GIZ** "Green Central Asia", **SDC** Blue Peace Project and other partners.

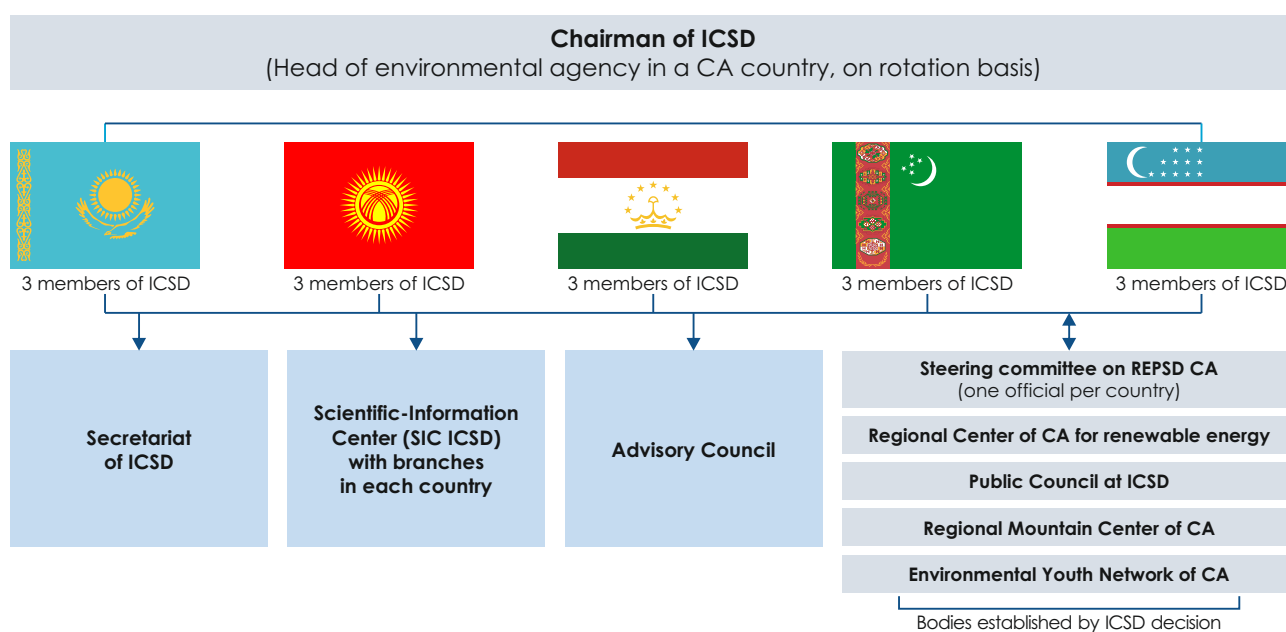
SIC continues issuing Water Yearbook: Central Asia and around the Globe as its contribution to coordination of water actions among countries and partners.

Media. Interviews were given to (1) the UN News Service on the need for sound consumption and international cooperation in the sphere of transboundary water protection (New York, March 24); (2) A. Shaydamov, representative of the National Research University "Higher School of Economics", regarding the research project "Study (assessment) of priorities and mechanisms for the implementation of sectoral policies in the countries of Central Asia and Transcaucasia in connection with the international donors agenda" (June 19); (3) the "Khabar" news agency (June 19); (4) V. Presnyakov, editor-in-chief of the online newspaper "Power and Industry of Russia" (June 20); (5) the French film company ARTE, which was shooting a documentary about the Syr Darya (July 1); (6) "Vzglyad.az" (<https://t.me/Vzglyad>) on the "Water crisis in Central Asia: how to deal with it in Uzbekistan?" (August 21).

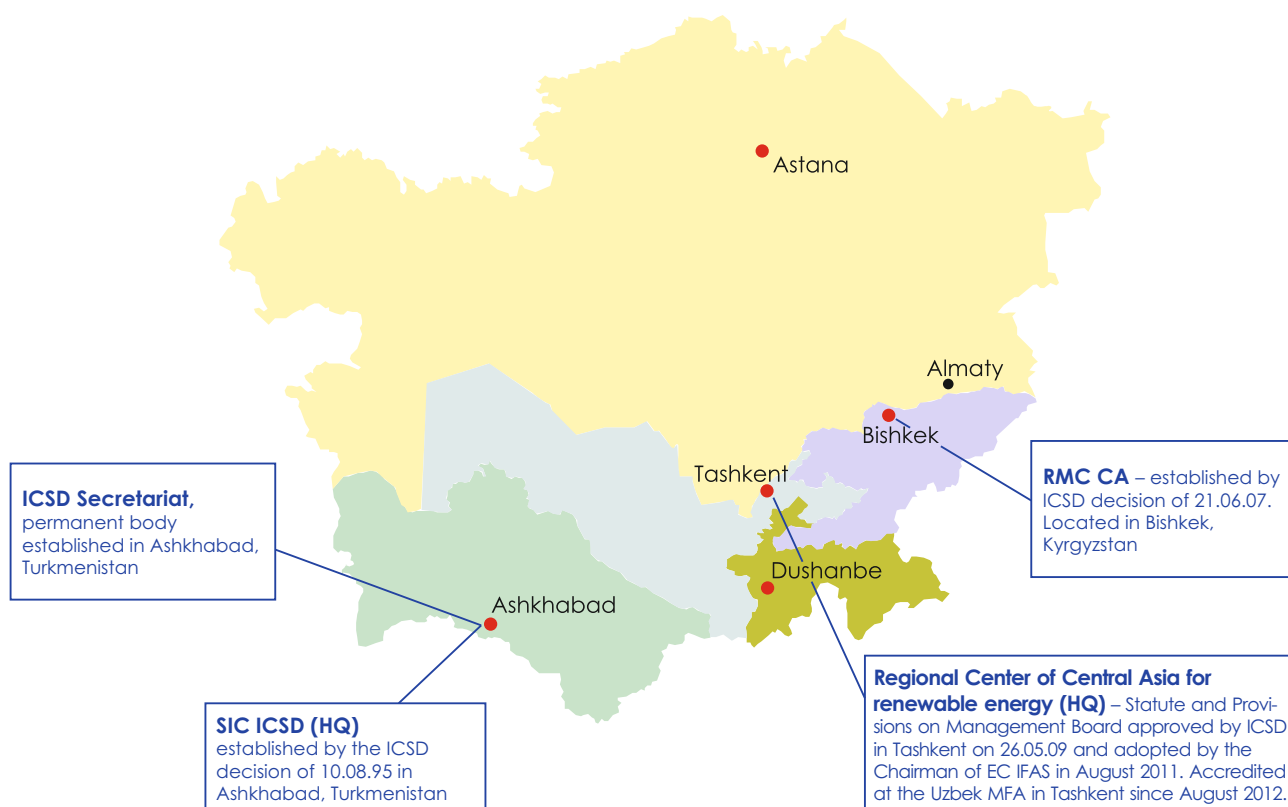
Source: SIC ICWC

3.4. ICSD of Central Asia

The Interstate Commission on Sustainable Development (ICSD) was established by the decision of the Interstate Council for the Aral Sea Basin in 1993. It is entrusted with the mission of coordination and management of regional cooperation in the field of environmental protection and sustainable development of the CA states. The organizational setup of ICSD and location of its executive bodies are shown in the figures below.



⁴⁶ under the ADB Regional Technical Assistance TA-9977: "Central Asia Regional Economic Cooperation (CAREC): Water Pillar Development"



The Republic of Kazakhstan is the chair country of ICSD for the period of 2022-2024 (March 18, 2022, online).

Activity in 2023

The primary task is to strengthen the legal, institutional and technical framework of ICSD and its bodies with the purpose of implementation of regional programs and projects, organization of monitoring in the area of environmental protection in CA, interaction with other regional and international organizations for the sustainable development in the region.

Regional Environmental Program for Sustainable Development (REP4SD CA) in Central Asia. The REP4SD CA⁴⁷ was approved at the meeting of the IFAS Board on February 22, 2022 in Dushanbe. The Program is based on the ongoing in CA processes aimed at achieving SDGs, implementing UN environmental conventions, developing green economy and adapting to climate change. The framework character of the Program is to promote regional environmental cooperation in CA until 2030.

REP4SD includes over 40 agreed **regional cooperation priorities** grouped by environmental SDGs. The **Roadmap** of REP4SD developed jointly with UNEP ranks the priorities of implementation. **High priority actions** include: (1) development⁴⁸ of indicators to fully measure implementation of the Roadmap and the Regional strategy on adaptation to climate change, with account of specifics of CA ecosystems (**the work was completed**); (2) preparation and implementation of regional programs and projects funded by GEF, GCF and other donors⁴⁹; (3) issues under the education-related SDG 4. There is a need for standardization of education disciplines in the area of ecology and sustainable development, for preparation of highly skilled professionals, and building human and institutional capacities of relevant ministries and agencies; (4) implementation of SDG 15 and UN conventions on desertification and biodiversity.⁵⁰ The **medium-term priorities** of REP4SD include: (1) "SDG 17. Development of guidelines and standards to establish a strategic environmental assessment on environmental protection and adaptation to climate change" and "SDG 6: Ensuring the effectiveness of water quality monitoring in ASB". ICSD intends to cooperate closely with UNECE on these issues; (2) moni-

⁴⁷ this was preceded by huge efforts, starting from the ministerial conference "Environment for Europe" in 1992, where ICSD took voluntary obligations to update the Regional program as part of the Batumi green economy initiative. See more in 2021 Water Yearbook, Section 3.4, http://www.cawater-info.net/yearbook/index_e.htm

⁴⁸ implemented jointly with GIZ as part of the Integrative and Climate-Sensitive Land Use in Central Asia (ILUCA) and Green Central Asia

⁴⁹ climate financing for the region can be attracted also through international organizations. The Memorandum of Cooperation with GIZ was updated to give it a higher status and to integrate more regional environmental programs of this organization. A special agreement was signed in addition to the existing MoC between SIC ICSD and CAREC for involving this important regional organization in the implementation of REP4SD as a co-implementer

⁵⁰ The following projects are supported by the ICSD decision: Integrated natural resources management in drought-prone and salt-affected agricultural production landscapes in Central Asia and Turkey/CACILM-2 (FAO/GEF); Ramsar Regional Initiative for Central Asia (Ramsar Convention Secretariat, CAREC) and other UNDP projects implemented in Turkmenistan and Uzbekistan

toring of glaciers and climate risks, as well as development of green economy principles.

ICSD meetings. The 3rd meeting of ICSD Advisory Board (September 4-5) and the regular ICSD meeting (September 5) were held in Astana. The report on ICSD 2022-2024 action plan was presented and the item on Regional Waste Management Center in Dushanbe, the tasks of which are to build capacities of ICSD and its bodies, contribute to cooperation on waste management between environmental authorities in the region, was addressed.

Director of Uzbek branch of SIC ICSD raised the need for deeper study of indigenous knowledge and practices of the CA countries and their role for sustainable development and for the regional youth ecological forum to ensure active engagement of CA youth in addressing environmental issues and exchange of knowledge and experience.

Improvement of the institutional and legal framework of IFAS. In 2023, ICSD took part in 3 meetings. Proposals on the institutional improvement of IFAS and ICSD were drafted and submitted to the Executive Committee of IFAS.

Activities. The Head Office of SIC and Secretariat of ICSD: (1) collected materials on environmental policies (strategies and programs) and laws of Turkmenistan; (2) developed a draft law "On amendments and additions to the Law of Turkmenistan on Wastes"; (3) rendered assistance in the development of measures for implementation of the Paris Climate Agreement and took part in a working meeting where the progress in the greenhouse gas inventory process, training on inventory methods and preparation of educational materials for FAO trainings were discussed; (4) contributed to the Turkmenistan's national report on implementation of the UN Desertification Convention.

ICSD also was involved in the project "Regional Climate Action Transparency Hub for Central Asia"/RECATH (ICAT/GHGMI/CAREC) and provided information support to the project "Conservation and sustainable management of land resources and high nature value ecosystems in the Aral Sea basin for multiple benefits" (UNDP/GEF). ICSD jointly with (1) SIC ICWC have been developing special training programs and educational materials and conducting trainings for different target groups within the framework of the project "Developing a National Adaptation Planning Process in Turkmenistan" (UNDP, GCF); (2) the Secretariat of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal have been implementing the project "Institutional strengthening for implementation of the Basel Convention in Turkmenistan".

The Tajik branch of SIC ICSD maintained cooperation with other branches on establishment of the Regional Waste Management Center for Central Asia, prepared additions to the draft Charter of the Center, and made proposals to the draft Regional Climate Change Adaptation Strategy in Central Asia.

The Uzbek branch of SIC ICSD prepared: (1) for the Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan the Roadmap to activate the environmental sectoral dialogue and cooperation between Uzbekistan and PRC and proposals on the projects "Green Mahalla", "Green Belt", and "Green Corridor" based on experience of USA, Korea, Singapore, China, and Kazakhstan; (2) proposals on organization of a study tour to a salt lake located in the desert in the south-east California (USA) and dried up as a result of mismanagement to learn from lessons and efforts made to mitigate the ecological catastrophe; on construction of artificial water bodies in the Aral Sea basin jointly with Kazakhstan; on organization of a scientific expedition to the Aral Sea, jointly with Kazakhstan, to study plantations of desert plants on the exposed and in the Aral Sea region (on saline land), wild animals and bird species, etc.

Representatives of the head office and branches took part in the following events: (1) roundtable dedicated to the 30th anniversary of IFAS (Tashkent, May 23); (2) Central Asian Climate Change Conference/CACCC-2023 (Dushanbe, May 16-17); (3) annual meeting "Advancing CGIAR science⁵¹ on water systems" (Tashkent, May 31); (4) regional workshop "Capacity building of ICSD and its institutions in environmental protection and sustainable development"⁵² (Dushanbe, June 5-7); (5) roundtable "Regional cooperation in Central Asia on environmental protection, climate change and sustainable development"⁵³ (Astana, June 1-3); (6) Second High-Level Dialogue on Climate Change and Resilience in Central Asia "Early warning systems for climate resilience" (Bishkek, September 21-22); (7) Regional Forum "Central Asia on the Way to the 28th Conference of the Parties to the UNFCCC: 5 Countries-1 Region-1 Vote" (Astana, November 7); (8) 6th meeting of the Kazakhstan-Uzbekistan Joint Working Group on Environmental Protection and Water Quality in the Syr Darya River Basin (Astana, 14 December), etc.

Publications. ICSD published the following articles: (1) "Sustainable water management in Turkmenistan in the context of climate change" and "On the Regional Environmental Program for Sustainable Development in Central Asia (REP4SD CA)", collection of articles "Regional cooperation in Central Asia" dedicated to the 30th anniversary of IFAS; (2) "Combating land degradation in Turkmenistan" and "Landscape desertification" in the international scientific-practical journal "Problems of desert development"; (3) "Global concept of land degradation assessment" in

⁵¹ advisory group on international agricultural research

⁵² as part of the international conference "Central Asia: Towards Sustainable Future through Strong Regional Institution" dedicated to the 30th anniversary of IFAS

⁵³ within the framework of the 3rd International Congress "ECOJER: Carbon Neutrality Pathways"

the journal "Ecological culture and environmental protection".

The "Collection of regulations on environmental protection in the Republic of Tajikistan" and the book "Glaciers of the Republic of Tajikistan – the main water source in Central Asia" were published as well.

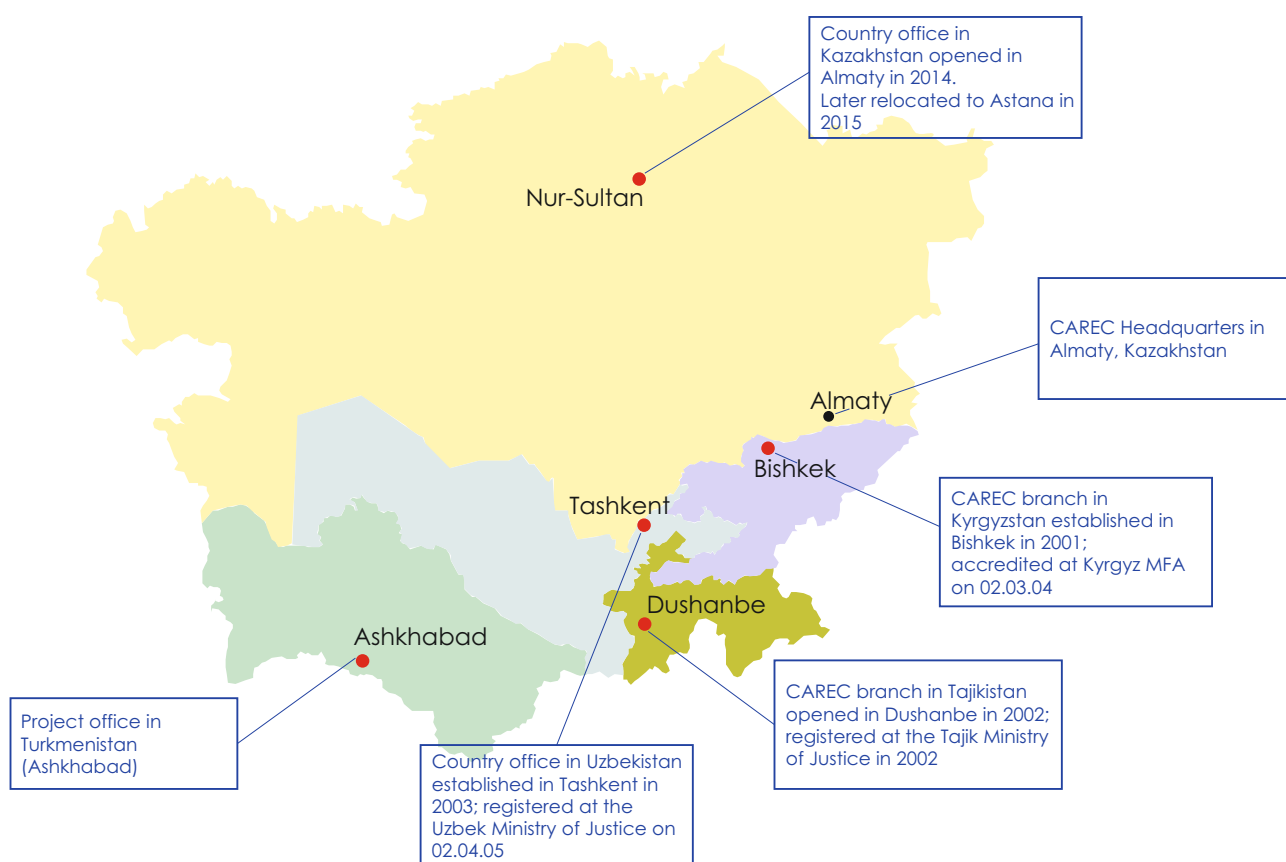
The research monograph "Legal aspects of climate protection in Turkmenistan" was prepared for publication.

Source: ICSD Secretariat and SIC ICSD, <https://www.mkurca.org/>, <http://www.filial-nic-mkur.tj/index.php/ru/>

3.5. Regional Environmental Center for Central Asia



CAREC is an independent, non-profit, nonpolitical international organization, which assists the Central Asian governments, regional and international stakeholders and partners in addressing their environmental and sustainable development issues in Central Asia. The headquarters is located in Almaty, with the country offices operational in 5 Central Asian states.



Activity in 2023

Key accomplishments of the year: (1) CAREC continued its flagship initiative on preparation of regional statements from countries and civil society and on organization of the CA pavilion at the Conference of the Parties to the UNFCCC; (2) CAREC was nominated to support the process of preparation of the national report to the UN Convention to Combat Desertification in Tajikistan; (3) national forest inventory was completed in Kyrgyzstan, including the update of the quantitative and qualitative data on all forests of the Republic and development of a new forest map; (4) testing of all reporting systems (JRC, Trends Earth and FAO-

WOCAT) was completed in Turkmenistan in the process of preparation of the national report on combating desertification; (5) micro-, small and medium-sized enterprises (MSMEs) engaged in processing of agricultural products, as well as local financial institutions became new beneficiaries of CAREC projects. The creation of MSME support centers was started in Fergana and Bukhara (Uzbekistan), Sughd and Gorno-Badakhshan regions (Tajikistan); (6) initiatives of women in the water sector in Central Asia were presented at sessions of the UN 2023 Water Conference; (7) Days of the Amu Darya River and the Syr Darya River were held (in Nukus, Dashoguz, Nurek, Daroot-Korgon, Khiva) and brought together 328 participants, inhabitants and

users of ecosystems in these river basins; (8) 15 projects (9 regional and 6 national) continued. See the list of projects in the [Annual Report 2023](#), Annex 1.

Capacity building. CAREC developed the following: (1) training modules on legislative changes, new strategic priorities of Turkmenistan and financial sustainability of small basin council operation for re-qualification and mandatory certification of specialists; (2) courses on water management for the Academy of Civil Service at the President of Turkmenistan and on IWRM for Ashgabat Agricultural University and Dashoguz Agricultural Institute; (3) training course, educational materials and a syllabus on “Water Diplomacy and International Water Law”.

In 2023, 74 events were organized for more than 712 participants, in particular 26 training workshops on: application of the biosafety clearing house (KR); processing of forest resources database and mapping of land and forest resources of the Kyrgyz Republic; application of data collection and analysis tools for preparation of National Inventory Reports (NIR), emission reduction and climate change adaptation reports; climate change for media representatives; water diplomacy skills, international water law and women's parti-

cipation in water diplomacy; green investments, climate finance and financial instruments, etc. For more details, see [Annual Report 2023](#), Annex 2.

Supported the Second Climate Eco-Festival “Let's Save the Earth Together” in Turkmenistan for fostering nature care among youth (Ashgabat, October 15).

Events. (1) 5th Central Asian Climate Change Conference (CACCC-2023) “Climate Change and Development” (Dushanbe, May 16-17); (2) meetings of representatives of MFAs and parliaments of CA countries on climate change and strengthening of inter-sectoral cooperation (Tashkent, April 19; Dubai, December 2); (3) 13th Central Asian Leadership Program (CALP)⁵⁴ on environment for sustainable development (Almaty, September 18-22); (4) meetings for preparation of participation of CA countries at COP28 with the purpose to formulate a regional position, prepare a regional statement from states, non-governmental sector and youth. As part of the Conference, CAREC supported the Central Asian Pavilion “5 countries-1 region-1 vote”, which was visited by more than 3,000 people (Dubai, November 30-December 10), etc. For more details on CAREC events in 2023, see <https://carececo.org/main/news/>.



Central Asian Pavilion “5 countries-1 region-1 vote”

Publications. As part of implemented projects, CAREC issued 31 publications (expert reports, manuals, video records, glossaries, handbooks) and 13 training materials. For more details, see <https://carececo.org/>

[main/ckh/publications/](#) and [Annual Report 2023](#), Annexes 3 and 4.

Source: www.carececo.org/main/, [Annual Report 2023](#)

⁵⁴ CAREC's flagship initiative, undertaken since 2010, designed to improve leadership capacity of young and mid-level managers of various environmental agencies and focused on addressing the multiple sustainable development challenges in the region



4

SECTION

Cooperation between
the Countries
of Central Asia
on Water and Other
Matters

4.1. Bilateral collaboration

4.1.1. Kazakhstan-Kyrgyzstan

High-level contacts

In 2023, the President of Kazakhstan paid a working visit to Kyrgyzstan to take part in the [II EU – Central Asia Summit](#) (Cholpon-Ata, Kyrgyzstan, June 2). In his turn, the President of Kyrgyzstan had **working visits** to Kazakhstan to take part in the [Astana International Forum 2023](#) (Astana, Kazakhstan, June 7) and in the [Summit of the Organization of Turkic States](#) (Astana, Kazakhstan, November 2-3).

Cooperation within the Chu-Talas Water Commission

Bilateral water relations between Kazakhstan and Kyrgyzstan are regulated by the [Agreement on the Use of Water Management Facilities of Intergovernmental Status on the Chu and Talas Rivers](#) (January 21, 2000). The Chu-Talas Water Commission (CTWC or Commission) is a joint body, the mission of which is to ensure the joint operation of the water facilities of interstate use and estimate operational costs required for their safe and reliable operation.

Meetings. From 2006 to 2023, the Commission convened 32 meetings, and the CTWC Secretariat held over 30 meetings. In 2023, the 32nd Commission meeting took place. Key discussions included: review of progress made on decisions adopted at the previous CTWC meeting in Bishkek, Kyrgyzstan, on December 7, 2022; assessment of work completed in 2023, approval of repair and rehabilitation plans for 2024, and discussions on increasing Kazakhstan's shared financing for operation and maintenance (Almaty, Kazakhstan, December 22). The parties also adopted the 2022-2030 Strategic Action Program (SAP) for the Chu and Talas River Basins⁵⁵ aimed at addressing climate change impacts and promoting sustainable development through water cooperation, focusing on water quality, quantity, ecosystem conservation, and monitoring.

Working Group on environment protection (WGEP) under the CTWC Secretariat. At its 11th meeting held on

November 21 in Almaty, the WGEP discussed the following reports: (1) findings from the 2023 monitoring of the Chu and Talas rivers, including seasonal coordinated water sampling; (2) results of hydrometeorological monitoring at mutually selected gauging stations conducted by Kazakhstan over 2022-2023; (3) annual reports on water quality in both countries. The WGEP also adopted its work plan for 2024.

Bilateral water-related arrangements

The Kazakh Minister of Water Resources and Irrigation and the Kyrgyz Minister of Agriculture met to discuss the construction of the Chu Bypass Canal-2 (CBC-2). Both sides agreed to provide necessary materials and facilitate hydrological and hydrogeological observations. Kazakh scientists gained access to historical hydrogeological data on the Chu River basin. A joint letter was sent to GIZ seeking support and expertise to assess the potential environmental impact of the CBC-2 (Bishkek, Kyrgyzstan, November).

The parties also agreed on water delivery to irrigated land in Zhambyl region through Tuite canal on the Talas river. Kazakhstan proposed adding several canals and facilities on the Kurkureusu, Chu and Talas rivers to the list of interstate water facilities.

Other bilateral arrangements

The 11th meeting of the Kazakh-Kyrgyz Intergovernmental Council was held during the first Kyrgyz-Kazakh interregional forum. The meeting focused on interstate cooperation in water use, energy, agriculture, trade, and other areas. The Prime Minister of Kazakhstan **highlighted** the importance of developing cooperation in ecology and rational water use, emphasizing its direct impact on citizens' livelihoods. He stressed the need for an effective monitoring mechanism through the digitization of interstate water canals and the exchange of hydrological information, including reservoir inflows and water withdrawals throughout the basin (Taraz, Kazakhstan, September 23).

4.1.2. Kazakhstan-Tajikistan

High-level contacts

The President of Tajikistan paid a **state visit** to Kazakhstan. During this visit, the Heads of State signed the [Declaration on Allied Co-operation](#) between Tajikistan and Kazakhstan in which, among others, they highlighted that: (1) one of the key factors of sustain-

able development of Central Asia is the integrated and rational use of water and energy resources; (2) Kazakhstan and Tajikistan reaffirm the important role of IFAS; (3) the parties will continue developing cooperation on environmental protection and natural and man-induced emergencies prevention and response. Additionally, a wide range of matters related

⁵⁵ SAP was developed as part of the GEF-UNDP-UNECE [project](#) "Enabling Transboundary Cooperation and Integrated Water Resources Management in the Chu and Talas River Basins"

to bilateral co-operation were addressed and, in total, over 60 new cooperation documents were signed at ministerial and business community level. As part of the state visit, the President of Tajikistan was awarded the Kazakhstan Order "Altyn Qyran" (Golden Eagle) (Astana, Kazakhstan, [May 3-4](#)).

The President of Tajikistan paid a **working visit** to Kazakhstan for attending the [opening ceremony of the Days of Culture of the Republic of Tajikistan in Kazakhstan](#) (Astana, Kazakhstan, [August 25](#)). The President of Kazakhstan had **working visits** to Tajikistan to take part in the [Fifth Consultative Meeting of the Heads of State of Central Asia](#). The heads of state met to discuss a number of issues, including strategic partnership and interactions in trade-economic, transport-

logistics, cultural-humanitarian and other priority areas (Dushanbe, Tajikistan, [September 14](#)).

On the sidelines of the [Gulf Cooperation Council-Central Asia Summit](#), the heads of state discussed the issues of further expanding the trade and economic cooperation, strengthening the cultural-humanitarian ties and implementing the agreements reached during Tajik President's visit to Astana (Jeddah, Kingdom of Saudi Arabia, [July 19](#)).

In the course of **telephone conversations**, the Presidents discussed such issues as transboundary water use, deepening cooperation in trade-economic and cultural-humanitarian spheres, and further strengthening of Kazakh-Tajik relations (January 7, October 5).

4.1.3. Kazakhstan-Turkmenistan

High-level contacts

The President of Turkmenistan had a meeting with the Minister of Foreign Affairs of Kazakhstan who arrived in Turkmenistan for attending the [16th Cooperation Forum "Central Asia-Republic of Korea"](#). The sides discussed a wide range of bilateral cooperation issues, in particular in the transport, logistics and energy spheres (Ashgabat, Turkmenistan, [November 1](#)).

During bilateral negotiations, ministers of foreign affairs of the both countries discussed bilateral cooperation on the Caspian Sea and under umbrella of IFAS in the political-diplomatic, trade-economic, cultural-humanitarian and other priority areas (Astana, Kazakhstan, [February 27](#); Ashgabat, Turkmenistan, [October 30](#)). Following the results of the meeting in October, the Cooperation Program between the Ministries of Foreign Affairs of Turkmenistan and the Republic of Kazakhstan for 2024-2026 was signed.

Bilateral working groups

The following meetings took place: (1) 12th meeting of the Intergovernmental Turkmen-Kazakh Commission on economic, scientific, technical and cultural cooperation. The parties discussed further development of cooperation in such spheres as trade-economy, transport, finance, agriculture, water management, construction, culture, tourism, education, science, and oil and gas (Astana, Kazakhstan, [May 15](#)); (2) 1st meeting of the Turkmen-Kazakh working group on transport, transit and logistics, as a result of which the Memorandum on transport interconnectivity was signed (Ashgabat, Turkmenistan, [November 26-27](#)).

The Majilis (*Council*) of the Kazakh Parliament adopted the Law [No.2-VIII ZRK](#) of 28.04.2023 "On ratification of the Treaty⁵⁶ between the Republic of Kazakhstan and Turkmenistan on the regime of the Kazakh-Turkmen State Border".

4.1.4. Kazakhstan-Uzbekistan

High-level contacts

Presidents of Uzbekistan and Kazakhstan had an **informal meeting** in Shymkent on [March 3](#). The parties reviewed the progress on agreements reached earlier in [December 2022](#) and discussed a number of issues, including further increase of mutual trade turnover, mobilization of investments, enhancement of cooperation on industry, energy, agriculture, transport and logistics.

The President of Uzbekistan paid a **working visit** to Kazakhstan to take part in the [Summit of the Organization of Turkic States](#) (Astana, Kazakhstan, November 2-3).

In the course of **telephone conversations**, the Presidents discussed topical issues on the bilateral and

regional agenda, including on implementation of high-level agreements and progress on major cooperation projects in trade, industry, energy, transport, agriculture and other economic sectors ([May 1](#), [May 17](#), [June 12](#), [July 10](#), [July 24](#)).

Kazakh-Uzbek Joint Working Group (Commission) on Environment Protection and Water Quality in the Syr Darya River Basin

The Commission on Environment Protection and Water Quality in the Syr Darya River Basin (hereinafter referred to as the Working Group) comprises experts from Uzbekistan and Kazakhstan. It was established under

⁵⁶ Treaty was signed on [25.11.2021](#) and entered into force on [28.11.2022](#)

the framework of the 2017-2019 Strategy for Economic Cooperation between Kazakhstan and Uzbekistan, signed by President Shavkat Mirziyoyev during his visit to Kazakhstan, as well as the [1997 Agreement between the Government of the Republic of Kazakhstan and the Government of the Republic of Uzbekistan on cooperation in the field of environmental protection and management](#).

Meetings⁵⁷. As of 1 January 2024, the Working Group has convened six times: [September 27-28, 2018](#) in Tashkent; [November 7-8, 2019](#) in Nur Sultan; [December 24, 2020](#) via video-conference; [December 13, 2021](#) in Almaty; [December 14-15, 2022](#) in Tashkent; and, [December 14, 2023](#) in Astana (hybrid).

During the 6th meeting, the parties discussed the implementation of the Commission's 2023 Work Plan. Key topics included: coordinated water quality monitoring on the Syr Darya River, information exchange, pollution source inventory due to the need to identify and address pollution sources along the Keles and Chirchik rivers, analysis of the impact of CDW discharges on water bodies, and measures to reduce these impacts. To further deepen cooperation and develop joint projects to improve the Syr Darya River Basin, Commission members expressed their willingness to hold future meetings with expanded participation, including experts from Kyrgyzstan and Tajikistan.

The meeting also reviewed the outcomes of the RWG-WQ meeting held on [December 13](#) in Astana and the UNECE project "Strengthening action in Uzbekistan on water, sanitation and protection of water resources from accidental pollution in the face of climate change." Based on the meeting results, the parties approved the Work Plan for 2024.

4.1.5. Kyrgyzstan-Tajikistan

High-level contacts

In 2023, the President of Tajikistan paid **working visits** to Kyrgyzstan to take part in the [II EU-Central Asia Summit](#) (Cholpon-Ata, Kyrgyzstan, [June 2](#)) and in the [meeting of the Council of Heads of CIS Member States](#) (Bishkek, Kyrgyzstan, [October 13](#)). In his turn, the President of Kyrgyzstan had a **working visit** to Tajikistan to take part in the [5th Consultative Meeting of the Heads of CA States](#) (Dushanbe, Tajikistan, [September 14](#)). As part of these visits, the heads of state discussed the topical issues and prospects of the Kyrgyz-Tajik bilateral cooperation, priorities of the regional and international agenda. The Presidents also paid particular attention to delimitation and demarcation of the Kyrgyz-Tajik state border, as earlier discussed on the sidelines of the 78th UNGA session (New York, USA, [September 19](#)) and during **telephone conversations** ([January 14](#)).

Joint Kazakh-Uzbek Working Group on developing proposals for deepening bilateral water cooperation⁵⁸

As of 1 January 2024, the Working Group has convened eight times: December 8-9, 2016 in Tashkent; February 15, 2017 in Shymkent; April 12, 2017 in Tashkent; November 7-8, 2017 in Astana; May 3-4, 2018 in Kyzylorda; February 26, 2019 in Almaty; November 5, 2019 in Almaty, and March 2, 2023 in Shymkent.

During the 8th meeting in 2023, the parties discussed: a draft agreement between Kazakhstan and Uzbekistan on joint management and use of transboundary water bodies; the development of a draft regional strategy for the rational use of transboundary water resources in Central Asia.

Other bilateral working groups

In 2023, the parties held the following meetings: (1) 20th Intergovernmental Commission Meeting, which resulted in the signing of the Roadmap for the International Center for Industrial Cooperation "Central Asia", a Joint Action Plan on labor activities and migrant worker rights protection, and the 20th meeting protocol (Tashkent, Uzbekistan, [May 5](#)); (2) 1st Interparliamentary Council Meeting, which discussed the approval of the intergovernmental agreement on transboundary water bodies and the creation of an international water and energy consortium in Central Asia. The Statute of the Interparliamentary Council was also signed (Tashkent, Uzbekistan, [October 26](#)); (3) Working Group Meetings on Cooperation Projects and Import Substitution, focused on the development of the draft [intergovernmental agreement](#) on transboundary water bodies ([February 27](#), [March 2](#) in Shymkent; [July 17](#) in Astana; [December 4](#) via video conference).

Bilateral water-related arrangements

On [July 27](#), delegations from Batken district, Kyrgyzstan and Isfara district, Tajikistan met to discuss, among other issues, delivery of necessary quantities of irrigation water through canals. The meeting took place in the border area between Orto-Boz village, Kyrgyzstan, and Hochai-Alo village, Tajikistan.

Other bilateral arrangements

The topographical working groups on delimitation and demarcation of the Kyrgyz-Tajik state border met several times in the course of the year ([October 12-18](#), [November 1-8](#) and [December 17-23](#) in Buston, Tajikistan; [December 8-14](#) in Batken, Kyrgyzstan). As of December, they, reportedly, reached agreement on more than 90% of the shared border.

⁵⁷ since 2019, regular meetings of the Commission have been held with the support of the Blue Peace Central Asia (SDC) Initiative implemented by CAREC

⁵⁸ established in 2016

4.1.6. Kyrgyzstan-Turkmenistan

High-level contacts

The President of Turkmenistan paid a **working visit** to Kyrgyzstan to take part in the regular meeting of the Heads of CA State. During the visit, the Presidents of Turkmenistan and Kyrgyzstan **discussed** trade and economic cooperation, as well as collaboration in the energy sector (Bishkek, Kyrgyzstan, **October 13**).

The President of Turkmenistan received the Extraordinary and Plenipotentiary Ambassador of Kyrgyzstan on **January 11** and the Minister of Foreign Affairs of Kyrgyzstan on **November 1** in Ashgabat. During these meetings, the parties discussed advancing bilateral

partnerships in key sectors, including transport, energy, and agriculture. They also explored the implementation of investment projects and collaboration in science, education, culture, sports, and tourism.

Foreign affairs ministers of Turkmenistan and Kyrgyzstan held negotiations on the sidelines of the **C5+1 Ministerial Meeting** on **February 28** in Astana and the **16th meeting of the Central Asia-Republic of Korea Cooperation Forum** on November 1 in Ashgabat. The parties discussed key aspects of Turkmen-Kyrgyz cooperation in the trade-economic, investment, transport-logistics, and energy sectors, as well as in the area of cultural and humanitarian collaboration.

4.1.7. Kyrgyzstan-Uzbekistan

High-level contacts

During the **state visit** of the President of Uzbekistan to Kyrgyzstan, the parties engaged in **negotiations** focused on enhancing bilateral cooperation in political, trade-economic, investment, transport-communication, water-energy, and interregional sectors. Discussions included plans for implementing new joint investment projects in industries such as manufacturing, textiles, energy, mining, and agriculture. Particular emphasis was placed on the construction of the Kambartat-1 hydropower plant. The heads of state signed the **Declaration on Comprehensive Strategic Partnership between the Kyrgyz Republic and the Republic of Uzbekistan**, reaffirming their commitment to the integrated use of water and energy resources. They also underscored the importance of developing sustainable mechanisms for mutually beneficial cooperation that align with shared interests and needs. Following the talks, the parties **signed** 25 documents, including: (1) Protocol on the Exchange of Instruments of Ratification of the Treaty on Certain Sections of the Uzbek-Kyrgyz State Border; (2) Program of Strategic Trade and Economic Partnership for 2023-2025; (3) Emergency Situations Prevention and Response Agreement; (4) **Memorandum of Understanding** between the Ministry of Energy of Uzbekistan and the Ministry of Energy of Kyrgyzstan on the construction of the Chotkal HPP Cascade; (5) Agreement on Cooperation between the Ministry of Agriculture of Uzbekistan and the Ministry of Agriculture of Kyrgyzstan (**January 26-27**).

The President of Kyrgyzstan paid a **working visit** to Uzbekistan to participate in the ECO summit (Tashkent, Uzbekistan, **November 8**). In the course of talks, the heads of state discussed bilateral Uzbek-Kyrgyz cooperation and emphasized the early implementation of major infrastructure projects in the Central Asian region. The President of Uzbekistan had working visits to Kyrgyzstan to attend the II EU-Central Asia Summit (Cholpon-Ata, Kyrgyzstan, June 2) and the meeting of the Council of Heads of CIS Member States (Bishkek, Kyrgyzstan, **October 13**).

During **telephone conversations**, the Presidents of Uzbekistan and Kyrgyzstan discussed key issues related to the development of Uzbek-Kyrgyz relations, multifaceted cooperation, and their comprehensive strategic partnership. They reviewed joint projects in sectors such as machine construction, energy, electrical engineering, textiles, agriculture, and others, while also exchanging views on regional cooperation. (**May 1, July 10, July 24, December 6**).

Joint water commission

The joint water commission between the Ministry of Water Management of Uzbekistan and the Water Resources Service at the Ministry of Agriculture of Kyrgyzstan⁵⁹ was established by the **Agreement between the Ministry of Water Management of Uzbekistan and the Water Resources Service at the Ministry of Agriculture of Kyrgyzstan on water cooperation** (Bishkek, Kyrgyzstan, November 3, 2022).

Meetings. By 1 January 2024, the Commission have held three meetings: (1) August 19, 2022 in Bulan Sogottu village, Issyk-Kul region, Kyrgyzstan; (2) **April 11-12**, 2023 in Tashkent, Uzbekistan. The Commission **signed**



⁵⁹ by Decree No.354 dated 25.12.2023, the Water Resources Service at the Ministry of Agriculture of Kyrgyzstan was transformed into the Ministry of Water Resources, Agriculture, and Processing Industry

the agreed schedules of water withdrawals from interstate canals, discussed funding for dam screen repair and automation of the Kasan-Sai (Orto-Tokoy) reservoir, and explored principles for joint water management of the Andijan (Kempir-Abad) reservoir; (3) August 21 in Chok-Tal village, Issyk-Kul region, Kyrgyzstan. The parties focused on implementing water withdrawal schedules from the Orto-Tokoy (Kasan-Sai) reservoir through interstate canals and other issues.

Bilateral water-related arrangements

Uzbekistan and Kyrgyzstan signed an investment agreement for the construction of the Kambarata-1 HPP in Kyrgyzstan's Jalal-Abad region. Additionally, they established a joint commission to manage the water resources of the Andijan (Kempir-Abad) reservoir⁶⁰. During the 1st meeting of this Commission in 2023, the parties discussed: (1) water withdrawal schedules for 2023; (2) historical reservoir filling and emptying data for the past 30 years; (3) reservoir filling regimes, planned release volumes, and maximum water level

forecasts; (4) mechanisms for joint online monitoring of water releases and bypasses. Following the meeting, the parties signed a protocol (Khana-bad, Uzbekistan, March 10).

The Ministers of Energy from Kyrgyzstan and Uzbekistan met to discuss energy cooperation. They reached an agreement on the transit of electricity from Turkmenistan to Kyrgyzstan through Uzbekistan's infrastructure for the year 2024 (Tashkent, Uzbekistan, May 18-19).

Other bilateral arrangements

The following meetings took place: (1) 1st meeting of the Uzbek-Kyrgyz Working Group on Agricultural Cooperation⁶¹, where the parties discussed the Roadmap for joint investment projects in the agro-industrial complex for 2023-2025 and signed a Memorandum of Understanding and a meeting protocol (Tashkent, Uzbekistan, March); (2) 10th meeting of the Joint Intergovernmental Commission on Bilateral Cooperation between the Kyrgyz Republic and Uzbekistan (Cholpon-Ata, Kyrgyzstan, August 16).

4.1.8. Tajikistan-Turkmenistan

High-level contacts

During the **state visit** of the President of Turkmenistan to Tajikistan, the Presidents of the two countries discussed a broad range of interstate relations and exchanged views on key regional and global issues. They reviewed trade and economic cooperation, emphasizing the development of partnerships in industrial cooperation, energy, agriculture, transport, and communication. As a result of the visit, the parties adopted the Declaration on Deepening the Strategic Partnership and signed a total of 23 documents aimed at expanding Turkmen-Tajik relations. Among them was the Roadmap for Expanding Cooperation in Agriculture between the Ministry of Agriculture of Tajikistan and the Ministry of Agriculture and Environmental Protection of Turkmenistan⁶² for 2023-2025 (Dushanbe, Tajikistan, May 10-11).

The President of Tajikistan paid a **working visit** to Turkmenistan to participate in the 1st Trilateral Summit of the Heads of Tajikistan, Turkmenistan, and Uzbekistan (Ashgabat, Turkmenistan, August 4). The President of Turkmenistan made working visits to Tajikistan to attend the Fifth Consultative Meeting of the Heads of State of Central Asia and the Meeting of the Council of the Heads of IFAS Founding States (Dushanbe, Tajikistan, September 14). During these events, the heads of state held bilateral meetings to discuss cooperation in the political, trade, economic, humanitarian, and cultural spheres. Particular emphasis was placed on the implementation of agreements reached during the

President of Turkmenistan's state visit to Tajikistan in May.

On January 27 during a **telephone conversation**, the Presidents of Turkmenistan and Tajikistan discussed prospects of development of mutually beneficial cooperation and exchanged views on the topical issues on international and regional agenda.

Political consultations were held at the level of foreign ministers of Turkmenistan and Tajikistan. The parties discussed Turkmen-Tajik relations, cooperation in the areas of economics, trade, energy, transport and logistics, interregional contacts and cultural-humanitarian exchange (Dushanbe, Tajikistan, March 8-9; Ashgabat, Turkmenistan, July 15-16).

Bilateral working groups

On November 27-28, the 12th meeting of the Joint Turkmen-Tajik Intergovernmental Commission on trade, economic, scientific and technical cooperation was held in Dushanbe. During the meeting, the parties discussed: key aspects of trade, economic and investment cooperation; intensifying collaboration in energy, water resources, and agriculture; enhancing partnerships in transportation and logistics; developing cooperation in education, science, medicine, culture, and sports. Following the meeting, a protocol was signed. Additionally, a separate meeting was held between the co-chairs of the commission, Deputy Chairman of the Cabinet of Ministers of Turkmenistan

⁶⁰ by the Agreement between the Government of the Republic of Uzbekistan and the Cabinet of Ministers of the Kyrgyz Republic on joint management of water resources of Andijan (Kempir-Abad) reservoir dated November 3, 2022, Bishkek, Kyrgyzstan

⁶¹ as part of the visit of the Chairman of the Council of Ministers of the Kyrgyz Republic, head of the presidential administration of the Kyrgyz Republic Akybek Japarov from March 8th to 10th

⁶² by Decree No.240 dated July 14, 2023 of the President of Turkmenistan, the Ministry of Agriculture of Turkmenistan was established on the basis of the Ministry of Agriculture and Environmental Protection of Turkmenistan

T. Atahallyev and Deputy Prime Minister of Tajikistan Ziyozoda Sulaimon Rizoi. The meeting focused on implementing the Memorandum of Cooperation between

the State Committee for Water Resources of Turkmenistan and the Ministry of Energy and Water Resources of Tajikistan.

4.1.9. Tajikistan-Uzbekistan

High-level contacts

The President of Uzbekistan paid **working visits** to Tajikistan to attend the [Fifth Consultative Meeting of the Heads of State of Central Asia and the Meeting of the Council of the Heads of IFAS Founding States](#) (Dushanbe, Tajikistan, [September 14](#)). The President of Tajikistan had a **working visit** to Uzbekistan to take part in the [16th ECO summit](#) (Tashkent, Uzbekistan, [November 9](#)). As part of the visits, the heads of state met to discuss the aspects of future improvement of Uzbek-Tajik relations, strategic partnership and alliance.

The heads of state addressed the matters related to bilateral cooperation in political, trade and economic, industrial, energy, cultural and humanitarian spheres on the sidelines of the [1st China-Central Asia Summit](#) (Xi'an, PRC, [May 18](#)) and the [Gulf Cooperation Council-Central Asia Summit](#) (Jeddah, Kingdom of Saudi Arabia, [July 19](#)).

During **telephone conversations**, the Presidents of Uzbekistan and Tajikistan paid attention to expansion of Uzbek-Tajik relations and cooperation, implementation of cooperation projects in trade, investment, industry, energy, agriculture and other priority areas. ([May 5](#), [July 10](#), [July 24](#), [October 5](#)).

Bilateral water-related meetings

A. Nazarov, the First Deputy Minister of Water Management of Uzbekistan, met with officials from the Sughd Region Water Authority and Zafarabad Water Management Division of Tajikistan in the Lower Syrdarya BISA. The meeting aimed to discuss water cooperation, address border area issues, and familiarize the Tajik officials with water management reforms in the Syrdarya region, including PPP projects, specialized water services, and digital technology integration

in Akaltyn, Sardoba, and Khavast districts (Syrdarya region, Uzbekistan, [February 13](#)).

Working Group on integrated transboundary water use in Central Asia

During the state visit of Uzbek President Shavkat Mirziyoyev to Tajikistan in March 2018, a working group (WG) was established to focus on integrated transboundary water use in Central Asia and Tajikistan. By January 1, 2024, the WG had convened five times. At the 5th WG meeting in 2023 (Dushanbe, Tajikistan), the parties: (1) discussed progress on the project "Rehabilitation of two gauging stations along the interstate Great Fergana Canal and North Fergana Canal"; (2) finalized and approved the draft instruction for joint monitoring at the Patar (Big Fergana Canal) and Sarvat (North Fergana Canal) gauging stations; (3) recognized the necessity for rehabilitation and automation of the Tangivorukh gauging station on the Isfara River.

Cooperation on the Zarafshan River

In [2018](#), the parties reached an agreement on Uzbekistan's participation in the construction and operation of two hydropower plants on the Zarafshan River. In [June 2021](#), the parties signed an agreement on the development of a feasibility study for the construction and operation of a hydropower plant and on the establishment of a joint-stock company. The project consists of two stages: stage 1 – Construction of the 140 MW Yavan HPP to generate 800 million kWh per year (cost: \$282 million); stage 2 – construction of the 135 MW Fondaryo HPP to generate 600 million kWh a year (cost: \$ 270 million). Work on the first stage commenced with the establishment of the joint-stock company "TaUz Hidro" and the completion of geological survey and exploration works. Construction of the Yavan HPP⁶³ began on [June 2, 2022](#).

4.1.10. Turkmenistan-Uzbekistan

High-level contacts

The President of Uzbekistan paid a **working visit** to Turkmenistan to attend the [1st trilateral summit](#) (Ashgabat, Turkmenistan, [August 4](#)). The President of Turkmenistan had a working visit to Uzbekistan to take part in the [16th ECO summit](#) (Tashkent, Uzbekistan, [November 9](#)). The heads of state held meetings on the sidelines of the above events to discuss: (1) how to consolidate efforts of the two countries for resolving the issues of sustainable development; (2) further strengthening of

the Uzbek-Tajik relations and strategic partnership; (3) the issues on the regional and global agenda.

During their **telephone conversations** on [April 15](#), [July 10](#), [July 24](#), [September 22](#), the leaders of the countries focused on enhancing trade and economic cooperation, implementing collaborative projects in key sectors such as industry, energy, agriculture, and transport, and expanding mutually beneficial ties in Central Asia.

⁶³ for more details refer to Section 4 of the Water Yearbooks for [2019](#), [2020](#), and [2021](#)

On the sidelines of the 16th meeting of the Cooperation Forum "Central Asia-Republic of Korea", the foreign ministers of Turkmenistan and the Republic of Uzbekistan signed the Program of Joint Activities (the 'Roadmap') for further developing cooperation between the two countries in 2023-2024. The document outlines key areas of collaboration, particularly in energy, water management, and environmental protection (Ashgabat, Turkmenistan, [November 1](#)).

Bilateral Commission on water (management) issues

The joint Turkmen-Uzbek Intergovernmental Commission on water issues was established by the [Agreement between the Government of Uzbekistan and the Government of Turkmenistan on the joint Uzbek-Turkmen intergovernmental commission on water issues](#) which was signed on May 26, 2021 (Ashgabat, Turkmenistan). Over 2021-2023, the Commission convened three times: [September 13, 2021](#) in Tashkent, Uzbekistan; [July 1, 2022](#) in Dashoguz, Turkmenistan, and [April 22, 2023](#) in Tashkent, Uzbekistan.

At the [meeting](#), the parties discussed the removal of the rotating schedule for workers maintaining Uzbekistan's waterworks facilities in Turkmenistan, as well as the automation of the joint water management system for the Amu Darya River and the data exchange. They also addressed issues such as minimizing water losses through joint bank protection and river training work on the Amu Darya, and ensuring smooth water flow.

Additionally, the parties reviewed the restoration of operations at two border posts, 'Tallimarjon-Tallymer-

djen' and 'Drujba-Gazodjak,' and the issuance of entry visas for foreign specialists involved in the 'Karshi Pumping Cascade Rehabilitation Phase III' project, as well as the construction of the cut-off wall at the Sultansanjar Dam of the Tuyamuyun hydroscheme. As a result of the meeting, the Commission signed the Protocol.

Bilateral working groups

The 17th meeting of the Uzbek-Turkmen Intergovernmental Commission on Trade-Economic, Scientific-Technical, and Cultural-Humanitarian Cooperation was held on [March 6](#) in Ashgabat, Turkmenistan. During the meeting, the parties discussed the implementation of decisions reached at the [16th meeting](#), the expansion of trade-economic cooperation, and the strengthening of bilateral cooperation in the field of transport. The parties also exchanged views on cooperation in the energy, agriculture, water, and other sectors. As a result of the Intergovernmental Commission's work, the relevant Protocol was signed.

Commission on Water Allocation in the Amu Darya lower reaches

Water cooperation between Uzbekistan and Turkmenistan is also maintained within the framework of the Commission on Water Allocation in the Amu Darya Lower Reaches, which includes the BWO Amu Darya. In 2023, the Commission held 15 meetings. By January 1, 2024, the Commission had convened a total of 252 times.

Source: BWO Amu Darya

4.2. Multilateral Collaboration

4.2.1. Trilateral water-related arrangements (Kazakhstan-Kyrgyzstan-Uzbekistan)

The energy ministers of Kazakhstan, Kyrgyzstan, and Uzbekistan signed the 'Roadmap' for the implementation of the 'Kambarata-1 HPP Construction' project, with a planned capacity of 1,860 MW, on the Naryn River in Kyrgyzstan (Bishkek, Kyrgyzstan, [January 6](#)). Over the course of the year, the heads of water and energy departments from Kazakhstan, Kyrgyzstan, and Uzbekistan met several times to discuss water and energy cooperation. During these meetings, they reviewed the progress of the 'Roadmap' implementation, the basic principles of cooperation, and the stages of project preparation. Key issues under consideration included the regional water-energy situa-

tion, the current state of the power industry, and the rational use of water resources. They also discussed the protection of the Toktogul reservoir during the summer irrigation period, electricity transit through the power grids of Kazakhstan and Uzbekistan to the Kyrgyz Republic, and cooperation among the Republics within the Unified Energy System of Central Asia for the 2023-2024 autumn-winter period. Additional topics included the volumes of water releases to agricultural consumers in Uzbekistan and Kazakhstan during the growing season through the Uchkurgan HPP (Tashkent, Uzbekistan, [March 15](#) and [July 2-3](#); Astana, Kazakhstan, [August 25](#)).

4.2.2. Trilateral arrangements (Turkmenistan-Tajikistan-Uzbekistan)

On August 4, the first trilateral summit was held in Ashgabat with the participation of the Presidents of Turkmenistan, Tajikistan, and Uzbekistan. During the summit, the heads of state discussed expanding

partnerships in the political, diplomatic, trade, economic, cultural, and humanitarian spheres, and exchanged views on developing cooperation on international and regional platforms. As a result of the summit, a



Joint Statement was adopted and included the following key points from the heads of state: (1) Clause 6. The Parties, recognizing the importance of developing cooperation in the energy sector, emphasized the

particular significance of cooperation in the supply of natural gas, oil, oil products, and electricity; (2) Clause 14. The Parties agreed to conduct joint research and development in areas such as the effective management, protection, and rational use of water resources, ensuring the safety of hydraulic structures, land reclamation, the efficient operation and modernization of water management infrastructure, and the conservation and reuse of water. This would include utilizing the capabilities of existing authorized regional bodies. They also expressed support for strengthening mutually beneficial cooperation between countries on the integrated and rational use of water and energy resources, while considering the interests of their respective states; (3) Clause 15. The Parties stressed the priority importance of the rational use of the Amu Darya River's water resources. They also highlighted the need to further improve multilateral mechanisms to effectively address new challenges, including those related to climate change and the potential increased pressure on the water resources of the Amu Darya River; (4) Clause 16. The Parties emphasized the importance of continued cooperation on climate change mitigation and adaptation, combating desertification, land degradation, glacier melting, environmental protection, early warning systems, ecology, and biodiversity conservation. They called for the promotion of joint initiatives that align with common interests, within both regional and international cooperation frameworks and platforms.

4.2.3. Regional Working Group on Water Quality (RWG-WQ)

The RWG-WQ was established between 2009 and 2012 by UNECE and CAREC as part of the "Water Quality in Central Asia" project. It includes representatives from national departments and ministries of water resources and the environment from the five Central Asian countries (see United Nations and its Specialized Agencies, Water Yearbooks for [2019](#) and [2020](#)).

Since 2019, the following meetings of the RWG-WQ have been held with the support of the Blue Peace Central Asia (SDC) Initiative: on [November 11-12, 2019](#), in Tashkent, Uzbekistan; on [June 30, 2020](#) (via video conference); on [May 21, 2021](#) (via video conference); on [December 13-14, 2021](#), in Almaty, Kazakhstan; and on [December 13, 2022](#), in Tashkent, Uzbekistan. At the regular RWG-WQ meeting in 2023, participants discussed the strategic development of the RWG-WQ as a

community of water quality experts in the region and initiated the process of updating the RWG Charter. To strengthen the RWG-WQ's efforts, SDC proposed involving the group in an inter-basin dialogue on the Syr Darya, funded by Germany, Switzerland, and GlZ. Experts shared updates on institutional reorganizations and the creation of a new environmental ministry in Uzbekistan, the development of water and environmental codes in Kazakhstan and Uzbekistan, water reforms in Tajikistan, new strategies and programs related to water quality in Kyrgyzstan, and progress on wastewater issues in Turkmenistan. Additionally, international experts presented practices on wastewater reuse, advanced technologies for decentralized wastewater treatment applicable to Central Asia, and other related topics (Astana, Kazakhstan, [December 13](#)).

4.2.4. Regional Working Group (RWG) on a mutually beneficial mechanism for water and energy cooperation under the Green Central Asia Initiative

Since 2022, the RWG held two meetings: one via video conference on May 19, 2022, and another in Almaty on [December 15, 2023](#).

At the second meeting, the results of expert work and recommendations for developing a mutually beneficial mechanism for water and energy cooperation were presented and discussed. CA countries' propo-

sals on this mechanism were also shared. Following the meeting, the parties agreed to continue supporting CA countries by providing expert advice, assessing various economic methodologies and financial instruments, legal mechanisms, and other assistance at the request of the countries.

Source: <https://greencentralasia.org/ru>



5

SECTION

Key Water
Developments
in the Countries
of Central Asia

5.1. Kazakhstan



Water Sector

Water resources. In terms of hydrography, the territory of Kazakhstan is divided into eight water basins: Aral-Syrdarya, Balkhash-Alakol, Ertis, Yesil, Zhaiyk-Caspian, Nura-Sarysu, Tobyl-Torgai, and Chu-Talas. Surface waters form the main water resources, with an average annual volume of 102.3 cubic kilometers. Of this total, 50.74 cubic kilometers (49.6%) is local runoff, while 51.56 cubic kilometers (50.4%) flows from transboundary rivers in China, Uzbekistan, Russia, and Kyrgyzstan.

As of March 1, 2023, the average annual runoff in Kazakhstan has decreased by 12.5 cubic kilometers com-

pared to 1960. Of this decrease, 9.0 cubic kilometers (72%) is attributed to local rivers, while 3.5 cubic kilometers (28%) is attributed to transboundary rivers.

There are 4,416 deposits (5,384 sites) with approved exploitable groundwater reserves of 43,120.56 thousand cubic meters per day in the country.

Water infrastructure. Total number of water management facilities is more than 13,000, including: 352 reservoirs, 117 hydroschemes, 472 dams, 8,278 irrigation canals, 246 dikes, 300 ponds, 3,408 pumping stations, wells, collecting drains, and others. In terms of ownership, 6,629 are state-owned, 6,007 – public utilities,

528 – private ownership, and 9 facilities have been abandoned.

The total length of irrigation systems is more than 35,000 km, of which 20,600 km are state-owned, 14,700 km – public utilities, and 500 km – in private ownership. Over 14,000 km of irrigation systems are in emergency state, leading to over 40% water loss in transportation.

Public administration reforms. In September 2023, the Ministry of Ecology and Natural Resources was reorganized by separating water management functions and establishing the [Ministry of Water Resources and Irrigation](#) (MWRI RK). The latter is responsible for water resource use and protection, as well as water supply and disposal (Decree No.318 of 01.09.2023). The Ministry includes the Committee for Water Management (CWM), which fulfills strategic planning, regulatory, implementation, and control functions on water use and protection. The CWM manages eight regional basin inspections responsible for regulating water use and protection within their respective areas.

Latest developments in legislation. Several Presidential Resolutions were approved: (1) Resolution No.100 dated February 9, 2023, "On Amendments to Presidential Decree No.933 dated December 29, 2017, 'On the List of Water Management Facilities of Special Strategic Importance, including those that can be leased or transferred to trust management'; (2) Resolution No.1245 dated December 29, 2023, "On the Annulment of the Government Resolution of the Republic of Kazakhstan No.21 dated January 9, 2004, 'On the Approval of the Rules for Water Regulation between Provinces in the Republic of Kazakhstan.'

New appointments. Nurzhan Moldiyarovich Nurzhigitov was appointed as the Minister of Water Resources and Irrigation (UPRK No.337 of 04.09.2023), and Arsen Armanovich Zhakanbaev was appointed as the Chairman of the Committee for Water Management.

Meetings of the Water Council of Kazakhstan⁶⁴. Recent meetings of the Water Council have focused on: (1) enhancing the effectiveness of the authorized body for water resource use and protection, strengthening basin inspections and training water specialists, fortifying water diplomacy efforts, establishing a Consortium of leading water research and educational institutions, accelerating the adoption of digital technologies and automated risk management systems in the water sector (June 29); (2) MWRI's initiatives, including on establishment of the (a) National hydrogeological service to monitor and assess groundwater, control the state of irrigated lands, maintain a groundwater cadastre, carry out prospecting and exploration operations, and deal with decommissioning and conservation of hydrogeological wells and (b) Caspian Sea Research Institute, which will conduct comprehensive research on the Caspian Sea and its coastal zones (December 11).

Results of the MWRI RK in 2023. The Ministry has developed several key documents: (1) Draft of the new Water Code, which aims to preserve water and resource potential of Kazakhstan, increase the role of society in water resource management, digitalize and ensure safety of hydraulic facilities, manage irrigation and drainage, water supply and discharge; (2) Concept of Water Management System Development for 2024-2030 (PPRK No.66 of 05.02.2024), which aims to increase the area of irrigated lands up to 2.2 million ha, bring the share of water-saving technologies to 40%, reduce irrigation water losses in transportation up to 15%, etc.; (3) Comprehensive Water Sector Development Plan for 2024-2030.

To enhance water resource management efficiency and create a unified information system, the MWRI RK

**MINISTRY OF WATER RESOURCES AND IRRIGATION
DEVELOPED THE COMPREHENSIVE WATER SECTOR
DEVELOPMENT PLAN FOR 2024-2030**

WHICH AIMS TO

**INCREASE WATER RESERVES
UP TO 3.7 CUBIC KILOMETERS IN THE COUNTRY**

INCREASE THE IRRIGATED AREA UP TO 2.2 MILLION HECTARES

**DECREASE IRRIGATION WATER CONSUMPTION AND ACHIEVE INCREASE
BY 3 CUBIC KILOMETERS A YEAR**

**PROVIDE GOOD QUALITY WATER SUPPLY
TO 41 SETTLEMENTS HOUSING OVER 55 THOUSAND PEOPLE**

**15 OPERATING RESERVOIRS ARE TO BE RECONSTRUCTED
IN 9 PROVINCES**

THIS WILL ALLOW

IMPROVING WATER SUPPLY FOR ALMOST 74 THOUSAND HA OF IRRIGATED LAND

DECREASING FLOODING RISKS IN 64 SETTLEMENTS HOUSING
70 THOUSAND PEOPLE

**MORE THAN 14 THOUSAND KM OF CANALS
ARE TO BE RECONSTRUCTED**

THIS WILL ALLOW

INCREASING THE IRRIGATED AREA UP TO 2.2 MILLION HA

DECREASING ANNUAL WATER CONSUMPTION
BY 3 CUBIC KILOMETERS

Source: <https://www.gov.kz/memleket/entities/water/press/news/details/668368?lang=ru>

⁶⁴ the Water Council of Kazakhstan is a consultative and advisory body under the Kazakh Government (Order of the Kazakh Prime Minister No.47-r of 09.03.2022). The MWRI RK is a working body of the Council (Order of the Kazakh Prime Minister No.187-r of 28.11.2023)



Source: <https://www.gov.kz/memleket/entities/water/press/news/details/668368?lang=ru>

is collaborating with the national company "Kazakhstan Space Technologies" to develop an **interactive geoinformation platform** (<https://hydro.gov.kz>). The platform will establish a central depository for water-related data, including water bodies, hydraulic facilities, water basins, gauging stations, etc.

Projects. Ongoing projects: (1) **Second Irrigation and Drainage Improvement** (WB, 2013-2025). Construction progress varies by province, with the national average reaching 70% completion, and some areas approaching 90%; (2) "Governance of Groundwater Resources in Transboundary Aquifers" (GGRETA)⁶⁵, which aims to strengthen joint management of the Tashkent area Transboundary Aquifer (TBA)⁶⁶; (3) **USAID Regional Water and Vulnerable Environment Activity** (\$21.5 million, October 2020-September 2025), which aims to strengthen regional capacity to manage shared water resources and mitigate environmental risks in the Syr Darya and Amu Darya River basins.

The MWRI RK and GIZ have signed an agreement on implementation of the regional program "Water Resource Management in Central Asia in the context of Climate Change" (Astana, October 18).

Capacity building. In 2023, the staff of basin inspections under the Ministry of Water Resources and Irrigation of the Republic of Kazakhstan (MWRI RK) was increased from 98 to 242 personnel. The Ministry has also undertaken several key initiatives: proposed the

inclusion of new programs in the current classifier of higher and postgraduate education disciplines; advocated for the allocation of grants to support Kazakh students pursuing water-related disciplines at universities abroad; launched joint training programs in collaboration with the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers (TIAME); announced plans to introduce professional development programs tailored to the water sector.

Events. A regional workshop was held on monitoring, assessment and information sharing in transboundary basins of Central Asia (Astana, [February 1-2](#)).

The delegation of Kazakhstan participated in the: (1) UN Water Conference 2023 (New York, USA, March 22-24.); (2) International Conference "Central Asia: Towards a Sustainable Future through a Strong Regional Institution" on the occasion of the 30th Anniversary of IFAS (Dushanbe, Tajikistan, June 5-7.); (3) 2nd Flash Flood Guidance System Global Workshop (Skopje, Republic of North Macedonia, June 19-23); (4) extraordinary session of the Intergovernmental Council of Hydrological Program (Paris, France, November); (5) meeting of experts of the CA states on water resource management in view of climate change ([December 7](#), online).

Regional and international cooperation. Kazakhstan hosted and participated in meetings of bilateral and trilateral joint working groups and commissions on water with Central Asian countries. See [Cooperation between the Countries of Central Asia on Water and Other Matters](#).

The President of Kazakhstan participated in the meeting of the Council of Heads of State-Founders of IFAS (Dushanbe, Tajikistan, [September 15](#)). Delegation of Kazakhstan took part in the: (1) 84th (Dushanbe, Tajikistan, [May 10](#)) and 85th (Tashkent, Uzbekistan, [November 1-2](#)) meetings of the ICWC; (2) IFAS Board meeting (Dushanbe, Tajikistan, June 5). Authorized representatives of Kazakhstan participated in the Working Group on Institutional and Legal Improvement of IFAS. The Republic of Kazakhstan assumed the chairmanship of the International Fund for Saving the Aral Sea (IFAS) for the 2024-2026 term. President Kassym-Jomart Tokayev of Kazakhstan was elected as the Chairman of IFAS. See [IFAS and Other Regional Organizations in Central Asia](#).

Kazakhstan held and participated in the meetings of the Working Groups of the Joint Kazakhstan-Russia Commission on the Use and Protection of Transboundary Water Bodies focused on various river basins, including Ertis/Irtysh (March 15, online; Omsk, Russian Federation, September 5), Yesil/Ishim (Petropavlovsk, July 12), Tobol (March 16, online; Kurgan, Russian Federation, August 17), Zhaiyk/Ural (August 24, online), Kigach, Karaozen. Additionally, the XIII Meeting of the Commission took place on December 6-7 in

⁶⁵ implemented by the UNESCO International Hydrological Program (UNESCO IHP) in close cooperation with the UNESCO International Groundwater Resource Assessment Center (IGRAC), International Union for Conservation of Nature (IUCN) and field project teams

⁶⁶ the small southeastern part of the aquifer is located in the Tashkent province of Uzbekistan and the larger, northwestern part is located in the Shymkent province of Kazakhstan, <https://unece.org/sites/default/files/2023-02/S4-4%20Valentina%20Rahimova.pdf>

Almaty. Implementation of a Unified Roadmap aimed at enhancing cooperation on research within the basins of major rivers, such as the Ural, Irtysh, and other transboundary water bodies was discussed at the bilateral working meeting of experts from Kazakhstan and the Russian Federation (Yekaterinburg, Russian Federation, October 20).

In addition, within the framework of the Joint Kazakhstan-China Commission on the Use and Protection of Transboundary Rivers, five events were organized in cooperation with the People's Republic of China.

Drinking Water Supply

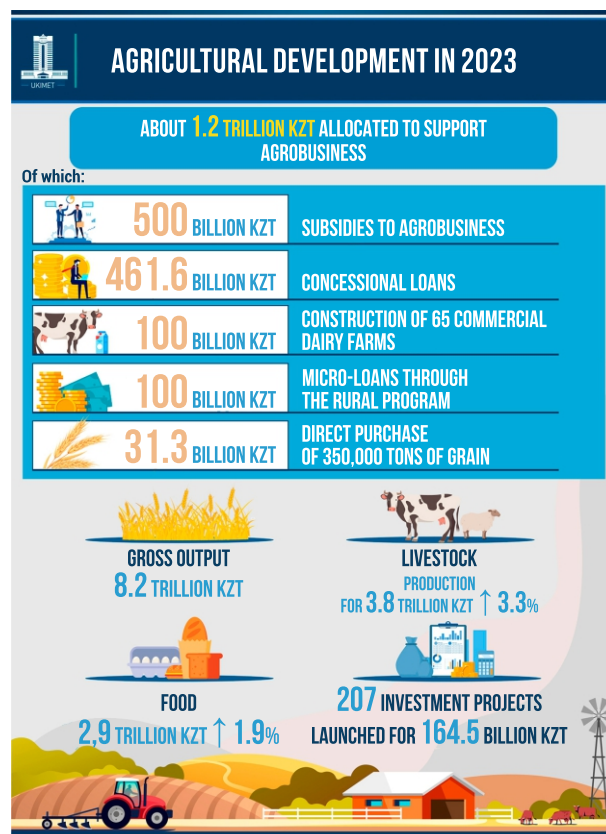
2023 Results and Plans. The Kazakh Ministry of Industry and Construction⁶⁷ has reported significant progress in access to water supply services: urban areas: 98.9% access, with 100% coverage in 9 provinces; rural areas: 96.6% access, with 100% coverage in Mangistau, Atyrau, and Almaty provinces; however, there are areas with lower coverage, such as Pavlodar and Abay provinces. To further improve access and infrastructure, the government has allocated 218 billion KZT for the construction and reconstruction of water supply and wastewater disposal systems in both urban and rural areas.

The Concept for Housing and Communal Infrastructure Development for 2023-2029 outlines goals to improve Kazakhstan's water infrastructure: by 2030, the depreciation of water supply and wastewater disposal networks will be reduced from 51% to 40%; the population's access to water supply services will be increased by 2.1 million people; in cities of national and provincial importance, wastewater treatment will be increased from 77.7% to 98.1%.

The MWRI RK⁶⁸ continued implementing: (1) 33 projects to improve water supply and modernize water supply systems in 375 settlements with a total population of 868,000 people; (2) 35 investment projects to reconstruct and modernize hydraulic facilities; (3) a project to improve irrigation and drainage systems on the area of 105,100 ha in Almaty, Zhambyl, Kyzylorda and Turkistan provinces. To ensure a stable water supply for Astana, 93 million cubic meters of water were transferred from the K. Satpayev Canal to the Esil and Nura rivers.

Agriculture

2023 results. According to the Ministry of Agriculture of the Republic of Kazakhstan (MA RK), the total area under crops reached 23.4 million hectares, marking an increase of 68.6 thousand hectares compared to the previous year. Farmers harvested 17 million tons of grain crops. The harvest of oilseeds amounted to 2.2 million tons and production of fodder crops reached 5 million tons.



Source: <https://www.gov.kz/memleket/entities/moa/press/news/details/676773?lang=ru>

Kazakhstan boasts over 2.3 million hectares of irrigated land, yet traditional methods still dominate its irrigation practices. In 2023, out of 1.5 million hectares, 75% relies on furrow irrigation, 6% is under flood irrigation (primarily for rice), and 21% is covered by modern irrigation (drip or sprinkler). To encourage a shift towards water-saving methods, the Kazakh government has taken steps. The Order of the Kazakh Minister of Agriculture No.409 of 20.11.2023 amended the subsidy rules to increase subsidies for purchasing and installing water-saving technologies from 50% to 80% and local budgets will contribute 30% subsidy.

The interactive map Jerkarta.gharysh.kz was updated to reflect locations and areas of all reclaimed agricultural lands and to include data on territories that lack pasture lands.

New appointments. Aidarbek S. Saparov was appointed as the Minister of Agriculture (UPRK No.336 of 04.09.2023).

Projects. Ongoing projects: (1) *Sustainable Food Systems and Improved Ecosystems Service* (UNDP, 2021-2026); (2) *Delivering a Climate Change Strategy for Central and West Asia* (ADB, \$3 million, 2022-2025); (3) *Restoration of Sustainable Landscapes in Kazakhstan* (WB, \$3.8 million, 2021-2025).

⁶⁷ formed by reorganizing the Ministry of Industry and Infrastructure Development of the Republic of Kazakhstan (UPRK No.318 of 01.09.2023) with the transfer of functions and powers, including state regulation in water supply and wastewater disposal, heat supply (excluding cogeneration plants and boiler-houses producing heat in the district heating zone) within settlements

⁶⁸ functions on water supply and wastewater disposal outside settlements (PPRK No.863 of 04.10.2023)

The S.Seifullin Kazakh Agrotechnical Research University (KazATU) started implementing the scientific and technical program "Development of new technologies for organic production and agricultural processing" (4 billion KZT), which aims to contribute new technologies for organic production and processing of agricultural products based on the principles of green economy, regional technological parks and engineering centers in agro-industry. The program is to develop an information and analytical database for innovations in the field of organic agriculture, including the digital platform for agricultural entities.

For UNDP projects and FAO efforts on agriculture and food, see [the United Nations and its Specialized Agencies](#).

Events. The following events were organized: (1) dedicated exhibition "Kazakhstan Field Day "Jańa Dala/ Green Day 2023" (Akmola province, July 13-14); (2) KazAgro/KazFarm-2023 international exhibitions, including a conference of the CIS Member-States on co-operation on food security (Astana, October 19-21); (3) conference "Seed Day "Tukym-2024" (Astana, [December 6](#)).

The Kazakh delegation participated in: (1) Ministerial meeting of the CA states⁶⁹, which discussed agricultural financing (February 15, online); (2) international exhibition "GreenTech Week", including a Kazakh-Dutch roundtable "Opportunities for Greenhouse Development" (Amsterdam, Netherlands, June 13-15); (3) 2nd meeting of Agricultural Ministers of the Organization of Turkic States (OTS) and II Agribusiness Forum of Turkic-speaking States (Baku, Azerbaijan, September 26); (4) AGRITECHNICA-2023 exhibition (Hannover, Germany, November 12-18).

Regional and international cooperation. During the state visit of the Tajik President to Kazakhstan, a number of documents was signed, including the roadmap for enhanced cooperation on agriculture for 2023-2025 (Astana, May 3-4). See [Cooperation between the Countries of Central Asia on Water and Other Matters](#).

Kazakhstan and the Netherlands signed a memorandum of understanding and establishment of a joint agricultural committee⁷⁰ to provide a platform for high-level discussions on agriculture and agribusiness development (Almaty, November 1).

As part of cooperation with China, the events included: (1) Kazakhstan-China Business Forum⁷¹ (Shenzhen, PRC, August 14); (2) I Forum of interregional cooperation between the RK and KR "Expanding Cooperation Boundaries", where 12 contracts and memorandums were signed for over \$64 million (Taraz, September 22).



Signing of a memorandum between Kazakhstan and the Netherlands (Almaty, November 1)

The Kazakh Minister of Agriculture held discussions on cooperation issues with: (1) European Commissioners (Brussels, Belgium, February 28); (2) Minister of Agriculture and Food Sovereignty of France⁷² (Paris, France, February 25-March 5); (3) CEOs of leading Russian agricultural holdings and large companies (Moscow, June).

Energy

2023 Results. The country relies on 222 power plants of varying ownership to generate [electricity](#). The average depreciation rate of these power plants is 56%. As of January 1, 2024, Kazakhstan had a total installed capacity of 24,641.9 MW, but the available capacity was lower at 20,428.4 MW. By 2030, the projected electricity demand is estimated to reach 28.2 GW. According to the approved capacity balance by 2030, the demand will amount to 28.2 GW, while the available capacity will be increased to 22 GW through the commissioning of new power plants.

In 2023, total electricity consumption reached 115.06 billion kWh, a 1.9% increase compared to the previous year. Electricity generation remained relatively unchanged at 112.82 billion kWh. Due to the increased demand, there was a power deficit of 1,519 MW. This deficit was covered by importing electricity from Russia. Electricity generated by RES reached 6.675 billion kWh: wind power – 3,824.99 million kWh; solar power – 1,853.95 million kWh; hydropower – 993.87 million kWh; biopower – 2.71 million kWh.

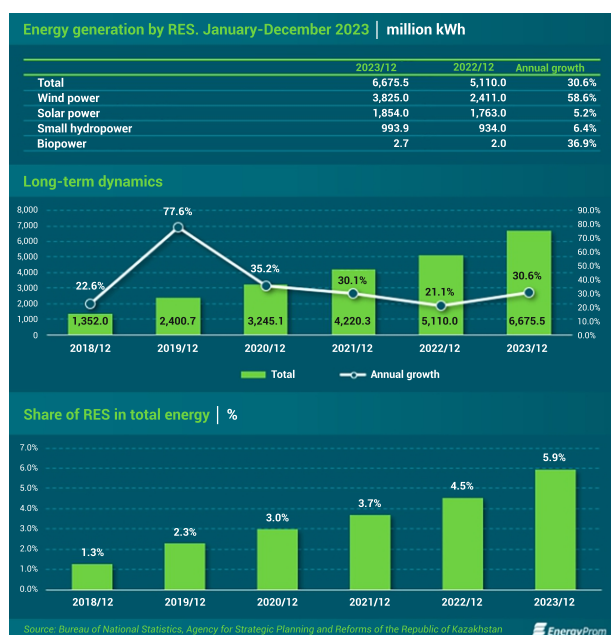
In Kazakhstan, investments in fixed capital in electricity generation reached 451.4 billion KZT: thermal power – 206.9 billion KZT; nuclear power – 288.6 million KZT; wind power – 175.8 billion KZT; solar power – 39.1 million KZT; hydropower – 12.4 billion KZT.

⁶⁹ organized by FAO and MFA Ruz

⁷⁰ signed on the sidelines of the Agroworld Qazaqstan exhibition ([November 1-3, Almaty](#))

⁷¹ organized jointly by the Kazakhstan-China Trade Promotion Association and Shenzhen Cross Supply Service Association

⁷² negotiations were held on the margins of [SIA-2023](#)



Source: <https://energyprom.kz/articles-ru/markets-ru/na-obekty-vie-prihoditsya-uzhe-pochti-6-vyrabotki-elektroener-gii-v-rk-eto-vsyo-eskhyo-ochen-malo-no-zametno-luchshechem-bylo-ranee/>

Installed capacities increased to 560 MW (112% of the plan), including: 65 MW traditional facility and 495.57 MW through 16 RES facilities (12 WPPs of 437.1 MW in Akmola and Zhetysay provinces; 2 HPPs of 3.7 MW in Almaty and Turkistan provinces; 2 SPPs of 54.77 MW in Turkistan and Karaganda provinces).

Latest developments in legislation. (1) Concept for Energy Sector Development in Kazakhstan for 2023-2029 (PPRK No.263 of 28.03.2023); (2) Concept for Energy Saving and Energy Efficiency Improvement in the Republic of Kazakhstan for 2023-2029 (PPRK No.264 of 28.03.2023).

New appointments. Almasadam Maidanovich Satkaliev was appointed as the Minister of Energy of the Republic of Kazakhstan (UPRK No.181 of 04.04.2023).

Capacity building. Kazakhstan's energy experts attended: (1) inter-system Russian-Kazakhstan trainings (Omsk, Russian Federation, February); (2) annual national competition "Qazaqstan Project Management Awards-2023" (June 1-October 12); (3) international inter-system emergency training for control operators (Moscow, Russian Federation, November).

Events. Astana hosted: (1) Forum of Veterans of Power Industry of Kazakhstan and CIS (June 15); (2) 7th Annual International Congress and Exhibition: Hydropower Central Asia and Caspian (June 21-22); (3) Kazakhstan Energy Week-2023 (KEW-2023)/XV KAZENERGY Eurasian Forum (October 3-6); (4) V International Forum on Energy Conservation (November 10).

The Kazakhstan's delegation actively participated in numerous events on energy issues, including, among many others: (1) 3rd meeting of the Expert Group to coordinate drafts of the Energy Cooperation Concept for the CIS Member-States until 2035 and the plan of priority measures (Moscow, Russian Federation, March 1); (2) Forum on Regional Energy Trade and Investment in Central Asia 2023 (London, England, March 2-3); (3) International Energy Conference "CERAWEEK 2023" (Houston, USA, March 6-8); (4) 6th meeting of the RK-EU Sub-Committee on Energy, Transport, Environment and Climate Change (Brussels, Belgium, March 13); (5) 3rd meeting of energy ministers of the SCO Member-States (March 14, online); (6) 39th (Dushanbe, Tajikistan, May 3-5) and 40th (Samarkand, Uzbekistan, October 26) meetings of the Central Asian Coordination Council for Electric Power Industry.

Kazakhstan chaired the SCO Energy Forum⁷³ (Astana, October 4) and facilitated negotiations on the draft⁷⁴ "Strategies for Energy Cooperation of the SCO Member-States until 2030" aimed at defining a systemic approach and extending the agenda of the organization in the most promising areas of cooperation in the energy sector (November 16, online).



Regional and international cooperation. For bilateral interaction of Kazakhstan with the CA states and on trilateral agreements (Kazakhstan-Kyrgyzstan-Uzbekistan) and meetings on water-energy cooperation issues, see [Cooperation between the Countries of Central Asia on Water and Other Matters](#).

The Kazakh Ministry of Energy held meetings with: (1) Head of the EBRD Sustainable Infrastructure Group (Abu Dhabi, UAE, January 16); (2) CNPC Vice President (Astana, April 26); (3) EU delegation (Astana, May 4); (4) Minister of Energy of Kingdom of Saudi Arabia (Riyadh, Kingdom of Saudi Arabia, June 12); (5) Russian energy representatives (Moscow, Russia,

⁷³ during the Kazakhstan Energy Week-2023 / XV KAZENERGY Eurasian Forum

⁷⁴ draft document was developed on the initiative of the President of Kazakhstan, announced during the Council of Heads of the SCO Member-States on September 15-16, 2022 in Samarkand

September 18); (6) European Commission Directorate-General for Energy (Brussels, Belgium, October 18) and others.

Hydropower. Kazakhstan possesses hydropower potential, estimated at 170 billion kWh, of which 62 billion kWh are technically feasible.

Kazakhstan is pursuing its "Hydropower Development Plan for 2020-2030." Recent developments include: commissioned 2.2-MW hydropower plant⁷⁵ on the Orta Kakpak River in Almaty province; project documentation drafted by AO Samruk-Energy for the following hydropower projects: 50-MW Kerbulak HPP on the Ili River, 300-MW plant on the Irtysh River, 70-MW plant on the Shelek River. Feasibility study⁷⁶ is underway for reconstruction and modernization of the Almaty HPP cascade.

Renewable Energy Sources

There are 144 RES facilities with the installed capacity of 2,868.6 MW, including: 57 wind plants (1,394.6 MW), 45 solar plants (1,202.61 MW), 39 hydro (269.605 MW), and 3 bio (1.77 MW).

Solar power. Plants launched in 2023: (1) 50-MW Shoulder SPP⁷⁷ in Turkistan province (100 ha) to generate 90,000 kWh annually; (2) 4.77-MW SPP⁷⁸ in Karaganda province. The SPPs have double-sided panels to utilize both direct sunlight and reflected sunlight from the ground.



New 4.77 MW-solar power plant, Balkhash

Wind power. The following plants were commissioned: (1) second phase of Akmola WPP⁷⁹ (56 MW) in the north of the country. The total plant capacity reached 206 MW; (2) Abai-2 WPP of 50 MW in Zhetysay province (16 wind turbines generate 3.2 MW of electricity each), etc.

The Ministry of Energy has signed (1) an agreement on principles of implementation of the 1-GW Dzungarian Gate project in Zhetysay province with the AO Samruk-Kazyna and ACWA Power (Riyadh, Kingdom of Saudi Arabia, March 1); (2) roadmaps for 1-GW Shokpar WPP project in Zhambyl province⁸⁰ with China Power International Holding limited and 1-GW WPP with energy storage system in Zhambyl and Kostanay provinces with Masdar (UAE) (Astana, June 9).

Nuclear power. Kazakhstan has been actively exploring the possibility of nuclear power generation. Several key events and initiatives have shaped this discussion: (1) public discourse (Ulken village, Zhambyl district, Almaty province, August 22); (2) open discussion "Referendum on NPP in Kazakhstan: public participation" (Almaty, September 22); (3) meeting of the Public Council on Fuel and Energy to discuss nuclear power projects in Kazakhstan, improvement of the regulatory framework for nuclear power projects, training of personnel for the nuclear power industry, and the draft law "On Radioactive Waste Management" (Astana, October 4). An IAEA Integrated Nuclear Infrastructure Review (INIR) mission was conducted. The mission concluded that Kazakhstan had effectively addressed recommendations in areas such as program coordination, financing, emergency planning, and radioactive waste management (Astana, March 28-31). Kazakhstan and the IAEA signed a Country Framework Program for 2023-2028, which recognizes Kazakhstan's intention to build its first nuclear power plant (Astana, April 18). In October 2023, an IAEA team of experts conducted a [safety review](#) of Kazakhstan's process for selecting the site for its planned nuclear power plant.

Several capacity building events were organized, including on "Information Security Fundamentals" (13-17 February), "SEED Capacity Building for Site Safety Evaluation and Review for New Nuclear Programs in Kazakhstan" (29 May-2 June), on a legal and regulatory framework for the development and safe implementation of the Nuclear Program for peaceful purposes (12-16 June, Astana), and a national introduction course in nuclear forensics (March 27-31, Almaty). A memorandum of understanding on Training and Education in the Peaceful Uses of Atomic Energy was signed also (Budapest, Hungary, January 27).

The Kazakhstan's delegation actively participated in a number of events on nuclear power, including, among others: (1) 8th and 9th review meetings of the Convention on Nuclear Safety (New York, USA,

⁷⁵ this project, implemented by Konaev & Company LLP between 2021 and 2023 with a \$3.5 million investment, is expected to reduce CO₂ emissions by 8,334 tons per year and save 31,523 MWh of primary energy annually

⁷⁶ conducted by the AFRY Switzerland consulting company and funded by the WB

⁷⁷ constructed by a subsidiary of Plenitude

⁷⁸ investment project was implemented by Kounrad Copper Company at its own funds

⁷⁹ includes two sub-projects: "Sofievskaya-39 MW" and "Arkalyk-17 MW". The facility is connected with the first phase – Borey 100 MW WPP and Energo Trust 50 MW WPP

⁸⁰ AIIB signed a loan agreement for \$36 million; EBRD will provide co-financing; the project (construction and operation) will be supported by concessional financing of up to \$10 million from the GCF and up to \$5.7 million from the Clean Technology Fund

March 20-31); (3) IAEA events: URAM⁸¹-2023 Symposium (May 8-12) and 67th session of the IAEA General Conference (Vienna, Austria, September 25), meeting "Nuclear Power for Achieving Carbon Neutrality" (Dubai, UAE, December 1).

At the 67th session of the IAEA General Conference, Kazakhstan initiated a resolution "Restoration of Sovereign Equality of IAEA Member-States" (Vienna, Austria, September 29).

AO NAC Kazatomprom has signed: (1) memoranda on cooperation in the field of digitalization of nuclear industry with Samsung Electronics and Honeywell (September 19); (2) cooperation agreement on nuclear fuel cycle with Framatome (November 1); (3) contract for supplies of Kazakhstani natural uranium concentrate with the China National Uranium Corporation Limited (November 9), and others.

Thermal power. TPP-3 and "South-East" and "Turan" thermal gas stations were launched in Astana; boiler houses in Kokshetau, TPPs in Ekibastuz and Ridder cities, TPP-1, TPP-2 and "MAEK" TPP in Mangistau province, and TPP in Uralsk have been reconstructed. Modernization and reconstruction are underway at Ekibastuz GRES-1 and unit No.1 of 500 MW. Memorandum of cooperation was signed between the Kazakh and Russian energy ministries for the construction of "Kokshetau", "Semey" and "Ust-Kamenogorsk" TPPs (November 9).

Environment and Climate Change

Public administration reforms. The Ministry of Ecology, Geology and Natural Resources of the RK was reorganized into the **Ministry of Ecology and Natural Resources of the RK** (MENR RK). The functions and authorities on geological surveying of subsoil and reproduction of mineral resource base have been transferred to the Ministry of Industry and Infrastructure Development.

Latest developments in legislation. In 2023, several laws were enacted in this sphere, including: (1) "On the flora" (No.183-VII of 02.01.2023) to regulate social relations and establish the legal framework for state policy in the areas of flora protection, preservation, restoration, and utilization; (2) "On amendments and additions to some legislative acts of the Republic of Kazakhstan on the flora and specially protected natural areas" (No.184-VII of 02.01.2023); (3) "On amendments and additions to the Criminal Code and the Code on Criminal Procedure of the Republic of Kazakhstan on strengthening responsibility for environmental offences and manifestations of vandalism" (No.186-VII of 03.01.2023); (4) "On amendments and additions to the Code on Administrative Offences of the Republic of Kazakhstan on strengthening administrative responsibility for environmental offenses and manifestations of vandalism" (No.187-VII of 03.01.2023).

The Strategy on Achieving Carbon Neutrality by 2060 in the Republic of Kazakhstan was approved in February (UPRK No.121).

New appointments. Yerlan N. Nysanbayev was appointed as the Minister of Ecology and Natural Resources (UPRK No.339 of 05.09.2023).

Projects. Ongoing projects: [Environmental Restoration of the Aral Sea/ERAS-I](#) (USAUD, \$430 thousand, 2021-2024). For details, see [Executive Directorate of IFAS in Kazakhstan](#); [Biodiversity in Kazakhstan](#) (UNDP/GEF, 2018-2024).

The current Green Kazakhstan Program (2021-2025) is aimed at creating a healthier and more sustainable environment for the people of Kazakhstan. Key objectives include: improving air quality, promoting efficient and sound water use, preserving the ecosystems of Lake Balkhash and the Northern Aral Sea, implementing effective waste management practices, etc.

Events. The [Turanian Temperate Deserts](#), spanning across Kazakhstan, Turkmenistan, and Uzbekistan, were inscribed on the UNESCO World Natural Heritage List⁸² in 2023. This designation includes two protected natural sites within Kazakhstan: Altyn-Emel National Natural Park at the foot of Dzungarian Alatau and Barsakelmes Reserve located in the Aral Sea ecological disaster zone.

The following important events have been organized: environmental campaign "Together for Clean Kazakhstan" (Southern regions in Kazakhstan, March.); interregional forum of environmental initiatives "Our Sky" (April 21); World clean-up day campaign (September 16); regional forum "Central Asia Towards the 28th Conference of the Parties to the UNFCCC: 5 countries – 1 region – 1 vote" (November 7); roundtable "Strengthening the role of the public in environmental protection" (November 29).

The Kazakh delegation participated in: (1) 7th European Union-Central Asia High-Level Conference on Environment and Water Cooperation (Rome, Italy, February 23-24); (2) joint meeting of Central Asian heads of agencies and the Regional Working Group on Glacier Monitoring and Modeling (Tashkent, Uzbekistan, March 17); (3) 9th meeting of Foreign Ministries and Parliamentarians of Central Asia: preparation for UNFCCC COP28 (Tashkent, Uzbekistan, April 19); (4) 5th Central Asia Climate Change Conference (Dushanbe, Tajikistan, May 16-17); (5) 10th Nevsky International Ecological Congress (Saint-Petersburg, Russian Federation, May 26); (6) International Conference "Central Asia: Towards Sustainable Future through a Strong Regional Institution" (Dushanbe, June 5-7); (7) COP28 (Dubai, UAE, November 30-December 12).

Regional and international cooperation. The Vice-Minister of Ecology and Natural Resources of Kazakh-

⁸¹ Uranium Raw Materials for the Nuclear Fuel Cycle

⁸² Kazakhstan has three World Natural Heritage sites: Sary-Arka – steppes and lakes of Northern Kazakhstan, Western Tien-Shan and Turanian Temperate Deserts; the latter two are transboundary sites

stan and the Minister for Overseas Territories, Commonwealth, Energy, Climate and Environment of the UK convened to discuss strategies for biodiversity conservation in Kazakhstan. A significant outcome of this meeting was the decision to join the High Ambition Coalition for Nature and People (March 16, online).

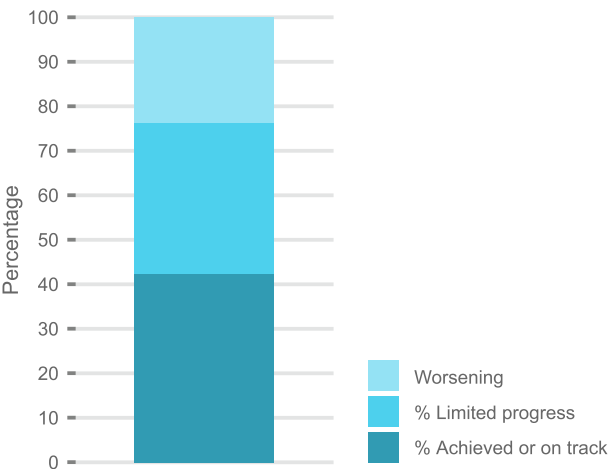
The 10th meeting of the Kazakhstan-China commission on cooperation in the field of environmental protection was held. Reports were presented on activities of the working groups on monitoring, analysis and assessment of transboundary river water quality and the working group on rapid response to emergencies and prevention of transboundary river pollution. The meeting resulted in the approval of the 2024-2025 Work Plan (November 21, online).

The MENR RK signed: (1) a memorandum of understanding with the Committee for Environmental Protection under the Government of Tajikistan⁸³ (May 3); (2) agreement on implementation of the regional program "Climate Risk Management in Central Asia" with GIZ (June 20); memorandum of cooperation on protection of endangered habitats and wildlife and sustainable use of natural resources with the German Nature and Biodiversity Conservation Union (September 28). The Governments of Kazakhstan and Japan concluded a memorandum of cooperation on a joint lending mechanism aimed at achieving the goals of the Paris Agreement (October 30, Astana).

SDGs in Kazakhstan

A Parliamentary Commission for Monitoring the Implementation of National Sustainable Development Goals and Targets has been established in Kazakhstan. Series of meetings were held to approve the Regulations on the Parliamentary Commission and the Action Plan (June 23, October 6, and October 31).

Status of SDG targets for Kazakhstan (% trend indicators)



Kazakhstan was ranked 66th out of 166 countries in the annual sustainable development rating.

Events. In the course of the year, the following events were held: (1) workshops and meetings to discuss opportunities for achievement of the SDGs at the local level (September 13-15, December 4-5); (2) VI Rural Women's Forum "The Role of Rural Women in Shaping Sustainable Development Priorities" (November 17, Astana); (3) workshop "The Role of Public Financing in Achieving the SDGs in the Republic of Kazakhstan" (December, Astana).

The delegation of Kazakhstan participated in the: (1) UN Summit on Sustainable Development Goals (New York, USA, September 18); (2) Global Conference "Public Finance for Inclusive and Sustainable Development: the Role of Strategic Budget Initiatives and Fiscal Policy" (Istanbul, Turkey, November); (3) II Global Forum of Interparliamentary Cooperation on SDGs (Tashkent, Uzbekistan, November 30).

Emergencies and Disasters

In 2023, a total of 12,891 natural and anthropogenic emergencies were recorded in the country, marking a 3.5% decrease compared to the previous year. The economic losses resulting from these disasters amounted to a significant 172,911 million KZT, a substantial increase from the 36,980 million KZT recorded in 2022.

Latest developments in legislation. The Presidential Decree No.565 of 14.07.2023 was issued to amend and supplement the Government Resolution No.486 of 16.08.2017. This decree approved action plans to address emergency situations of global and regional scale, including devastating earthquakes, natural fires, floods, highwater, floodwaters, mudflows, and other potential disasters.

Kazakhstan

Eastern Europe and Central Asia



OVERVIEW INDICATORS



SDG Dashboards and Trends



Dashboards: ● SDG achieved ● Challenges remain ● Significant challenges remain ● Major challenges remain ● Information unavailable
Trends: ↑ On track or maintaining SDG achievement → Moderately improving → Stagnating ↓ Decreasing → Trend information unavailable

⁸³ within the framework of the visit of the President of the RT to Kazakhstan

New appointments. Syrym Dyusengazievich Sharipkhanov was appointed as the Minister for Emergency Situations (UPRK No.251 of 10.06.2023).

Preventive measures. As part of the Comprehensive Plan for Mudflow, Landslide and Avalanche Safety for 2020-2024, the Ayusai retaining dam⁸⁴ was completed in June 2023 to protect the population of Almaty and Almaty Province from potential mudflow disasters. The construction of the Aksai retaining dam and Khorgos dam is ongoing.



To enhance earthquake preparedness, several proactive measures have been implemented: automated earthquake early warning stations installed in Almaty; evacuation routes and assembly points revised and updated; stockpiles of essential medical supplies and equipment established; the public educated on earthquake safety procedures.

Strategies and projects. As part of the Strategy for Development of Cooperation of the Central Asian Countries in Disaster Risk Reduction for 2022-2030⁸⁵, series of events were organized, including: (1) final meeting of the UNDRR "Strengthening Disaster Resilience and Accelerating Implementation of Sendai Framework for Disaster Risk Reduction in Central Asia" project (February 15); (2) meeting of the Working Group (October 4) of the Regional Forum-Meeting of the Heads of Emergency Authorities of Central Asian countries⁸⁶, where a range of documents was approved and signed (November 10, Almaty).

Under the UNICEF "Capacity Building of the Sectors of Emergency Situations, Health, Education, Social Protection, Internal Affairs on the Core Commitments for Children in Emergencies" project, trainings were held on: (1) instruction of hotline operators in gender-sensitive feedback mechanisms for the population

vulnerable to emergencies, including informing the population on resilience to emergencies (May 11-12); (2) preparedness to response to emergency situations taking into account the commitment to children (May 17-18); (3) capacity building of stakeholders on access to water, sanitation and hygiene (WASH) in emergency situations (June 20).

The "Climate Risk Management in Central Asia" project was launched (GlZ) and started with a kick-off meeting of the Steering Committee (June 13-14) and a working visit to Bonn (Germany) to gain insights into German and European approaches, best practices, and technologies related to climate risk management and transboundary early warning systems for hydrometeorological disasters (December 3-8).

Capacity building. Several training programs were conducted during the year: (1) a series of training sessions to enhance skills in utilizing territorial drought response plans (Kokshetau, March 1; Astana, March 14) and developing a comprehensive drought response system based on effective monitoring and forecasting (Astana, March 27); (2) master trainings for canine services personnel from emergency departments across Central Asia (Rock City – Astana, May 15); (3) a training seminar for heads of Crisis Situations Departments and specialists from the Crisis Management Center of the Ministry of Emergency Situations. The focus of this training was on utilizing the web portal "GIS Platform for Emergency Situations" (Turkistan, June 26-28).

Events. The following events were held: (1) regional workshop on lessons learned as part of the USAUD funded implementation program "Strengthening Local and National Capacities for Emergency Preparedness and Response in High Earthquake and Natural hazard prone Countries of Central Asia" (July 19-21); (2) 1st meeting of the Technical Working Group⁸⁷ on the creation of the Regional Early Warning and Mutual Information System for disaster threats and occurrence (September 5); (3) International Rescue All-Around Competition "Kazkutkaru-2023" (September 13); (4) seminar on disaster prevention in urban areas (November 2); (6) 14th meeting of the Council of the Center for Emergency Situations and Disaster Risk Reduction (November 9); (7) International Scientific and Practical Conference "Mudflow safety – 50 years of activity of Kazselezaschita: status and prospects" (November 22-24); (8) regional consultation workshop on International Disaster Response Law (December 5).

Regional cooperation. The Kazakh delegation participated in: (1) 35th meeting of the Interstate Council on Natural and Man-Caused Emergency Situations (Yerevan, November 25); (2) extraordinary summit of

⁸⁴ this dam is situated in the Ulken River basin in Almaty. This upper basin is home to 98 mudflow-prone areas, 89 glaciers, 20 moraine and glacial lakes

⁸⁵ approved by the Protocol of the Regional Forum-Meeting of the Heads of Emergency Authorities of Central Asian countries (November 5, 2021)

⁸⁶ as part of the UNDRR "Strengthening disaster resilience and accelerating implementation of Sendai Framework for Disaster Risk Reduction in Central Asia" initiative

⁸⁷ in pursuance of paragraph 2 of the Protocol of the Regional Forum – Meeting of the Heads of Emergency Authorities of the Central Asian Countries (signed on October 6, 2022 in Dushanbe, Tajikistan)

the OTS Member-States "Emergency Management and Humanitarian Assistance" (Ankara, March 16); (3) regional workshop on strengthening cooperation in disaster management at the national and sub-regional levels (Kuala Lumpur, Malaysia, [May 23-25](#)); (4) regional review workshop on loss and damage within the Santiago Network for Asia and the Pacific (Bangkok, Thailand, [June 19-21](#)); (5) ASEAN (Association of Southeast Asian Nations) Interregional Dialogue and Forum on Disaster Resilience (Singapore, June 21-24); (6) 2nd meeting of the Ministers on Disaster and Emergency Management of member and observer states of the OTS (Baku, September 6-8); (7) 2nd high-level dialogue on climate change and resilience in the Central Asian region "Early warning systems for climate change resilience" (Bishkek, [September 21-22](#)); (8) Asian Conference on Disaster Reduction (Dushanbe, [October 20](#)); (9) 8th meeting of the Regional Expert Group of the Asian and Pacific Centre for the Development of Disaster Information Management (Dushanbe, [December 7-8](#)).

Foreign Policy and International Cooperation

Working and official visits. In 2023, the Head of State paid state, official and working visits to the UAE (January, [December](#)), Turkey (March, June), PRC (May, [October](#)), Russian Federation (May, December), KR (June, October), Kingdom of Saudi Arabia (July), Vietnam ([August](#)), Germany ([September](#)), USA (September), RT (September), and Belarus (November).

Major Significant Events in the Foreign Policy of the Republic of Kazakhstan in 2023

Kazakhstan's foreign policy is primarily focused on sovereignty and territorial integrity, citizen protection and economic growth.

Several significant events took place: (1) Expert Meeting "Central Asia-2030: Images of the Future": this meeting focused on strengthening cooperation among Central Asian countries in areas such as trade, economy, transport, energy, human capital development, and cultural exchange (Astana, January 20); (2) Central Asian Interparliamentary Forum: this forum adopted the Turkistan Declaration, which outlined the future trajectory of interparliamentary relations. The declaration emphasized expanding economic cooperation and fostering a shared cultural and historical space for the region (Turkistan, February 10).

Astana hosted: meeting of foreign ministers of Central Asia and the United States in the C5+1 format (February 28); 35th Plenary Session of the Foreign Investors' Council (June 8); Astana International Forum (June 8-9); Kazakhstan-German Business Forum (June 20); International Volunteer Forum (June 21); INNOPROM.QAZAQSTAN International Industrial Trade Fair ([September 25-27](#)); Digital Bridge 2023 ([October 12-13](#)).

Development of alliances and strategic partnerships. Kazakhstan actively pursues mutually beneficial

cooperation with its Central Asian neighbors, as well as with Russia and China.

Within the **CIS**, Kazakhstan participated in the meetings of: (1) CIS Council of Heads of State (Bishkek, KR, October 13), Council of Heads of Government (Sochi, Russia, June 8; Bishkek, October 26; Moscow, Russia, December 18); (3) Council of Foreign Ministers (Samarkand, Uzbekistan, April 14; Bishkek, October 12); (4) Economic Council (Moscow, March 17; September 22, online; Moscow, December 8), as well as in the informal Summit of the Heads of CIS Member-States (Saint Petersburg, Russia, December 26).

Within the **SCO**, Kazakhstan attended the meetings of the SCO Council of Heads of State (July 4, online), SCO Council of Heads of Government (Bishkek, KR, October 26), and SCO Council of Foreign Ministers (Panaji, India, May 4-5).

Within the **CSTO**, in Minsk Kazakhstan participated in the meeting of the heads of CSTO Member-States (November 23) and in the session of the CSTO Collective Security Council (November 23).

As part of regional cooperation, the Kazakh delegation attended a number of important meetings and fora, including, among many others: (1) 6th Ministerial Meeting in the format "Central Asia-Russia" (Samarkand, Uzbekistan, April 14); (2) 4th Central Asia-China Ministerial Meeting ([April 27](#)), Kazakhstan-China investment roundtable (May 18) and 1st China-Central Asia Summit (May 19); (3) II Eurasian Economic Forum (Moscow, Russian Federation, May 24-25); (4) 2nd meeting of the Heads of Central Asia States and the President of the European Union (Cholpon-Ata, KR, June 2); (5) Meeting of Foreign Ministers of Central Asia (September 13), V Consultative Meeting of the Heads of Central Asia States ([September 14](#)), meeting of the Council of Heads of Founder-States of IFAS ([September 15](#)) and Dushanbe 2023 International Investment Forum (September 29-30); (6) 6th meeting of the High-Level Working Group on the Caspian Sea (Ashgabat, Turkmenistan, September 11-13).

Chairmanship in international organizations. In 2023, Kazakhstan chaired the (1) **OTC** and took part in the **2nd Extraordinary Summit** "Disaster-Emergency Management and Humanitarian Assistance", which addressed prospects of multilateral cooperation in disaster management and humanitarian assistance, as well as coordination of efforts in preventing and overcoming the consequences of natural disasters (Ankara, Turkey, March 16) and hosted the **10th Summit**, which resulted in signature of the Declaration and Protocol on cooperation between relevant institutions of the OTS Member-States in the field of metrology (Astana, [November 3](#)); (2) **Dialogue of Women of Central Asia**.

Promotion of the national interests and reinforcement of the country's image. Kazakhstan actively cooperates with a wide range of international organizations, including the UN, EU, OSCE, OIC, ECO, and others.

UN. On December 18th, 2023, the UN General Assembly adopted a resolution⁸⁸ (A/78/127) declaring 2026 as the International Year of Volunteers for Sustainable Development. This significant achievement was initiated by Kazakhstan and supported by like-minded countries from around the world.

Speaking at the 78th UNGA session, the President of Kazakhstan noted that the country plans to launch the Just Energy Transition Partnership and Project Office for Central Asia on Climate Change and Green Energy in Almaty. A significant part of the statement was focused on climate change. It was noted that Kazakhstan, within the framework of its presidency in the IFAS, would continue to work on preventing further environmental degradation and mitigating the impact of the Aral Sea crisis. The President highlighted the growing environmental challenges facing the Caspian Sea and emphasized the need for international cooperation to protect this vital ecosystem.

The 78th UNGA session also adopted resolutions on: International cooperation and coordination for the human and ecological rehabilitation and economic development of the Semipalatinsk region in Kazakhstan (December 19) and Addressing the legacy of nuclear weapons: providing victim assistance and environmental remediation to Member-States affected by the use or testing of nuclear weapons⁸⁹ (New York, USA, December 22).

The Kazakh delegation participated in: (1) virtual summit “Voice of Global South” (January 13, online); (2) summit “Abu Dhabi Sustainability Week – ADSW 2023” (January 16); (3) 1st Gulf Cooperation Council and Central Asia Summit (Jeddah, Kingdom of Saudi Arabia, July 19); (4) Berlin Global Dialogue forum (September 28); (6) meeting of the Heads of Central Asian States with German Chancellor (September 29); (7) III Belt and Road Forum for International Cooperation (Beijing, PRC, October 18); (8) 1st Summit of Heads of State of the UN Special Program for the Economies of Central Asia (SPECA) (Baku, Azerbaijan, November 24); (9) UN Climate Change Conference COP28 (December 1, Dubai, UAE).

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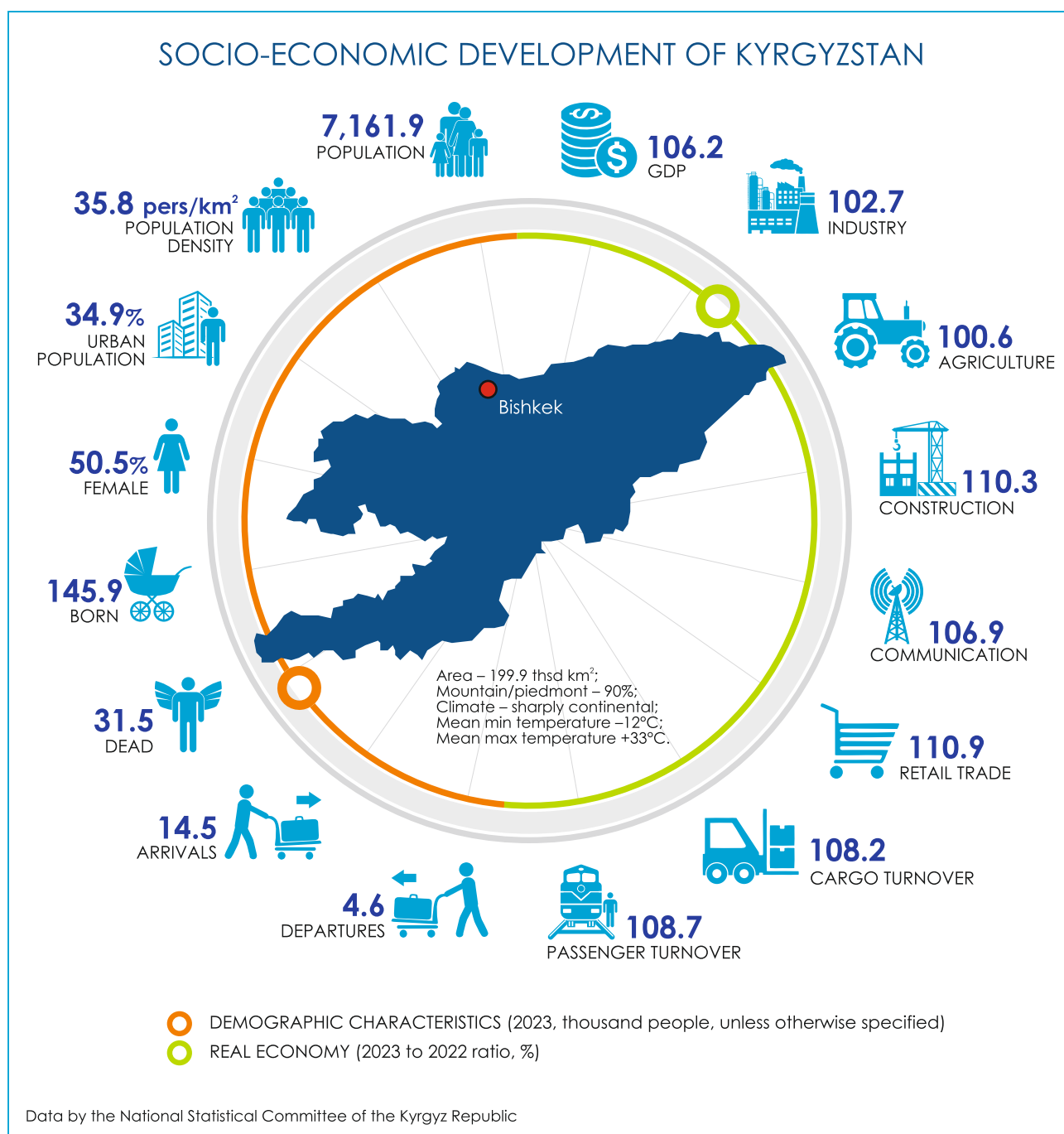
<https://centrasia.org;>

<https://economy.kz/ru/>

⁸⁸ the initiative was originally announced by the President of Kazakhstan during his address to the 75th UN General Assembly session in 2020

⁸⁹ Joint Initiative of Kazakhstan and Kiribati

5.2. Kyrgyz Republic



Water sector

Water resources. The total available water resources in KR are 2,458 km³, including 650 km³ (26.4%) in glaciers, 1,745 km³ (71%) in lakes, 13 km³ (0.5%) as potentially usable groundwater and mineral thermal water, and 44.5 to 51.9 km³ (2%) as average annual river runoff. Total annual volume of renewable water resources in Kyrgyzstan is 46.5 km³.

Kyrgyzstan has a complex hydrological network, consisting of over 3,500 watercourses. Among these, 30 are considered large rivers. The average long-term

river runoff within the country is estimated at 44.5 km³, which increases to 47.2 km³ when accounting for return water.

2023 Results. According to the [data](#) of the Water Resources Service (WRS): water withdrawal limit was 8,364.2 million m³, while the actual water withdrawal reached 8,081.6 million m³ (97% of the limit); irrigation water delivery plan was 6,075 million m³, and the actual water delivery reached 5,659.1 million m³ (93% of the plan); irrigated area plan was 3,872.9 thousand hectares, of which 3,526.5 thousand hectares were actually irrigated.

Public administration reforms. By Presidential Decree “On amendments to the Cabinet of Ministers of the Kyrgyz Republic” (No.354 of 25.12.2023) the Kyrgyz Ministry of Agriculture was renamed as the Ministry of Water Resources, Agriculture and Processing Industry⁹⁰ (MWRAPIKR).

New appointments. Bakyt Torobaev was appointed as the Minister of Water Resources, Agriculture and Processing Industry.

Latest developments in legislation. The Kyrgyz government has approved: (1) National Water Strategy 2023-2040 (Presidential Decree No.23 of 10.02.2023), which focuses on protecting water resources from contamination, promoting their rational use, and reforming the water management system in Kyrgyzstan, and an action plan for its implementation for 2023-2025 (Order of the Kyrgyz Cabinet of Ministers No.389-r of 03.07.2023); (2) territorial boundaries of the key river basins, based on their hydrography⁹¹ (Resolution of the Kyrgyz Cabinet of Ministers (hereinafter – PKM KR) of 17.02.2023).

Water management system. In 2023, 962.1 million KGS of allocated budget were used for: repair and rehabilitation of canals (675 km), 958 hydraulic structures, gauging stations, 105 pumping stations and cleaning of collector-drainage systems (223.6 km). The WRS procured special-purpose equipment worth 200 million KGS and dredging machines worth 199.4 million KGS.

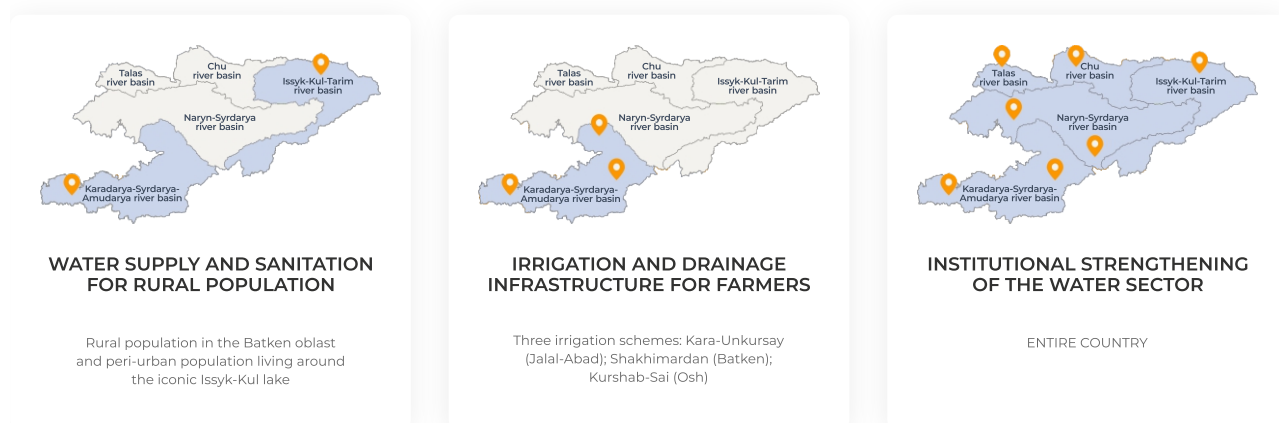
Irrigation flumes (worth 9 million KGS) were installed in Yssyk-Ata district, Chu province. In addition, Luxemburg aiyl okmotu (local rural authority) completed

overhaul of irrigation systems and built irrigation flumes at a total length of 2.314 km (9,275 thousand KGS). The P-1 canal, spanning 4.4 km, was commissioned to supply irrigation water to the Ishak-Polotkhan aiyl aymak (municipal unit) in Batken province. The Shibe-Zhekendi canal was constructed in Osh province. In Talas province, reconstruction of the Sarymsak canal has been completed in Kara-Buura district and the commissioning of Kyzyl-Zhar and Zhalpak-Til canals is underway in Bakay-Ata district.

In the next decade, Kyrgyzstan plans to construct 64 reservoirs for 10-day regulation on all rivers.

Drip irrigation has been installed on an area of 13,223 thousand ha, of which 9,490 thousand ha – in Chu province, 1,678 thousand ha – in Issyk-Kul province, 142 ha – in Naryn province, 25 ha – in Talas province, 452 ha – in Osh province, 566 ha – in Batkent province, and 870 ha – in Zhalal-Abad province.

Projects and programs. Ongoing projects: (1) *Climate change and disaster-resilient water resources sector* (ADB, \$43.6 million, 2019-2025)⁹²: rehabilitation of the “Osmon” channel (5,862 ha) was started in Chu province; (2) *Climate-Resilient Water Services /CRWSP*⁹³ (IDA, \$100 million, 2022-2028, Batkent, Zhalal-Abad and Osh provinces): training workshops were organized for project specialists (Bishkek, August 1-2, September 21); World Bank’s mission was conducted (November 14-23), as part of which meetings were held with the heads of the CWMA and the DWMA of Osh, Zhalal-Abad and Batkent provinces; a regional workshop “Stakeholder engagement for interaction during implementation” was organized (December 7, Osh);



Source: <https://www.crwsp.kg/>

(3) National Water Resources Management Project/ *AFNWRMP* (SDC, WB, \$12.24 million, 2015-2024): a draft of 2040 National Water Strategy was developed, assis-

tance was provided to establish the boundaries of 5 river basins and prepare five basin water management plans in Kyrgyzstan; (4) *USAID Regional Water and Vul-*

⁹⁰ regulations of the Ministry of Water Resources, Agriculture and Processing Industry and the institutional setup were approved by the PKM KR No.98 of 07.03.24

⁹¹ five key basins exist in the territory of the Kyrgyz Republic: Talas, Chu, Issyk-Kul-Tarim, Naryn-Syrdarya and Karadarya-Syrdarya-Amudarya

⁹² <https://water-climate.kg/wp-content/uploads/2023/12/PP-presentation-on-CFTDs-analysis-v1-November-2023.pdf>

⁹³ implementing agencies: Water Resources Service for irrigation and Department for Development of Drinking Water Supply and Sanitation for drinking water supply and sanitation

nerable Environment Activity (USAID, \$21.5 million, August 2022-July 2025), within the framework of which an expert group was formed to assess the current state of the Orto-Tokoy (Kasansay) reservoir, analyze conditions of control and measuring facilities and gauging stations, and develop safety and operating rules for the reservoir.

The following projects were launched in 2023: (1) a regional project "Climate-Sensitive Water Resources Management in Central Asia"⁹⁴ (BMZ, SDC, GIZ, €12.9 million, 2023-2027), aimed to strengthen the capacity of organizations that are responsible for water management at the national and transboundary level, address effectively water issues that arise due to climate impact. As part of the project, a meeting was organized to **discuss** a draft Agreement on project implementation between GIZ and the Water Resources Service; (2) a **pilot project** on organization of integrated maintenance and development of irrigation and drinking water supply systems in Naryn province (January 2023-January 2025)⁹⁵, as part of which an integrated system for collection, administering and distribution of fees to be charged for further operation, maintenance and development of irrigation systems, drinking water supply systems in rural areas and for improvement of pastures and pasture infrastructure will be established.

With the support of the "CAMP Alatau" Foundation, a new water distribution system has been developed and tested in Chu province. This system, powered by software from the "SlySoft Community," empowers Water User Associations (WUAs) to efficiently manage water allocation and distribution. The project "**Adapting and Strengthening Community-Based Water Management Approaches in the Kyrgyz Republic**" (USFS/IP⁹⁶, METI⁹⁷, 2022-2023) has been completed. Activities included the assessment of WUA activities, establishment of an automated information system on water distribution, and public awareness raising about water management issues.

The Kyrgyz Republic has secured loans from the European Bank for Reconstruction and Development (EBRD) to modernize and reconstruct the Aravan-Ak-Buura canal in the Kara-Suu and Aravan districts of the Osh region: credit of €14 million 130 thousand and grant of €3 million 740 thousand.

The STREAM project, a USAID-funded initiative, aims to improve water resource management in the Kozu-Baglan, Ak-Suu (Shakhimardan), and Isfayram river basins. This \$2.5 million, three-year project (2023-2025) focuses on an inclusive, gender-sensitive, and integrated approach to river basin management (Bishkek, September 27).

The Coca-Cola Foundation has launched a \$500,000 regional project aimed at enhancing economic independence and improving the situation of women in Central Asia through improved access to irrigation water and infrastructure. This initiative will focus on empowering local communities to implement sustainable water management practices.

Events. The following meetings were held: (1) **18th Steering Committee Meeting** of the National Policy Dialogue on IWRM⁹⁸ in Kyrgyzstan, during which the participants shared information about current events on water, food, energy and environmental security (Bishkek, February 3); (2) meeting of the National Water and Land Council under the President of the Kyrgyz Republic (Bishkek, December 20).

The Kyrgyz delegation participated in: (1) **UN 2023 Water Conference** (New York, March 22-24); (2) 1st Kyrgyz-Kazakh Interregional Forum and 11th meeting of the Kyrgyz-Kazakh Intergovernmental Council, on which water resources issues were addressed among others (Taraz, September 23); (3) international scientific-practical conference "Problems of monitoring, modeling and forecasting of water and energy resources of Central Asia in the context of Climate Change" (Bishkek, November 9); (4) high-level segment "One Planet Summit", as part of which the President of the Republic delivered a call to unite global efforts to preserve glaciers and protect the critical water resource formation zones (Paris, November 10); (5) meeting of the Asian Inter-Parliamentary Advisory Council on Water Resources (Seoul, November 16).

Regional and international cooperation. A high-level meeting was held between Kyrgyz and Kazakh officials to discuss the construction of the Chu-2 bypass canal. The meeting involved the Kyrgyz Minister of Agriculture, A. Janybekov, the Director of the Water Resources Service, A. Sokeev, and the Kazakh Minister of Water Resources and Irrigation, N. Nurzhigitov (Bishkek, November 14).

The Kyrgyz delegation attended: (1) 11th meeting of the Working Group on environmental protection under the Secretariat of the Chu-Talas Water Commission (Almaty, November 21); (2) 32nd meeting of the Chu-Talas Water Commission, during which a joint statement on approval of the 2022-2030 Strategic Action Program for the Chu and Talas River Basins was signed (Almaty, December 22).

Several agreements have been signed, including: (1) framework agreement⁹⁹ on strategic cooperation between the Naryn province of Kyrgyzstan and the Xinjiang Trade and Logistics Corporation and the Xinjiang Water Resources Investment and Development Corporation (Urumqi, China, August 19); (2) grant agree-

⁹⁴ as part of the Green Central Asia initiative

⁹⁵ the outcomes of the pilot project will be summarized by February 1, 2025 and the experience gained – distributed to the aiyl aymaks of other provinces in the Republic

⁹⁶ U.S. Forest Service International Program

⁹⁷ International Organization for Management and Engineering Technologies

⁹⁸ as part of the "National Policy Dialogues (NPD) of the European Union Water Initiative in Central Asia" (EU, UNECE/OECD)

⁹⁹ on the sidelines of the Kyrgyz-China business forum

ment between Kyrgyzstan and Japan¹⁰⁰ on the grant aid for the project "Improved Equipping of Irrigation Canals"¹⁰¹ (Tokyo, November 17-20).

Drinking Water Supply

Public administration reforms. The PKM KR No.84 of 17.02.2023 led to a reorganization within the State Agency for Architecture, Construction and Housing and Communal Services. The Department of Construction and Engineering Infrastructure was divided into two separate departments: Department of Residential and Civil Engineering Construction and Department for Development of Drinking Water Supply and Sanitation. The newly formed Department for Development of Drinking Water Supply and Sanitation is tasked with creating sustainable conditions for the development and operation of centralized drinking water supply and sewerage systems in Kyrgyz settlements.

Projects and programs. The Community Development and Investment Agency/KR ARIS is implementing the following projects: (1) *Naryn Rural Water Supply and Sanitation Development Program/NRWSSDP* (ADB, \$32.9 million, 2020-2027); (2) *Rural Water Supply and Sanitation Improvement Project for Batken and Talas Provinces/RWSSIP BT* (IsDB, Saudi Fund for Development), which plans: laying the water supply system, construction of a well and rehabilitation of a reservoir (500 m³), establishment of the municipal water operator and training for staff; (3) *Sustainable Rural Water Supply and Sanitation Development Project/SRWSSDP* (WB, IDA, \$26 million 364 thousand + additional financing – \$36 million 323.9 thousand, 2017-2025, Chu, Issyk-Kul and Osh provinces); (4) *Rural Water Supply and Sanitation Improvement Project* (IsDB, \$21 million, 2019-2023): the construction of water supply and sanitation systems in 16 villages and 24 schools of Zhalal-Abad province has been completed.

The following projects are continued: (1) **CRWSP** (see above), **subcomponent 1.1 Water Supply and Sanitation Infrastructure**, which covers investments to increase climate resilience of drinking water supply and sanitation services and to enhance wastewater treatment capacity: 95,000 people in 31 villages around Lake Issyk-Kul and Batken province will be provided with climate-resilient drinking water supply services, and 43,000 – with climate-resilient sanitation services; (2) *Bishkek Water Supply and Wastewater Rehabilitation* (Phase II, Government of Swiss Confederation, EBRD, €16 million): the 10.5-km sewage collector has been completed; (3) *Issyk-Kul Wastewater Management Project/IWMP* in Balykchy and Karakol (ADB): a Sludge Management Plan has been developed and a training on "Gender Equality and Integration in Water Resources Management" has been conducted (Karakol, October 31).

KR and EBRD have signed: (1) loan and grant agreements for the **project** "Kyrgyz Water Resilience Framework – subprojects in Kadamzhai, Tash-Komur, Kok-Dzhangak and Aidarken" (€18.6 million, including €10.6 million as a technical assistance grant), aimed at improving drinking water supply; (2) document "Bazar-Korgon Water Supply Rehabilitation" (€8.5 million).

Agriculture

Irrigated area. According to the State Statistics Committee of the Kyrgyz Republic, the total crop acreage reached 1,232 thousand ha, which is 3.3 thousand ha more than in 2022. As to the cropping patterns, grain crops are grown on 585.4 thousand ha (47.5% of all crop area), legumes – on 53.6 thousand ha (4.4%), oilseeds – on 15.3 thousand ha (1.2%), cotton – on 17.6 thousand ha (1.4%), tobacco – on 0.5 thousand ha (0.04%), sugar beet – on 13.1 thousand ha (1.1%), potatoes – on 72.5 thousand ha (5.9%), vegetable and forage crops – on 54.8 thousand ha (4.4%) and 396.3 thousand ha (32.2%), respectively, and other crops (rice, cucurbits and others) – on 22.9 thousand ha (1.9%).

Agricultural production. In 2023, the gross agricultural production amounted to 378.7 billion KGS, with a real growth rate of 100.6% as compared to 2022 (increase by 7.3% in 2022).

Grain production reached 1.6 million tons, which is 13% less than in 2022, due to a 14.6% decrease in yields of grain crops (with the exception of legumes, rice and buckwheat). The unusually high temperatures experienced during the 2023 growing season had a significant impact on agricultural yields in Kyrgyzstan. While certain crops benefited from the warmer conditions, others suffered due to the extreme heat (decreased yields: wheat -25.7%, barley -29.2%; increased yields: sugar beet +32.7%, tobacco +19.2%, corn +9.2%, vegetables +4.6%, cucurbits +4.2%, fruits and berries +1.2%).

Public administration reforms. State enterprises and institutions under the Kyrgyz Ministry of Agriculture's¹⁰² jurisdiction have been merged to streamline operations and improve efficiency (PKM KR No.267 of 18.05.2023). Amendments to Cabinet of Ministers resolutions have been made to optimize the size of the civil service staff and reduce state budget costs (PKM KR No.358 of 12.07.2023).

New appointments. Aynura Tuybaeva was appointed as the Deputy Minister of Agriculture for agricultural policy, water resources, ecology and regional development, while Asylbek Satyvaldiev was appointed as the Director of the Land Resources Service at the Kyrgyz Ministry of Agriculture.

¹⁰⁰ within the framework of the official visit of the Kyrgyz President to Japan (November 17-20)

¹⁰¹ Japan International Cooperation Agency/JICA is planned to purchase 44 units of equipment for over \$7.2 million for seven provinces in Kyrgyzstan

¹⁰² according to the Presidential Decree No.354 of 25.12.2023 "On Amendments to Cabinet of Ministers of the Kyrgyz Republic", the Kyrgyz Ministry of Agriculture was renamed as the **Ministry of Water Resources, Agriculture and Processing Industry of the KR (MWRAPI KR)**

Latest developments in legislation. A comprehensive "Program for the Development of Agricultural Co-operation for the period 2023-2027", an action plan for its implementation and a matrix of monitoring and evaluation indicators have been adopted by resolution of the Cabinet of Ministers (PKM KR No.418 of 23.08.2023).

The following laws and resolutions have been adopted as well: (1) "On amendments to Legislative Acts in the Field of Agriculture" (ZKR No.11 of 25.01.2023); (2) "On the Progress of Preparations for the 2023 Spring Field and Agricultural Work in the Kyrgyz Republic" (PKJ 974-VII of 16.02.2023); (3) "On amendments to the Kyrgyz Government Decree on Approval of the 'Agriculture Financing-9' Project No.34 of 04.02.2021" (PKM KR No.549 of 12.10.2023); (4) "On amendments to Resolutions of the Kyrgyz Cabinet of Ministers that govern the Land Resources Service under the Kyrgyz Ministry of Agriculture" (PKM KR No.696 of 22.12.2023).

The Kyrgyz Republic and Uzbekistan have approved a draft agreement aimed at strengthening cooperation in the field of agriculture (Resolution of the Kyrgyz Cabinet of Ministers No.22-r of 25.01.2023).

Projects. The following projects have been completed: (1) "Support to Development of a Green Agriculture by Local Communities"/"GoGreen" (EU, €1.1 million, December 2020-June 2023), as part of which a mobile application "Birlik" was developed for farmers and potential buyers of agricultural products. The project outcomes were summarized at the final conference in Bishkek on May 23-24; (2) "Agriculture Productivity and Nutrition Improvement Project"/APNIP (\$38 million, GAFST, WB, 2015-2023) aimed at increasing food security among rural households in specific areas across the country. The project outcomes were presented at the final conference on June 22; (3) "Biodiversity Conservation and Poverty Reduction with the Involvement of Local Communities in the Management of Nut Forests and Pastures in Southern Kyrgyzstan" (BMZ, GIZ, 2021-2023, Bazar-Korgon and Aksy Districts, Zhalal-Abad province).

The ongoing projects include: (1) "Kyrgyzstan Pasture and Natural Resource Management" (US Forest Service, 2021-2025, Naryn and At-Bashy Districts, Jerge-Tal aiyl aymak, Naryn province); (2) "Additional Financing for the Third Village Investment Project (AF VIP-3)" (IDA, \$17 million, 2022-2024, Chu province), which aims to build local capacity for participatory development and improve access to improved community infrastructure services in targeted rural communities.

The expert support was provided to the Pastures and Livestock Breeding Department (PLBD) of the Kyrgyz Ministry of Agriculture in the development of a unified methodology for monitoring and assessment of pastures (BMZ, GIZ, 2023).

The "Agriculture Financing-11" project has been approved. The project is to provide public support to

Kyrgyz farmers for timely performance of agricultural operations in 2023. The Ministry of Finance allocated 3.3 billion KGS as planned to support the project.

ADB has approved the "Resilient and Inclusive Agricultural Development and Food Security in the Central Asia Regional Economic Cooperation" technical assistance project (\$3 million). Loan and grant agreements have been signed for the "Climate-Resilient Agricultural Value Chain Development" Project (ADB, \$40 million).

Events. The Kyrgyz delegation took part in the 1st meeting of the Uzbek-Kyrgyz Working Group for agricultural cooperation, which resulted in signature of a MoU (Tashkent, March 16), and the 35th meeting of the Intergovernmental Council on the CIS Agro-Industrial Complex¹⁰³ (November 16, video-conference).

Regional and international cooperation. The number of documents were signed: (1) a "Roadmap" for agro-industrial cooperation between Kyrgyz and Uzbek ministries of agriculture (Bishkek, January 26); (2) 2023-2025 cooperation plan on agriculture between the Kyrgyz Ministry of Agriculture and the Chinese Ministry of Agriculture and Rural Affairs (Xi'an, China, May 18); (3) 13 documents between Kyrgyzstan and Qatar, including a memorandum of understanding and cooperation in the field of agriculture and food security (Bishkek, June 7); (4) an agreement on agricultural cooperation between the Cabinet of Ministers of the Kyrgyz Republic and the Government of Mongolia, and a memorandum of understanding between the Kyrgyz Ministry of Agriculture and the Ministry of Environment and Tourism of Mongolia for the development of forest ecosystems (Ulan Bator, July 9); (5) a memorandum of understanding between the Kyrgyz Ministry of Agriculture and the Ministry of Natural Resources and Ecology of Russia in the field of development of forest ecosystems (Bishkek, October 12).

Energy

2023 Results. In 2023, according to the Ministry of Energy of the Kyrgyz Republic, reconstruction of the second hydrounit of Toktogul HPP (capacity increased from 300 MW to 360 MW) and of At-Bashi HPP (capacity increased from 40 to 45.7 MW) were completed. Planned overhauls, current repairs, and maintenance were conducted across all hydroelectric power plants (HPPs); 261 units of special-purpose equipment were purchased for regional power plants. The total electricity generation capacity reached 72.73 MW. Notably, the reconstruction of HPP hydrounits contributed to a significant increase of 65.6 MW in power generation. Construction of new solar power plants added a total capacity of 430 kW and the commissioning of small hydropower plants contributed an additional 6.7 MW to the overall electricity generation capacity.

¹⁰³ Deputy Minister of Agriculture A.A. Tuybaeva was elected as the Chairman of the Council

In 2024, Kyrgyzstan plans to increase its hydropower capacity by 69 MW through the reconstruction of the Toktogul and Uch-Kurgan HPPs. The commissioning of 50.6 MW of small hydropower plants will contribute an additional 119.6 MW to the country's energy mix.

Since August 1, 2023, a state of emergency has been declared in the country's energy sector.

Public administration reforms. OJSC "National Energy Holding" has been liquidated by government's decision PKM KR No.482 of 18.09.2023.

Latest developments in legislation. In June 2023, the government approved the "Implementation of Policy of Energy Saving and Energy Efficiency in the Kyrgyz Republic for 2023-2027" Program (PKM KR No.328). Furthermore, in July 2023, the Law of the Kyrgyz Republic "On Electric Power Industry" was amended (Law No.147).

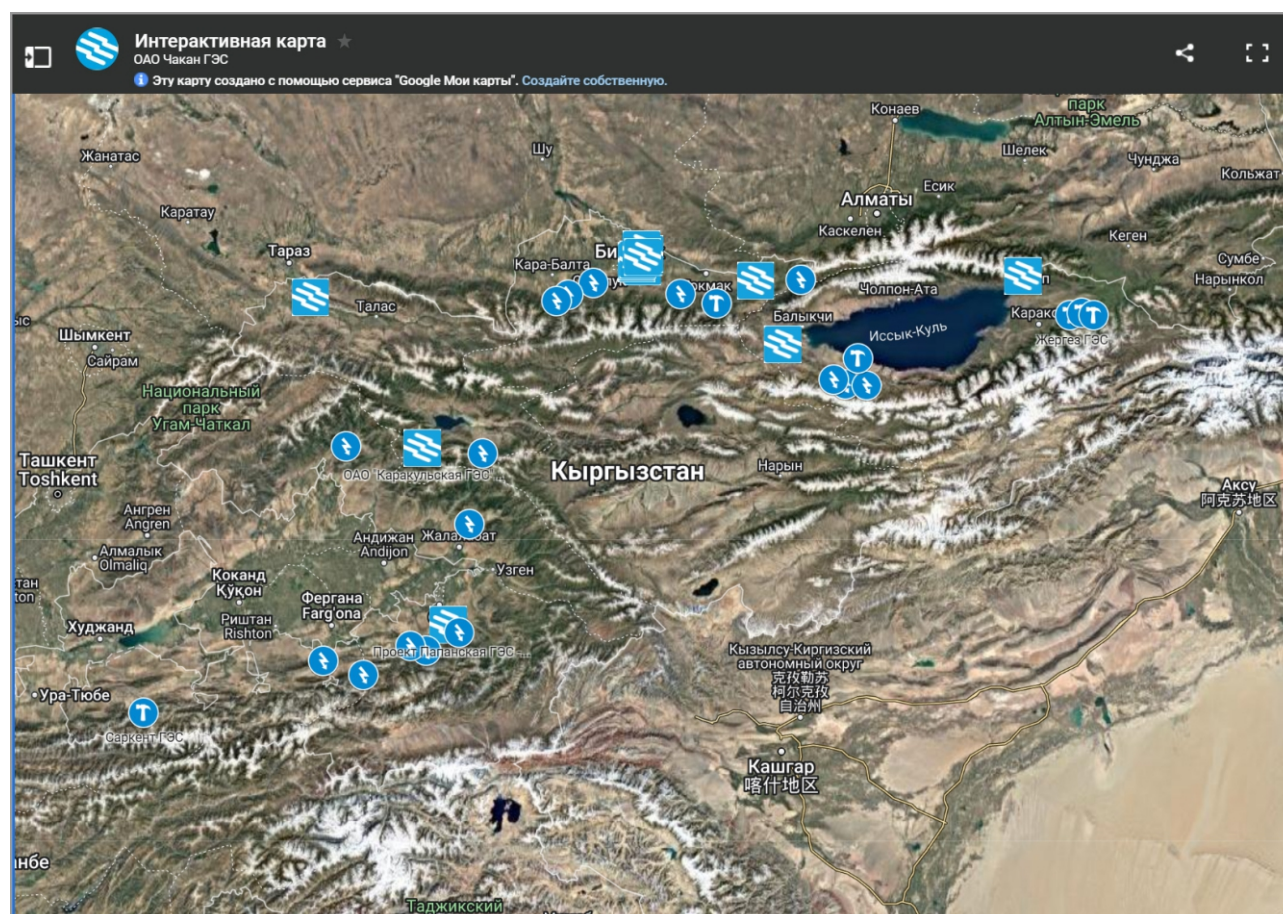
Hydropower construction and modernization. Electric Power Plants JSC has completed its annual work schedule for 2023, focusing on the Kambarata-2, At-Bashi, Tash-Kumyr, and Toktogul HPP cascades. Addi-

tionally, the company has initiated preparatory work for the construction of the Kambarata-1 HPP¹⁰⁴. The rehabilitation of the Toktogul HPP (Phase 3) and the modernization of the Uch-Kurgan HPP are ongoing projects.

The draft Law of the Kyrgyz Republic "On ratification of the agreement between the Kyrgyz Republic and the World Bank" was approved in its second reading on February 16, 2023. This agreement will provide grant funds for the following initiatives under the "Electricity Sector Modernization and Sustainability" project: digitization of the distribution network, implementation of an automated power accounting and a SCADA (supervisory control and data acquisition) systems.

Alternative energy

OJSC Chakan HPP, which includes 9 small hydropower plants (1) implements a pilot project (ADB) on the construction of a floating solar power plant¹⁰⁵ at HPP-5 reservoir; (2) signed an agreement with the China National HEAVY Machinery Corporation on the construction of a small HPP at the Orto-Tokoy reservoir¹⁰⁶ of 21 MW (January 13).



Source: OJSC Chakan HPP, leading Kyrgyz company in the small hydropower sector

¹⁰⁴ planned capacity – 1,860 MW, average annual generation – 5.6 billion kWh

¹⁰⁵ a floating part of the plant of 95 kW and an above-ground part of 5 kW

¹⁰⁶ Orto-Tokoy reservoir is the first reservoir in Kyrgyzstan, which is designed for seasonal regulation of flow along the Chu River and irrigation of 120 thousand ha. The small Orto-Tokoy HPP will be operated in irrigation mode



Small 25 MW Bala-Saruu HPP

The construction of **small 25 MW Bala-Saruu HPP**¹⁰⁷ (downstream of the Kirov reservoir, Manas district, Talas province), with an average annual electricity generation of 92 million kWh, is almost complete.

A credit agreement with EBRD and a grant agreement with EBRD and OJSC Chakan HPP were ratified on June 20, 2023 (ZKR No.120) for the reconstruction of the Lebedinovskaya HPP¹⁰⁸ (€13.8 million).

The Kyrgyz Government has approved financing of \$88 million for the construction and operation of the Kulanak HPP on the Naryn River (through EDB and the Russian-Kyrgyz Development Fund on a parity basis). The total project cost is \$127.9 million. The project capacity is 100 MW and an average annual generation is 435 million kWh. Its commissioning is planned by the end of 2025.

The construction of the Kun-Bulagy solar power plant is currently underway in the Toru-Aygyr aiyl aymak of the Issyk-Kul province. This \$35 million project aims to generate 50 MW of clean, renewable energy.

Regional and international cooperation. The following documents were signed: (1) Roadmap for construction of the Kambarata-1 HPP between energy ministers of Kazakhstan, Kyrgyzstan and Uzbekistan (January 6); (2) agreement on the construction of 100-150 MW solar power plant¹⁰⁹ on the basis of PPP between the Kyrgyz Ministry of Energy, the Ministry of Economy and Finance and the International Finance Corporation (IFC) (January 18); (3) framework agreement on implementation of the project "Construction of a solar power plant with a total capacity of 400 MW in the Kara-Talaa area of Kok-Moynok aiyl aymak situated in Ton district of Issyk-Kul province", between the Kyrgyz Ministry of Energy and the Chinese company "Molin Energy" (October 25); (4) memorandum of understanding between the Kyrgyz Ministry of Energy, the French energy company Électricité De France (EDF), and the Abu Dhabi Future Energy Company

PJSC (Masdar, UAE). The MoU aims to foster cooperation between the two parties to explore and develop hydropower and renewable energy projects within the Kyrgyz Republic, with a combined potential capacity of up to 3.6 GW (December 2).

The World Bank has [approved](#) financing for the first phase of the "Kyrgyz Renewable Energy Development Project". The project aims to support an increase of hydropower generation, meet the growing demand for electricity and attract private investments to the energy sector. It will be implemented using a multi-phase programmatic approach with a total financing of \$125.7 million over 10 years.

Environment Protection and Climate Change

On the [initiative](#) of the President of Kyrgyzstan, the United Nations General Assembly declared 2023-2027 the "Five Years of Action for the Development of Mountain Regions." Kyrgyzstan presented the Global Framework for the Five Years of Action, which addresses key issues like climate change adaptation, environmental conservation, infrastructure development, and improving the living conditions of mountain communities (New York, [July 19](#)). In this context, the following documents were approved: Presidential Decree No.237 of 15.09.2023 "On the declaration of the period 2023-2027 as the Five Years of Action for the Development of Mountain Regions", the Concept for the Five Years of Action for the Development of Mountain Regions and the Roadmap for implementation of the Five Years of Action. Kyrgyzstan will host the Second Global Mountain Summit in 2027.

Public administration reforms. The Environmental Research, Consulting and Auditing Center was removed from the structure of the Ministry of Natural Resources, Ecology and Technical Supervision of the Kyrgyz Republic (PKM KR No.360 of 12.07.2023).

New appointments. Melis Turgunbaev was appointed as the Minister of Natural Resources, Ecology and Technical Supervision of the Kyrgyz Republic, and Azamat Temirkulov – as Deputy Minister.

Latest developments in legislation. The following laws were adopted: "On amendments to the Law of the Kyrgyz Republic on Hydrometeorological Activities in the Kyrgyz Republic" (ZKR No.67 of 23.03.2023) and "On restricting the circulation of bags made of polymer film and plastic products in the territory of the Kyrgyz Republic" (ZKR No.177 of 09.08.2023).

Projects. The "[Advancing regional cooperation on integrated land use through strengthened regional expert networks – Green CA](#)" project launched in

¹⁰⁷ HPP was launched on May 21, 2024

¹⁰⁸ this project aims to significantly increase the power generation capacity of the Lebedinovskaya HPP, which was initially commissioned between 1943 and 1948 and currently supplies electricity to Bishkek. The reconstruction will boost the plant's annual power generation from 34.2 GWh to 53.5 GWh

¹⁰⁹ as part of the "Scaling Solar" Program (WB)

2023 (BMZ, GIZ, 2023-2024) has facilitated several events: regional meeting of GREEN CA specialists (Tashkent, April 11-13); 1st international conference on enhancing the effectiveness of expert services in addressing environmental and related issues in the region (Almaty, September 25-26); training in "Deep Analysis of Land Degradation Economics: How to Assess Ecosystem Services for Better Recognition of Nature's Value in Land Management" (September).

Events. Kyrgyzstan hosted: (1) international conferences "Environmental and Socio-Economic Security as a Factor of Sustainable Mountain Development" (Bishkek, January 19-21) and "Actual Issues of Environmental Research for Sustainable Development in Arid Zones" (Chok-Tal, Issyk-Kul, August 16-17); (2) roundtables on "UNESCO Global Geoparks: Opportunities and Potential in the Kyrgyz Republic" (February 9) and "Restoration of Mountain Ecosystems" (December 15); (3) Climate Week (September 16-23); (4) Caravan of Climate Events (October 19-November 10); (5) [National Forum on Climate Change](#) (November 10); (6) Green Economy Forum 2023: Common Goals for Sustainable Development of the Central Asian region (Bishkek, [November 16](#)).

The Kyrgyz delegation took part in: (1) 7th "EU-Central Asia" high-level conference on environment and water resources (Rome, [February 23-24](#)); (2) 9th meeting on climate change of representatives of foreign ministries and members of parliaments from the Central Asian countries (Tashkent, April 19); (3) international forum "Children and Youth in Action – Climate Change in Central Asia" (Tashkent, [November 9](#)); (4) "One Planet: Polar Summit" (Paris, [November 10](#)); (5) COP28 (Dubai, November 30-December 12).

Kyrgyz President [delivered a speech at the COP28](#), during which he: (1) called on the international community to support the efforts of mountain countries aimed at solving the climate and environmental problems of mountain ecosystems; (2) noted that "by 2050, on the platform of green development, Kyrgyzstan plans to achieve carbon neutrality"; (3) called on the world community, primarily developed countries, to do "more targeted work on accumulating climate finance, simplifying the mechanisms for obtaining it and creating new mechanisms to support developing countries"; (4) hoped that "the issues of mountain ecosystems will be included as priority on the agenda of COP28".

International cooperation. The MNRETS signed: (1) a memorandum of understanding with the Ministry of Natural Resources and Ecology of the Russian Federation on cooperation in the field of environmental protection and natural resources (Bishkek, October 12); (2) a memorandum of understanding and cooperation in the field of environmental protection with the Ministry of Environment of the Republic of Korea (Bishkek, October 20).

SDGs in Kyrgyzstan

In 2022, the Government of the Kyrgyz Republic and the UN [signed](#) the UN Sustainable Development

Cooperation Framework (UNSDCF) in the Kyrgyz Republic for 2023-2027 (UNSDCF). The UNSDCF is fully aligned with the national development strategies and plans of the Kyrgyz Republic. According to the National Development Strategy of the Kyrgyz Republic for 2018-2040, the country strives to achieve the adopted SDGs.

[Kyrgyzstan](#) was ranked 45th out of 163 countries in the annual [sustainable development rating](#) published by the UN and BertelsmannStiftung.

In 2023, the SDI Public Foundation was established in Bishkek, building upon the "YLSP" Public Platform. Its mission is to empower youth and advance the SDGs in Kyrgyzstan and Central Asia across social, economic, and environmental dimensions.

Kyrgyz Republic

Eastern Europe and Central Asia



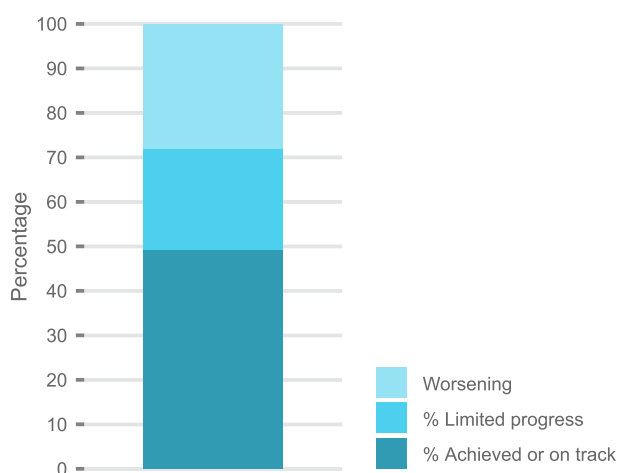
OVERVIEW INDICATORS



SDG Dashboards and Trends



Status of SDG targets for Kyrgyz Republic (% trend indicators)



Source: <https://dashboards.sdindex.org/profiles/kyrgyz-republic>

Capacity building. Kyrgyzstan hosted: the seminar “Statistics of the Sustainable Development Goals”, with the support of GIZ (Bishkek, June 26-27); the workshop on the development of a country initiative on the “Education for Sustainable Development” Framework Programme until 2030 (Bishkek, October 27).

The “Sustainable Development Initiatives” Public Foundation and members of the UN Youth Advisory Council held an intellectual quiz “Youth Quiz” within the International Youth Day in the Kyrgyz Republic (Bishkek, November 10).



The intellectual quiz “Youth Quiz” (Bishkek, November 10)

Events. The Kyrgyz delegation participated in: (1) the high-level Political Forum on Sustainable Development, during which Kyrgyzstan presented a [Global Framework](#) developed jointly with the Mountain Partnership Secretariat to support the implementation of the “Five Years of Action for the Development of Mountain Regions 2023-2027” (New York, July 10-20); (2) the SDG Summit, on which the head of state emphasized that “Kyrgyzstan is ready to commit for SDG acceleration”, specifically through: initiative 1 – “Transforming the system and reforms for inclusive and quality education” (goal 4) and initiative 2 – “Promoting an inclusive green economy” (goals 7, 12, 13 and 15) (New York, September 19-20); (3) the Global Forum on Inter-Parliamentary Cooperation in achieving the SDGs (Tashkent, November 30).

Cooperation. The SDI Public Foundation in the Kyrgyz Republic and the “ASAA” youth public association in Kazakhstan signed a memorandum of understanding and cooperation aimed to promote sustainable development in the CA countries and across the region (November 24).

Publications. The National Statistical Committee of the Kyrgyz Republic¹¹⁰ prepared and published:

“Sustainable Development Goals and Gender in the Kyrgyz Republic”; “Sustainable Development Goals and Youth in the Kyrgyz Republic”; “A Tutorial on Statistics of the Sustainable Development Goals”.

Emergencies

The Kyrgyz Republic is taking steps to implement the “Concept for comprehensive protection of the population and the territories of the Kyrgyz Republic from emergencies for 2018-2030” in alignment with the [Sendai Framework Program](#).

Latest developments in legislation. The following laws and regulations were adopted: (1) “On amendments to the Government Order of the Kyrgyz Republic ‘On the Concept for comprehensive protection of the population and the territories of the Kyrgyz Republic from emergencies for 2018-2030’” (PKM KR No.1 of 10.01.2023); (2) “On amendments to the Law of the Kyrgyz Republic ‘On Civil Protection’” (ZKR No.71 of 27.03.2023); (3) “About the emergency situation in the energy sector of the Kyrgyz Republic” (Presidential Decree No.178 of 24.07.2023); (4) “On ratification of the agreement between the Cabinet of Ministers of Kyrgyzstan and the Government of Uzbekistan on cooperation in the field of emergency prevention and response signed on 27.01.2023 in Bishkek” (ZKR No.4 of 10.01.2024), which is aimed at organizing cooperation in the field of prevention and response to emergency situations, reducing the risk of natural disasters, ensuring the readiness and response to potential emergencies, and rendering mutual assistance in addressing their consequences; (5) “On issues of prevention and risk mitigation of disasters due to river-bank erosion in the Kyrgyz Republic” (Resolution of the Jogorku Kenesh of the Kyrgyz Republic No.1278-VII of 15.06.2023).

Natural disasters. In 2023, the Ministry of Emergency Situations (MES) reported a total of 57 emergencies and over 4,000 individual incidents, leading to tragic consequences: 347 fatalities and 783 injuries. The economic toll was also significant, with material damage estimated at 1.707 billion KGS. Floods and mudslides accounted for 7 of the 57 emergencies and 109 of the incidents. These events caused over 40 million KGS in damage, primarily affecting the Issyk-Kul, Naryn, and Chu provinces.

Preventive measures. As of 01.12.2023, 5,396 meters of protective dams were built and strengthened along the coast lines of transboundary rivers in the territory of Kyrgyzstan (Chu, Kara-Darya, Kok-Art, Kara-Unkur-Sai, Sokh). Also, 118 meters of reinforced concrete fences and 2 bridges were built for 120 meters of flood channels.

The MES KR branch for Batken province took flood protection measures in Orozbekov aiyal aymak of Kadamjay district (Tash-Bulak canal). In Suzak district

¹¹⁰ member of the Coordination Committee for SDGs Adaptation, Implementation and Monitoring in the Kyrgyz Republic until 2030 and the governing body of the working group “Monitoring and Evaluation” for the preparation of the voluntary national review on progress in achieving the SDGs

of Jalal-Abad province, flood control dams were erected in Changyr-Tash village of Kara-Darya aiyi ayamak, and the strengthening of fences of Changet-Say canal in Besh-Moynok village of Barpin aiyi okmotu have been completed.

The MES KR has also bought 3 helicopters and upgraded 700 units of special-purpose equipment.

Projects. (1) "Landslide Risk Management in the Kyrgyz Republic" (ADB): the *Atlas of Landslides in the Kyrgyz Republic* was prepared and published. It provides a consolidated overview of evidence, risks and control of landslides in Kyrgyzstan. This atlas draws data from the national and international literature, analytical data and results from the ADB technical assistance; (2) "Climate Risk Management in Central Asia" (GIZ): study trips were organized (1) along the Danube (Munich-Passau, Germany; Linz, Austria, November 6-10), (2) to Germany, with the visits to the German Committee for Disaster Reduction and the European Centre for Medium-Range Weather Forecasts, the purpose of which was to explore approaches, best practices and technologies related to climate risk management and transboundary early warning systems on hydrometeorological disasters in Germany and Europe (Bonn, December 3-8); (3) "Enhancing Resilience in Kyrgyzstan" (ERIK, WB): the cultivation of the insurance market in Kyrgyzstan and the development of an earthquake risk model are ongoing; the system for actuarial loss valuation in the insurance portfolio is still under formation. The planned activities include risk-based pricing for the compulsory disaster insurance program in the country. Works aimed to improve the performance of the national fire service were finalized. Specialists from the Department of monitoring and forecasting of emergencies under the MES KR studied areas that are prone to dangerous landslide. 15 territorial offices of the MES KR received suitable equipment for organization of the distance training on civil protection.

Capacity building. MES specialists continue to conduct the mobile training sessions among the population. The training topics cover: how to protect themselves against hazards that are likely to arise during emergencies of various types; emergency preparedness; and, the rules of behavior in emergency situations.

MES KR held: an international diving training course sponsored by the International Civil Defense Organization (ICDO) at Lake Issyk-Kul (Cholpon-Ata, August 8-18); a training on the pilot drought information system for Kyrgyzstan, which is aimed at addressing the issue of "monitoring and forecasting" of the drought management cycle (Bishkek, October 31-November 2).

MES specialists took part in: (1) international drills "Kazkutkaru-2023" on the use of UAVs for emergency response (training ground "Rock City – Astana", Ka-

zakhstan, May 14-18); (2) sub-regional workshop on the mine tailings safety and the prevention of accidental water pollution in Central Asia (Dushanbe, online, May 25-26); (3) training on the use of GIS technologies and mapping in emergencies (Almaty, June 12-16); (4) regional consultation workshop on international disaster response law¹¹¹ (Almaty, December 5).

Events. Kyrgyzstan hosted the following events: (1) 2nd high-level dialogue on climate change and resilience in the Central Asian region "Early warning systems for climate change resilience" (September 21-22); (2) Disaster Risk Reduction Day (October 4); (3) 56th session of the ICDO Council (October 18).

The Kyrgyz delegation participated in: (1) 14th meeting of the CSTO Coordination Council for Emergency Situations (Minsk, September 5); (2) 2nd meeting of emergency ministers of OTS (Baku, September 7); (3) 67th regular session of the IAEA General Conference (Vienna, September 25-29); (4) 14th meeting of the Council of the Center for Emergency Situations and Disaster Risk Reduction, chaired by the Kazakh side, a meeting of the working group of the Regional Forum-Meeting of the heads of emergency departments of Central Asian countries (Almaty, November 9) and the Regional Forum-Meeting (Almaty, 10 November); (5) international scientific-practical conference "Mudflow Safety – 50 Years of Kazselezashchita's activities: State and Prospects" (Almaty, November 22-24); (6) 8th meeting of the regional expert group of the Asian-Pacific Center for development of disaster information management (Dushanbe, December 7-8).

Cooperation. The Ministry of Emergency Situations of Kyrgyzstan and the International Civil Defense Organization (ICDO) signed an agreement to establish the ICDO Regional Humanitarian Office for Central Asia and Asia in Bishkek (October 27). This new office will play a crucial role in improving emergency response efforts in the region. By providing rapid access to vital resources and expert knowledge, the office will facilitate more effective and timely interventions during crises. It will work closely with local authorities, NGOs, and international organizations to coordinate efforts, develop emergency response plans, and deliver essential humanitarian aid.

The Kyrgyz Ministry of Emergency Situations has been actively engaging with international organizations to strengthen emergency prevention and response capabilities. In September, the Minister met with the UNDP Resident Representative and the Head of the OSCE Programme Office to discuss potential collaborations. Later, in November, the First Deputy Minister participated in a high-level meeting in Almaty, Kazakhstan, with representatives from the UN Office for Disaster Risk Reduction, the International Federation of Red Cross and Red Crescent Societies, and GIZ.

A meeting was held between the First Deputy Minister of Emergency Situations of Kyrgyzstan A. Mambetov and representatives of the Russian state corporation

¹¹¹ as part of implementation of Provisions on the Regional Emergency Response Coordination Mechanism approved by the decision of the Regional Forum-Meeting of the Heads of Emergency Departments of Central Asian countries on 05.11.2021 in Tashkent

"Rosatom". The parties discussed the jointly implemented intergovernmental target program "Reclamation of territories affected by uranium mining operations", focusing on reclamation of tailing dumps in Kadji-Say settlement of Issyk-Kul province and in Min-Kush settlement of Naryn province, and also plans for remediation of other sites. The parties signed an agreement on the joint plan of remediation activities in Kyrgyz territories affected by uranium extraction and mining operations (Bishkek, August 23).

Foreign Policy and International Cooperation

Working and official visits. In 2023, the Kyrgyz President paid state and working visits to Hungary (February, August), Turkey (March), Russia (May, December), China (May), Kazakhstan (June, November), Mongolia (July), Saudi Arabia (July, November), Tajikistan (September), USA (September), Germany (September), Uzbekistan (November), France (November), Japan (November), Belarus (November), Azerbaijan (November), and UAE (November).

Most significant events in the Kyrgyz foreign policy in 2023

The foreign policy of Kyrgyzstan focuses on strengthening and deepening cooperation with the countries of the Central Asian region, and also with Russia and China.

Kyrgyzstan hosted: (1) high-level summit in the "CA-EU" format (Cholpon-Ata, June 2); (2) CIS forum of creative and scientific intelligentsia (Bishkek, September 11-13); (3) meeting of the Eurasian Intergovernmental Council of the EAEU (Bishkek, October 26); (4) 13th meeting of the deputy foreign ministers of the Central Asian states (Bishkek, November 27-28).

Development of alliances and strategic partnerships.

Kyrgyzstan has been actively working with its neighboring countries to resolve border disputes. As of December, approximately 90% of the disputed sections of the Kyrgyz-Tajik border have been defined. In January, Kyrgyzstan and Uzbekistan signed a protocol to exchange instruments of ratification of the Treaty on Certain Sections of the Uzbek-Kyrgyz State Border. This marked the completion of the border delimitation process between the two countries, paving the way for the demarcation process. See [Cooperation between the Countries of Central Asia on Water and Other Matters](#).

Chairmanship in international organizations. In 2023, Kyrgyzstan assumed the chairmanship of the Commonwealth of Independent States (CIS). In parallel, Kyrgyzstan chaired¹¹² the Council of Heads of State, Council of Heads of Government, Council of CIS Foreign Ministers, CIS Economic Council, Council of Permanent Plenipotentiary Representatives, and

Commission on Economic Affairs at the CIS Economic Council.

Within the framework of **CIS**, Kyrgyzstan participated in/held the meetings of: (1) the Council of CIS Heads of State (Bishkek, October 13); (2) the Council of Heads of Government (Sochi, Russia, June 8; Bishkek, October 26; Moscow, December 18); (3) the Council of CIS Foreign Ministers (Samarkand, Uzbekistan, April 14; Bishkek, October 12); (4) the CIS Economic Council (Moscow, March 17; video-conference, September 22; Moscow, December 8); (5) 56th plenary meeting of the CIS Inter-Parliamentary Assembly (Bishkek, November 17); (6) informal summit of the CIS Heads of State (Saint Petersburg, Russia, December 26).

Within the framework of **SCO**, Kyrgyzstan attended the meetings of: (1) the Council of Heads of SCO member states (video-conference, July 4); (2) the Council of Heads of Government of the SCO member states (Bishkek, October 26); (3) the Council of SCO Foreign Ministers (Panaji, India, May 4-5).

CSTO. The Kyrgyz delegation participated in the meeting of the heads of CSTO member states in Minsk, Belarus on 23 November; the session of the CSTO Collective Security Council, resulting in the Statement of Foreign Ministers of the CSTO member states on common approaches to ensuring the security of the Eurasian space and the Declaration (November 23).

Within the framework of the regional cooperation, the Kyrgyz delegation participated in: (1) expert meeting "Central Asia-2030: Images of the Future" (Astana, January 20); (2) 1st inter-parliamentary forum of Central Asian states (Turkistan, Kazakhstan, February 9-10); (3) 6th ministerial meeting in the "Central Asia-Russia" format (Samarkand, Uzbekistan, April 14); (4) 4th meeting of foreign ministers in the "Central Asia-China" format (Xi'an, China, April 27); (5) XIV International Economic Summit: Russia-Islamic World: Kazan Forum 2023 (Kazan, Russia, May 18-20); (6) meeting of foreign ministers of the Central Asian states (Dushanbe, September 13); (7) 5th consultative meeting of Heads of Central Asian states (Dushanbe, September 14); (8) meeting of the Council of Heads of the IFAS Founding States (Dushanbe, September 15).

Promotion of the national interests and reinforcement of the country's image in the global stage

UN. On **March 24** the Cabinet of Ministers of the Kyrgyz Republic and the United Nations met under the auspices of the Joint Strategic Coordination Committee. The outcomes of the meeting were the endorsement of joint work plans worth \$223 million for 2023-2024. Cooperation will focus on: 1) quality social services; 2) green socio-economic development; 3) climate action and disaster risk management; 4) rule of law, human rights, gender equality and good governance under the Agenda 2030.

¹¹² according to the decision of the Council of CIS Heads of State adopted on October 14, 2022 in Astana

The Permanent Mission of the Kyrgyz Republic to the UN held a side event titled "Advocating for mountain women and girls' education through student-engaged learning" within the framework of the 67th session of the UN Commission on the Status of Women (New York, March 8); and a meeting "Climate Science in Action" (New York, July 6).

The Kyrgyz President during its speech at the General Debate of the 78th UNGA urged donors to revise their approaches towards a significant increase in climate financing for needy countries. He underlined that Kyrgyzstan supports the Bridgetown Initiative proposed at the last climate conference in Sharm el-Sheikh, and also the calls (voiced at the summit on global finance in Paris) to mobilize the necessary funding and structural reform of the international financial architecture. He also emphasized that Kyrgyzstan advocates the creation of a broad coalition of mountain countries, focusing on adaptation to climate change and transition to a green economy (New York, September 19).

The Kyrgyz President participated in the One Planet: Polar Summit and the 42nd session of the UNESCO General Conference in Paris on November 9-10 and also in the Summit of Heads of State and Government of the SPECA member states in Baku on November 24.

The Kyrgyz delegation attended: (1) meeting of foreign ministers of the Central Asian countries and the US in the "C5+1" format (Astana, February 28); (2) session of the Council of Foreign Ministers of the OIC (Nouakchott, Mauritania, March 16-17); (3) extraordinary session of the Council of Foreign Ministers of the OTS (Ankara, March 16); (4) summit "Central Asia – Cooperation Council for the Arab States of the Gulf" (Jeddah, Kingdom of Saudi Arabia, July 19); (5) first summit of Heads of State of "Central Asia and the US" (New York, September 19); (6) summit of Heads of State in the format "Central Asia + Germany" (Berlin, September 29); (7) 19th "Central Asia-European Union" ministerial meeting (Luxembourg, October 22-23); (8) meeting of foreign ministers of the Central Asian coun-

tries and the "G7" (videoconference, November 8); (9) 10th summit of Heads of the OTS member states (Astana, November 3); (10) 16th summit of Heads of the ECO member states (Tashkent, November 9); (11) 8th extraordinary summit of the OIC (Riyadh, November 11).

Sources:

Official sites of the:

President of the Kyrgyz Republic (<https://www.president.kg/>);

Parliament (<http://kenesh.kg/>);

Ministry of Foreign Affairs (<https://mfa.gov.kg/ru/>);

Ministry of Justice (<http://cbd.minjust.gov.kg/>);

Ministry of Water Resources, Agriculture and Processing Industry (<https://agro.gov.kg/language/ru/main/>);

Ministry of Finance (<https://www.minfin.kg/index.php>);

Ministry of Energy (<https://minenergo.gov.kg/>);

Ministry of Natural Resources, Environment and Technical Supervision (<https://mnr.gov.kg/ru/>);

Ministry of Emergency Situations (<https://mchs.gov.kg/>);

Water Resources Service (<https://www.water.gov.kg/index.php?lang=ru>);

Center for Emergency Situations and Disaster Risk Reduction (<https://cesdr.org/>);

Permanent Mission of the KR to the UN (<https://mfa.gov.kg/en/dm/postoyannoepredstavitelstvo-kyrgyzskoy-respubliki-pri-organizacii-obedinennyh-naciy-v-g-nyu-york/news/25543>);

National Electric Grid of Kyrgyzstan (<https://nesk.kg/ru/>)

Information agencies:

<https://knews.kg/>;

<https://kabar.kg/>;

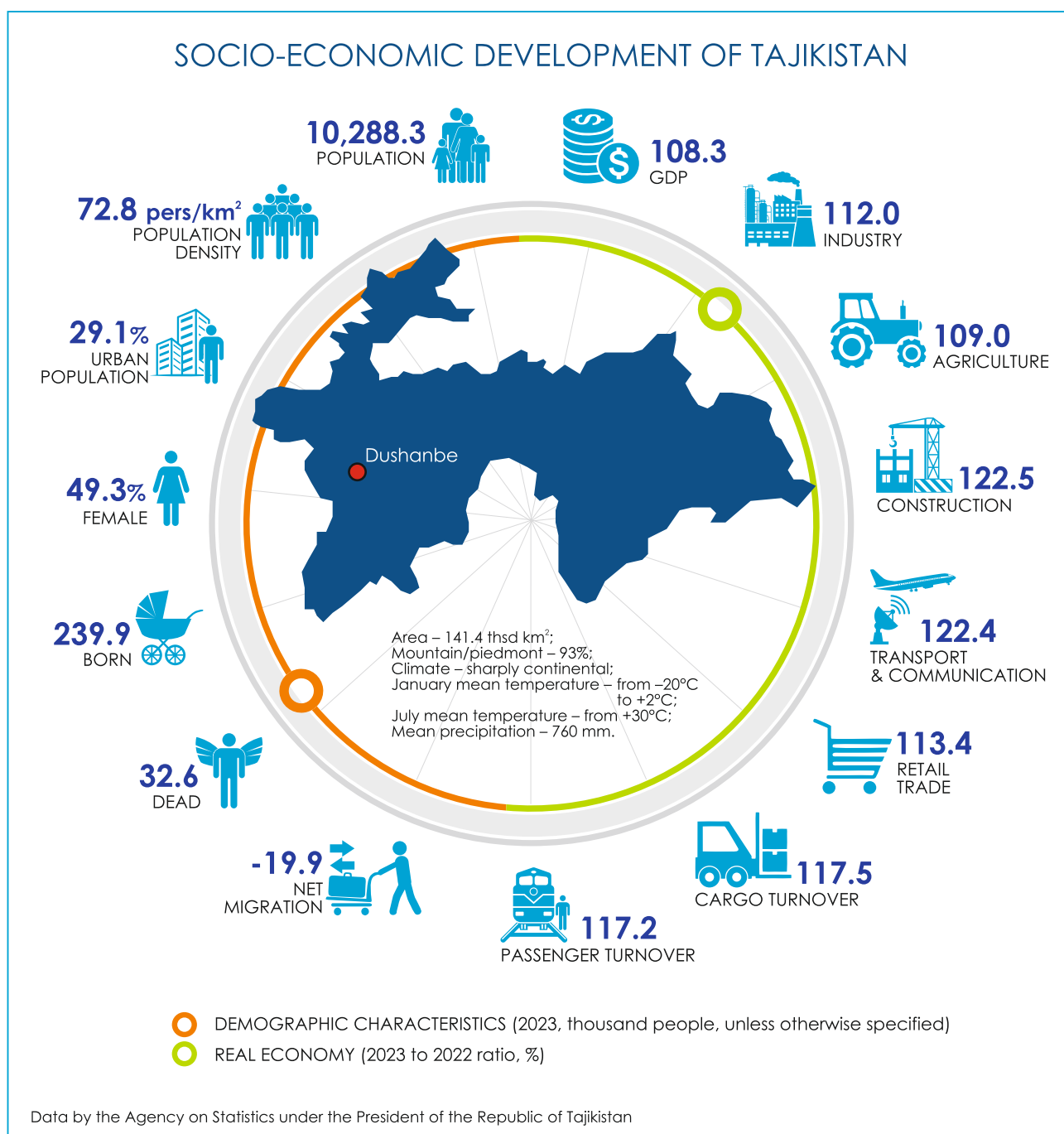
<https://www.akchabar.kg/>;

<https://www.aris.kg/#>;

<https://24.kg/>;

<https://economist.kg/>

5.3. Tajikistan



Water sector

Water resources. In Tajikistan, the main water resources are glaciers, rivers, lakes, reservoirs and groundwater. There are 14,509 glaciers, with a total glacial area of 11,146 km² (approximately 8% of the country's territory) and a total ice volume of about 845 km³. The country is crisscrossed by 947 rivers, stretching over 28,500 km in total. The average annual river runoff is 64 km³/year (80% from the Amu Darya River and 1% from the Syr Darya River). This accounts for 55.4% of the long-term average annual runoff in the Aral Sea basin. Tajikistan boasts approximately 1,300 lakes, covering a total area of 705 km². These lakes hold over 46.3 km³

of water, including 20 km³ of fresh water. The country's 11 reservoirs cover a total surface area of 664 km² and hold a total capacity of 15,344 km³. Their usable capacity, amounting to 7.63 km³, represents 13% of the long-term average annual runoff in the Aral Sea Basin. The country's potential groundwater stock is 18.7 million km³ per year, with usable resources estimated at 2.8 km³ per year. Additionally, over 200 mineral springs and 100 geothermal water deposits have been identified.

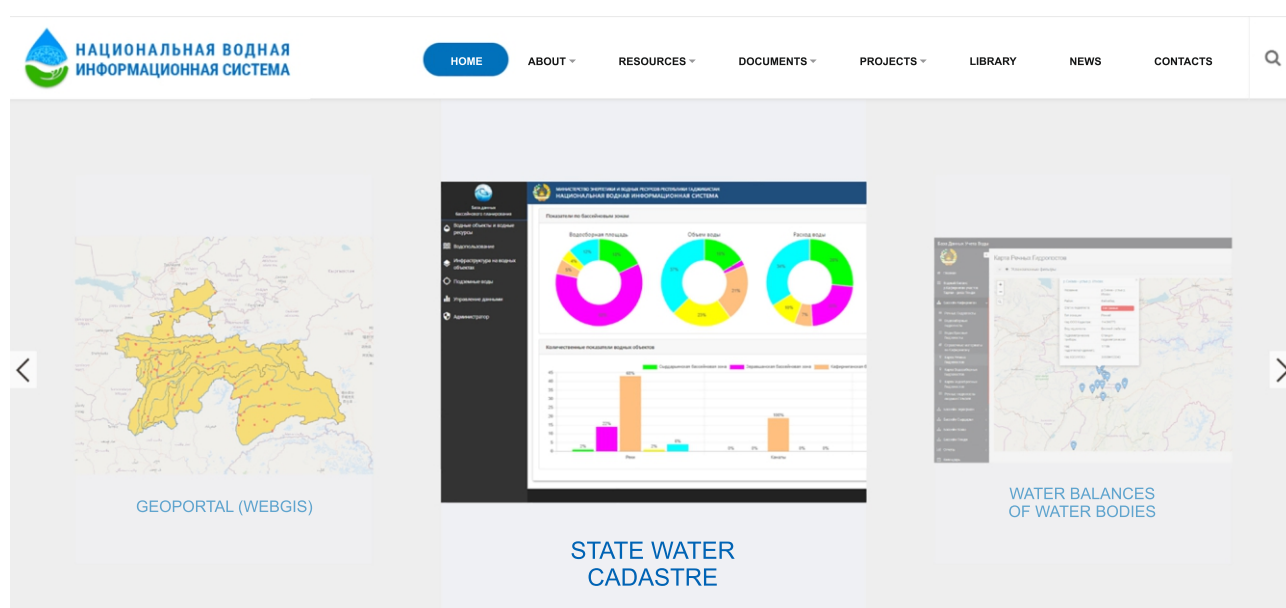
The main water consumer in Tajikistan is irrigated agriculture, which accounts for 85% of total water use. Household and drinking water supplies account for 5%, industry – 5%, fishing – 2%, and other sectors – 3%.

Latest developments in legislation. The “Investment Program to Provide Pumping Stations of the Agency for Land Reclamation and Irrigation at the Government of Tajikistan with Modern Energy-Saving Equipment for 2023-2027” worth 889,670 thousand TJS has been adopted (PP RT No.296 of 30.06.2023). Modern energy-saving equipment will be installed at 36 pumping stations between 2023 and 2025, at 16 pumping stations in 2026, and at 7 pumping stations in 2027.

New appointments. Mr. Z. Davlatzoda was appointed as the Director of the Agency for Land Reclamation and Irrigation under the Government of the Republic of Tajikistan (PP RT No.7 of 05.01.2023) and Mr. Kh.Z. Zarifzoda and Mr. A. Safarzoda were appointed as First Deputy Directors of the Agency (PP RT No.105 and 106 of 16.03.2023).

State programs and projects. Ongoing/completed projects: (1) 2016-2025 Water Sector Reform Program; (2) Irrigation Land Reclamation Program of the Republic of Tajikistan, 2019-2023¹¹³ (PP RT No.374 of 01.08.2018); (3) State Program for Development of New Irrigation Land and Rehabilitation of Withdrawn Agricultural Land¹¹⁴ (PP RT No.90 of 01.03.2022), according to which more than 11,000 ha of new irrigation land are to be developed by the end of 2027¹¹⁵ and more than 5,000 ha of land withdrawn from agricultural production will be reclaimed. 563 million TJS are allocated for these purposes. In 2023, out of 1,547 ha planned new irrigated land and 480 ha of re-introduced land, 3,082 ha (199%) and 1,092 ha (228%) were developed and reclaimed, respectively.

MEWR RT maintains and develops the National Water Information System.



Source: <https://www.wis.tj/>

Ongoing projects: Improvement of Water Resources Management in Khatlon Province (IsDB, \$53.5 million, 2020-2024); [Water Resources Management in the Panj River Basin](#) (ADB, \$46.610 million, 2017-2024); Climate and Disaster-Resilient Irrigation and Drainage Modernization in the Vakhsh River Basin (WB, \$35.2 million, 2022-2027).

New projects: (1) Strengthening Water and Irrigation Management in Tajikistan (WB, EU, \$47.34 million, 2022-2027) aims to [enhance](#) capacities in water resource planning and irrigation management in Tajikistan and improve efficiency of selected irrigation systems in the Vakhsh and Zerafshan River basin zones; (2) Enhancing economic independence and Improving the situation of women in Central Asia

through access to irrigation water and infrastructure¹¹⁶ (Coca-Cola Foundation, more than \$500 thousand). The project will cover Bokhtar district in Khatlon province and Vakhdat district in Tajikistan.

Tajikistan signed an agreement with the EDB for a \$32 million loan for the project “Irrigation System Renovation to Increase the Capacity of Irrigation Systems in Zafarabad District in Sogd Province” (2024-2029) aimed to improve the efficiency and sustainability of the irrigation system in this region.

Events. Several events were organized in the course of the year, including: (1) 84th ICWC meeting (Dushanbe, May 10); (2) International Conference “Central Asia: Towards a Sustainable Future through a Strong

¹¹³ PP RT No.137 of 01.03.2024 approved the “Program for Reclamation of Irrigated Agricultural Land in the Republic of Tajikistan for 2024-2028” and the Action Plan 2024-2026 for its implementation

¹¹⁴ Coordinated by the Cabinet of Ministers of the Republic of Tajikistan

¹¹⁵ Currently, the total area of irrigable land is 1,570 million ha, of which about 763 million ha are irrigated. Of these, about 40% is under pumped irrigation, 15% is salinized land and 18% is stony land

¹¹⁶ <https://carececo.org/en/main/news/upravlenie-vodnymi-resursami-v-tadzhikistane-snizit-defitsit-vody/>

Regional Institution" dedicated to the 30th Anniversary of IFAS (Dushanbe, June 6); (3) joint meeting of the Working Group on IWRM and the Coordination Working Group on Implementation of the Tajikistan Water Sector Reform Program, where ongoing reforms were discussed, including the finalized draft "National Water Strategy for Tajikistan until 2040", the institutional structure for coordinating the water sector in the Republic of Tajikistan, and the finalized draft Concept on Integrating Basin Water Resources Management Plans into Development Plans and Programs for Cities and Districts in Tajikistan (Dushanbe, November 23); (4) a special session¹¹⁷ on contribution of the Tajikistan Water Sector Reform Program to climate change adaptation and sustainable development of the water sector (Dubai, UAE, December 5).



The staff of the MEWR RT and Administration of Water Resource Management in the Republic of Tajikistan received training¹¹⁸ in GIS, information technologies, applications of the National Water Information System (NWIS), and other topics (August 21-26, November 20-25), glacio-hydrological modeling and water distribution in the Zerafshan River basin in Tajikistan (September 25-28, December 5-7), and a one-day training session with Dr. Sonu Kanal, a SPHY modelling

trainer (December 19). They also attended a training course on sustainable groundwater management¹¹⁹ (Tashkent, March 14-15).

The Tajikistan's delegation participated in the UN Water Conference (New York, March 22-24) and World Water Week (Stockholm, Sweden, August 20-24).

Drinking Water Supply

Access to drinking water supply and tariffs. According to the State Unitary Enterprise (SUE) "Housing and Communal Services," 66% of the population now has access to centralized water supply, representing a 6.3% increase from the previous year. This improvement has resulted in 6.742 million people gaining access to clean drinking water, a substantial increase of 1.618 million individuals. Drinking water tariffs¹²⁰ are 1.09 TJS per 1 m³ for population, 2.02 TJS for budget organizations, and 3.48 TJS for commercial enterprises. For sewerage services, population pays 0.55 TJS, budget organizations – 1.09 TJS, and commercial enterprises – 1.88 TJS per 1 m³.

New appointments. Mr. A.A. Dostizoda was appointed as the First Deputy Director General of the SUE "Housing and Communal Services" (PP RT No.149 of 17.04.2023) and Mr. R.A. Rasulzoda, as the Deputy Director General (PP RT No.150 of 17.04.2023).

State programs and projects. As a result of implementation of the past program prior to 2021 and the current "Development Program of Housing and Communal Services in the Republic of Tajikistan, 2021-2024" (PP RT No.53 of 27.02.2021), thanks to cooperation with several international financial organizations, access to clean drinking water for the population increased from 43% to 65.8%. Thanks to several key projects, including the Rehabilitation of Water Supply System in Cities of Khatlon province (IsDB, Yavan and J. Balkhi districts), Reconstruction of Cities in Northern Tajikistan (Istiklol, Buston, Guliston, Khorog, Kanibadam, and Isfara cities, B. Gafurov district), and Reconstruction of Cities in Northern Tajikistan-2 (Istaravshan and Penjikent cities, Shahrstan and Zafarabad districts), significant strides have been made in improving access to clean drinking water. Over 534,740 people now have access to clean drinking water, and more than 1 62,000 people have gained access to water in general. In B.Gafurov district, the first phase of the Rehabilitation and Construction of Drinking Water Supply Networks in Zarzamin Rural Council project was recently completed, benefiting 7,000 residents with clean drinking water. Additionally, a new water pipeline was inaugurated in Kahramon village, providing water to over 180 households.

The "Water Supply and Sewerage in Kulyab City" project (€16.25 million) has provided significant support to the State Enterprise of Water Supply and Se-

¹¹⁷ as part of COP28

¹¹⁸ as part of TRIGGERII project (See Subsection "Agriculture")

¹¹⁹ as part of CAWEP

¹²⁰ since January 1, 2024, tariffs for agricultural water were increased by 150% (from 2 dirams in 2023 to 5 dirams per m³, including VAT)

werage in Kulyab City. This includes the transfer of 9 units of special engineering equipment, 5 pieces of equipment, and 10,650 water meters. Additionally, the project has assisted with hydrogeological surveying to improve water resource management.

The "Rural Water Supply and Sewerage" project (WB, \$58 million, 2019-2025, Vose, Vakhsh, Kushoniyon, J. Balkhi, Levakant, Dusti, and Jaihun cities) is currently underway in 7 districts of Khatlon province. This project is providing consultation services for the development of the Drinking Water Supply and Wastewater Disposal State Program up to 2030 and building the capacity of local communities. Furthermore, the project is actively engaged in the construction and equipping of water supply facilities in these districts.

Other ongoing projects: (1) USAID Rural Water Supply Activity (2020-2025): a pumping station in the Zaynabobod village of Rudaki district and a [drinking water supply system](#) in Soycha village of B.Gafurov district were rehabilitated; (2) Investments in Water Supply and Sanitation in Tajikistan (IDA, \$45 million, 2022-2027) and others.

Agriculture

2023 Results. The gross agricultural product increased by 9.027 billion TJS, representing a 1.8% growth rate. Agriculture now contributes over 24.6% to the country's GDP. The total agricultural output surpassed 63 billion TJS, marking a 9% increase compared to the previous year. This growth can be attributed to both crop and livestock production. Crop production reached 43.37 billion TJS, a 6.8% increase, while livestock production surged to 19.66 billion TJS, a 14.1% increase.

85% of the cotton plan was fulfilled: 344,400 tons of cotton were harvested, slightly below the forecast of 429,600 tons. A grain harvest of 1.754 million tons was achieved, exceeding the forecast of 1.67 million tons by 5%.¹²¹ The area under crops increased by 1,800 hectares to over 392,000 hectares.

Approximately 178,000 tons of agricultural products were exported, a decrease of 13,000 tons compared to the previous year¹²². Despite a record fruit harvest of 665,000 tons (a 30% increase), Tajikistan imported over 44,000 tons of fruit, a 6.7% increase. Wheat imports increased by 48,000 tons to over 975,000 tons and rice imports increased by 5,500 tons to 33,000 tons.

Latest developments in legislation. The following documents were approved: (1) "Program of Agro-Food System Development and Sustainable Agriculture up to 2030" (PP RT No.54 of 01.03.2023); (2) a new procedure for issuing, replacement and canceling of land share certificates aimed at ensuring favorable conditions for exercising the right to land use, establishing farms, determining the size of a land plot and land

share, and overcoming existing problems (Resolution of the Chairman of the State Committee for Land Management and Geodesy of RT, No.32 of 15.05.2023).

New appointments. Mr. K.Khakimzoda was appointed as the Minister of Agriculture of the Republic of Tajikistan (PP RT No.493 of 05.01.2023); Mr. D.Nosizoda was appointed as the First Deputy Minister (PP RT No.322 of 18.07.2023); and, Mr. M.F.Nazarzoda was appointed as the Deputy Minister (PP RT No.323 of 18.07.2023).

Programs and projects. Ongoing programs: "Pasture Development Program for the Republic of Tajikistan, 2023-2027" (PP RT No.579 of 29.11.2022)¹²³ aimed to increase natural pasture areas by applying modern technologies and improve pasture productivity; "Concept for Creation and Development of Agro-Industrial Clusters in the Republic of Tajikistan up to 2040" (PP RT No.566 of 28.10.2020) and the "Program of Agro-Food System Development and Sustainable Agriculture up to 2030" (see above) approved in 2023. Several investment projects make a significant contribution to these programs, including: Strengthening Resilience of Agriculture Sector (WB, 2021-2026) by increasing the availability of quality seeds, climate-resilient seedlings, improving access to agro-logistic services for farmers and agribusinesses, and improving the public governance institutions; Community-Based Agricultural Support (IFAD, 2023-2030, 16 districts in Khatlon province, 3 districts of central subordination and 2 districts in Sogd province).

The Towards Rural Inclusive Growth and Economic Resilience/TRIGGERII project is underway (EU, BMZ, GIZ). The project aims to strengthen economic resilience of micro-, small- and medium-sized enterprises (MSMEs), including small farmers, young entrepreneurs and women entrepreneurs: farmers have got agricultural equipment in four rural communities (Lakhsh, Lakhshi Bolo, Surkhob, Sari Tal) in Lakhsh district; startup and entrepreneurship financing program has been launched in the Rasht and Zerafshan valleys; training for trainers on launching an incubation program for startups (July 3, Nurek) and a number of meetings (August 1-6, 15-21, and 21-26) were held; a Conference on the occasion of the International MSMEs Day (July 6), a meeting to present the results of the Rasht Valley project (July 18, Garm), and a meeting with start-up entrepreneurs (1 November, Khujand) were organized, etc.

USAID launched: (1) [Market Driven Rural Development Project/MDRD](#)¹²⁴ (\$19 million, 2022-2027). This is a Nationwide Activity that accelerates agricultural sector growth to enable inclusive access to economic opportunities in rural communities; (2) [Tajikistan Food Security Net Activity](#) (\$10 million, 2022-2027).

As part of the USAID Feed the Future Program, the following projects are implemented: (1) Tajikistan Eva-

¹²¹ PP RT No.370 of 29.07.2022 "On Prospects for Key Macroeconomic Indicators in the Republic of Tajikistan in 2023-2025"

¹²² one of the reasons is the loss of more than 60% of the grape due to winter frosts

¹²³ MA RT monitors and evaluates the Program

¹²⁴ <https://www.usaid.gov/tajikistan/press-releases/may-11-2023-usaid-launches-19-million-activity-focused-agriculture-led-inclusive-economic-growth>

uation and Analysis Activity/TEAA (\$3 million, 2022-2025)¹²⁵ aimed to raise incomes of the rural poor and improve food and nutrition security; (2) **Agriculture and Land Governance Activity** (more than \$36 million, 2020-2025, 12 districts in Khatlon province) to accelerate agriculture-led growth, deepen resilience among vulnerable populations, enhance the enabling environment for agriculture and land reform, and improve nutrition.

In Dushanbe, the final results were announced for the EU's Enhanced Competitiveness of Tajik Agribusiness Program (EBRD, loans for \$24.5 million, grants for €5.65 million, 2014-2023) (May 26) and the USAID Entrepreneurship and Business Environment Development Project (\$18.6 million, 2018-2023, Khatlon province) (May 30).

Events and international cooperation. Agricultural products of Tajikistan were presented at the 87th "International Green Week" exhibition (January 20, Berlin). The Bactria Food 2023 Export Forum brought together key players from the public and private sectors to discuss and address challenges in exporting agricultural products (Bokhtar, Khatlon province, May 25).

Within the framework of the state visit of Turkmen President to Tajikistan, 23 documents were signed, including the "Roadmap for Expanding Cooperation in Agriculture for 2023-2025" between the Tajik MA and the Turkmen MAEP¹²⁶ (Dushanbe, May 10).

Agricultural cooperation issues were discussed during the meeting with the head of the Turkish Cooperation and Coordination Agency (TIKA) in Tajikistan (Dushanbe, November 9) and on the margins of the 19th meeting of the Tajikistan-Russia Intergovernmental Commission on Economic Cooperation (Moscow, December 18). For more news, see <https://moa.tj/news/>.

Energy

Energy production and export. Tajikistan possesses hydropower resources estimated at 527 billion kWh per year. However, currently, only a small fraction (4-5%) of this potential is being harnessed. The country's hydropower infrastructure comprises 11 large and medium-sized hydropower plants (HPPs) and approximately 300 smaller ones, with a combined installed capacity of about 5,500 MW.

In 2023, Tajikistan generated 21.656 billion kWh of electricity, a 2.1% increase compared to the previous year. This increase was driven by a 453 million kWh boost in production. Tajikistan also increased its electricity exports by 4.9% to 2.6 billion kWh. The primary

destinations for these exports were Afghanistan (1.6247 billion kWh), Uzbekistan (907.5 million kWh), and Kazakhstan (144.6 million kWh). Despite this, Tajikistan still imported 18.6 million kWh of electricity from Uzbekistan and Kyrgyzstan.

Latest developments in legislation. The "2023-2027 Renewable Energy Program" aimed at achieving energy independence and the Action Plan for 2023-2025 for its implementation were approved in March (PP RT No.51 of 01.03.2023)¹²⁷. It is anticipated that the implementation of the Program will increase the production capacity of the country's energy system by 32.2 MW through the utilization of Renewable Energy Sources (RES), including water, solar, and wind power.

By embracing a green economy, Tajikistan aims to become a global leader in renewable energy generation and a major exporter of electricity in the region. The "Strategy of Green Economy Development in the Republic of Tajikistan, 2023-2037" and its accompanying Action Plan for 2023-2025 outline the key steps to achieve this ambitious goal (PP RT No.482 of 30.09.2022).

Hydropower Construction and Modernization

Rogun HPP.¹²⁸ According to the MEWR RT, \$1 billion is allocated annually (on average) to finance the construction of the Rogun HPP. Construction is carried out exclusively at the expense of state funds. In 2023, 5 billion TJS (\$456 million) has been allocated. According to the latest estimates, \$6.2 billion will be needed to complete the plant¹²⁹. Funds from international financial institutions are expected to be raised. In particular, there are agreements to attract a soft loan from the Asian Infrastructure Investment Bank/ABII (PRC) in the amount of \$500 million; an agreement was signed



¹²⁵ implemented by the International Food Policy Research Institute/IFPRI in partnership with local public and private research institutions, including the Tajik Academy of Agricultural Sciences (TAAS) and Z-Analytics Group (Takhilil and Mashwarat LLC)

¹²⁶ by Presidential Decree No.240 of 14.07.2023, the Ministry of Agriculture and Environmental Protection of Turkmenistan was established on the base of the Ministry of Agriculture

¹²⁷ MEWR and NAS monitors and evaluates the Program

¹²⁸ the Rogun HPP (3,600 MW, more than 17 billion kWh) on the Vakhsh River includes 6 units, each of 600 MW. The total water volume in the reservoir will be 13.3 km³, and the usable volume will be 10.3 km³. According to the plan, the reservoir should be filled with water within 15-17 years

¹²⁹ since the beginning of reconstruction and construction work (since 2008), more than 35 billion TJS have been allocated from the state budget

with the Saudi Fund for Development to provide a \$100 million loan (Dushanbe, December 4); EDB plans to channel \$130 million in 2024; a grant agreement was signed with the IDA to implement the draft structure and business framework of the Rogun project to improve its environmental and social sustainability, transparency and support its implementation (\$15 million).

As of now, two units of the Rogun HPP are operational, generating approximately 7 billion kWh of electricity since their commissioning. The third unit is scheduled to become operational in 2025. The entire construction project is expected to be completed by the end of 2031.

Construction of Yavan HPP and Fandaryo HPP on the Zerafshan River. In June 2022, Tajikistan and Uzbekistan initiated the first phase of a joint hydroelectric power plant construction project, focusing on geological exploration and survey work. To oversee this project, a new operator company, "Tad-Uz Hydro", was established. The second phase will involve conducting a feasibility study to determine the project's final cost. The initial plan is to construct the 140 MW Yavan HPP, estimated to cost approximately \$282 million. Subsequently, the parties will proceed with the construction of the 135 MW Fandaryo HPP, projected to cost around \$270 million.

Following its reconstruction in April 2023, the **Sarband HPP**¹³⁰ commenced full operations. The commissioning of the final 38 MW unit¹³¹ boosted the plant's generation capacity from 160 MW to 270 MW.

Kairakkum HPP¹³². In 2023, two units of the hydropower plant were repaired and recommissioned, generating a combined capacity of 58 MW. This is equivalent to the output of three previous units. Additionally, repairs were completed on units 6 and 5, and reconstruction work on unit 4 commenced. All repair and reconstruction efforts are expected to be finalized by 2025.

CASA-1000¹³³. At the COP28 climate summit in Dubai, Energy Ministers from Tajikistan, Pakistan, and Kyrgyzstan announced that the CASA-1000 project is nearing completion. They signed a statement reaffirming their commitment to accelerating the implementation of this crucial energy project. Furthermore, during the conference, the President of Tajikistan met with Ajay Banga, President of the World Bank Group, to discuss the importance of reviving the CASA-1000 power transmission line project. This project aims to connect the energy markets of Central and South Asia through Afghanistan.¹³⁴



Kairakkum HPP



CASA-1000 project



¹³⁰ construction of the Sarband HPP on the Vakhsh River (Khatlon province) started in 1956. The first unit commissioned in 1962. In 2013, the Government of Tajikistan and ADB signed a grant agreement (\$136 million) for the Sarband HPP reconstruction

¹³¹ the remaining units were refurbished and then alternately started up from November 2018 to March 2022

¹³² construction of the Kairakkum HPP on the Syrdarya River started in 1952. The first 21 MW turbine was put into operation in 1956. It consists of six power units totaling 126 MW. After reconstruction, it is planned to increase the capacity of the plant to 176 MW. The approximate cost of work is \$200 million

¹³³ the largest energy project in the region (\$1.2 billion), which will connect the energy systems of Tajikistan and Kyrgyzstan with Afghanistan and Pakistan to export electricity

¹³⁴ all CASA-1000 activities were terminated due to the political situation in Afghanistan in August 2021. According to the WB, the CASA-1000 project (\$1.2 billion) will be resumed in Afghanistan in 2024. Completion of the Afghan phase is critical, as it is a key connecting country for the CASA-1000 transmission line. Work in the other three countries is almost completed. Countries started repaying loans to the WB and other financial institutions

Tajikistan and the World Bank have signed grant agreements for additional funding to support the CASA-1000 project: (1) CASA-1000 Regional Power Transmission (\$11 million): This funding will be used to facilitate the transfer of surplus electricity from Tajikistan and Kyrgyzstan to Afghanistan and Pakistan during the summer months. Additionally, it will support the development of electricity trading mechanisms and the establishment of a regional electricity market in Central and South Asia; (2) CASA-1000 (\$10 million): This grant will be allocated to improve the quality and accessibility of electricity services, enhance socio-economic infrastructure, and support capacity building for local governments in communities within the project area.

Alternative Energy

Tajikistan has set a goal of reaching 10 GW of RES capacity by 2030. The country possesses vast renewable hydropower resources, with the potential to generate more than 3.5 times the current electricity consumption of the entire Central Asia region. In addition to hydropower, Tajikistan is exploring other renewable energy sources like solar, wind, biomass, and thermal energy. These sources are projected to contribute approximately 10% of the country's total energy needs.

Small hydropower. Over 285 small HPPs have been registered in Tajikistan, with capacities ranging from 5 kW to 4,300 kW. Some of the largest among these include: Marzikh (4,300 kW) in Ayni district, Sangikar (1,000 kW) in Rasht district, Pitovkul-2 (1,100 kW) in Jirgital district, and Kukhiston (500 kW) in Gorno-Matcha district. Small Khatfat HPP has been put into operation in Savnab village, Rushan district.

Tajikistan has secured an additional €10 million grant from the KfW Development Bank to fund the construction of the **small Sebzor HPP**¹³⁶. The 110/35/6 kV Sebzor substation has been completed, and necessary equipment has been delivered and installed. Work is currently underway on the main building of the HPP, the dam area, and the construction of the main bridge. The first unit of the HPP is scheduled to commence operations in 2024.

Solar power. The government plans to construct several SPPs with a combined capacity of 730 MW in the coming years. In the initial phase, five SPPs with a total capacity of 430 MW are slated for development.

Construction of a 600 kW SPP has already commenced in Murghab, Gorno-Badakhshan Autonomous Oblast (GBAO). Additionally, plans are underway to build a 200 MW SPP in the Sogd province.

Climate Change, Glaciers and Environmental Protection

Latest developments in legislation. The "State Environmental Program of the Republic of Tajikistan for 2023-2028" and its accompanying Action Plan for 2023-2025 were approved by Presidential Decree No.53 on March 1, 2023. This program aligns with the National Development Strategy of the Republic of Tajikistan until 2030 and aims to boost socio-economic development by responsibly utilizing the country's abundant natural resources, including land, water, vegetation, forests, and minerals. Furthermore, the program prioritizes the development of a green economy.

The Republic of Tajikistan has enacted the Law "On Glaciers' Protection" (ZRT No.2026 of 03.01.2024). This law establishes a legal, economic, and organizational framework for safeguarding glaciers as vital environmental assets and strategic water resource sources. It regulates various aspects related to glaciers, including research, monitoring, conservation, and training. Furthermore, the law outlines the state's and international community's roles in glacier conservation.¹³⁷

Programs and projects. As part of the: (1) "State Program for the Study and Preservation of Glaciers in the Republic of Tajikistan, 2010-2030"¹³⁸, specialists from the Tajik Committee for Environmental Protection conducted aerial surveys to assess snow cover in critical river basins, including the Kyzylsu, Yokhsu, Obihingob, Surkhab, Kamaroba, and Kanask region of the Kofirnigan River basin (April 2); The State Scientific Institution "Center for Glacier Research of the National Academy of Sciences of Tajikistan" has made substantial contributions to glacier research. They published the "Atlas-Catalog of the Fedchenko Glacier" and the "Consolidated Catalogue of Tajikistan's Glaciers," which represents the first comprehensive inventory of the country's glaciers using modern techniques; (2) "Comprehensive State Program on Development of Environmental Education and Public Awareness in the Republic of Tajikistan, 2021-2025"¹³⁹, the following events were organized: Youth Ecological School (Dushanbe, August 19-23); environmental campaign dedicated to the Syr Darya River Day (Khujand, October); meeting with students of the Tajik Technical University named after academicians M.S. Osimi (Dushanbe, October); ecological workshop "Glaciers of Tajikistan – a source of fresh water" (Dushanbe, October); interview to the "My City" radio program (October); roundtable "Implementation of the Aarhus Convention principles, environmental education, and the community's role in environmental protection" (Bokhtar, November 14); contests

¹³⁶ construction of the 11 MW Sebzor HPP started in late 2020. It will provide green energy to more than 227 thousand people in Roshtkala district of GBAO and 468 thousand people in the border areas of neighboring Afghanistan. A total of \$84 million in grants was raised for the construction of the Sebzor HPP

¹³⁷ an international trust fund for glaciers' preservation will be established, and a high-level international conference will be held in Dushanbe in 2025

¹³⁸ approved by PP RT No.209 of 03.05.2010

¹³⁹ approved by PP RT No.116 of 03.04.2021

among students on “Protection of glaciers of Tajikistan – a factor of ecologization in cities and villages of the country” and among media professionals “Glaciers of Tajikistan – a source of clean water and a basis for development of green economy”, etc.

The [Promoting Transboundary Climate Risk Management in Central Asia/CRM CA](#) project (BMZ, GIZ, 2022-2026) organized: study tour along the Danube (Munich-Passau, Germany; Linz, Austria, November 6-10); study tour to Germany, including visits to the German Committee for Disaster Risk Reduction and the European Centre for Medium-Range Weather Forecasts (Bonn, December 3-8).

The WB approved a grant for the Tajikistan Preparedness and Resilience to Disasters project (IDA, \$50 million) aimed to strengthen the resilience of key infrastructure and enhance the national capacity.

Capacity building. The following activities were organized: seminars dedicated to the World Water Day and International Decade for Action “Water for Sustainable Development”, 2018-2028 (Main Department of Environmental Protection in Sogd province, March), Earth Day (Sogd province, April 20); scientific-theoretical seminar “Internationalization of Glaciers’ Protection” for students and teachers of the Statistical College (Vakhdat, April 6); consultative seminar “Ensuring an Effective National Adaptation Plan (NAP) Process for Tajikistan” (Dushanbe, August 29-30).

Events. Tajikistan hosted: (1) conferences on “Tajikistan’s Global Initiatives on Water, Climate Change and Glacier Conservation” (Dushanbe, February 20), “Contribution of the Leader of the Nation to the Globalization of Glaciers’ Preservation” (Dushanbe, March 29), “Glaciers – Main Source of Water Resources” (Levakant, April 10), “Glaciers’ Preservation – Guarantee of Fresh Water Abundance” (Khorog, April 12), and the 5th Central Asia Climate Change Conference (CACCC-2023) (Dushanbe, May 16-17); (2) sub-regional workshop on tailings dump safety and prevention of accidental water pollution in CA¹⁴⁰ (May 25-26) and seminar “Action Plan for Implementation of the National Climate Change Adaptation Strategy of the Republic of Tajikistan up to 2030 and for 2024-2026” (October 30); (3) exhibition of paintings of Central Asian artists “Glacier Preservation as a Factor of the Aral Sea Conservation”¹⁴¹ (Dushanbe, September 14).

The Tajik delegation participated in a number of events, including: European Union-Central Asia High-Level Conference: Joining Efforts for Climate Action and Green Transition (Rome, Italy, February 22-24); UN Water Conference (New York, March 22-24); Nevsky International Ecological Congress (Saint-Petersburg, Russian Federation, May 25-26); 7th Assembly of the Global Environment Facility (Vancouver, Canada, August 24); International Conference on Combating Sand and Dust Storms (Tehran, IRI, September 9-10);

45th session of the UNESCO World Heritage Committee (Saudi Arabia, September 10-25); 22nd CAREC Ministerial Conference (Tbilisi, Georgia, November 30); COP28 (Dubai, UAE, November 30-December 12). At COP28, a detailed financing plan for the Nationally Determined Contributions/NDCs was presented at the National Pavilion of Tajikistan (December 5); a side event “Roadmap 2025: International Year of Glaciers’ Protection” and “Climate Change and its Impact on the Cryosphere” was organized by the Agency for Hydrometeorology in cooperation with the WMO (December 11).

Tajik experts attended the workshop on Droughtmap ASB tool (Tashkent, May 3-5) and the 4th meeting of the Regional Working Group on a Regional Strategy for Adaptation to Climate Change in Central Asia (Almaty, July 4-5).

In 2023, the tugai forests of the Tigrovaya Balka Nature Reserve were inscribed on the UNESCO World Heritage List (September 20).



Regional and international cooperation. The Tajik delegation took part in the ICSD meeting (Astana, September 5). See [ICSD of Central Asia](#).

The issues of cooperation on climate change and environmental protection were discussed with representatives of the Global Green Growth Institute/GGGI (Seoul, South Korea, November 16-17); Mr. Nik Nazmi Nik Ahmed, Minister of Natural Resources, Environment and Climate Change of Malaysia (Dubai, UAE, December 9); Sheikh Dr. Faleh bin Nasser, Minister of Environment and Climate Change of Qatar (Dubai, UAE, December 10).

As part of the Green Central Asia Initiative, a joint meeting was held between the heads of Central

¹⁴⁰ as part of the [Green Central Asia Initiative](#) by the German Federal Foreign Office

¹⁴¹ the exhibition was opened within the framework of the 5th Consultative Meeting of Heads of State of Central Asia and the regular meeting of the Council of Heads of Founder-States of the International Fund for Saving the Aral Sea (IFAS)

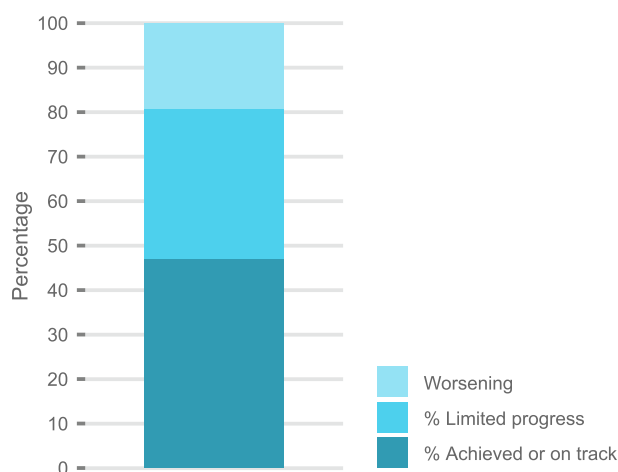
Asian institutions and the Regional Working Group on Glacier Monitoring and Modeling in Central Asia. This led to the signing of a [Memorandum of Understanding and Cooperation](#) aimed at developing and agreeing on a common regional methodology for monitoring, assessing, and forecasting glaciers to strengthen regional coordination and address deficiencies in precipitation, snow cover, and glacier behavior prediction. The goal is also to develop a unified approach for research and development of relevant models in the region (Tashkent, March 17). CA institutions that signed the Memorandum participated in a scientific expedition to Tuyuksu glacier located in Kazakhstan, where they learned how to conduct glaciological research and identify boundaries of open and buried glaciers to compile a catalog of glaciers (August 20-28).

SDGs in Tajikistan

Tajikistan's second¹⁴² Voluntary National Review "Green Development for a Bright, Sustainable and Inclusive Future" was presented at the High-Level Political Forum. The Review includes an assessment of the progress made in implementing SDGs in 2015-2022. It also contains conclusions and recommendations, which are published on the official website of the [High-Level Political Forum](#) (New York, July 19).

Tajikistan was ranked 85th out of 166 countries in the [annual sustainable development rating](#) published by the UN and Bertelsmann Fund.

Status of SDG targets for Tajikistan (% trend indicators)



Source: <https://dashboards.sdindex.org/profiles/tajikistan>

Events. Dushanbe hosted: a roundtable on presentation of the Draft VNR of the Republic of Tajikistan ([April 26](#)); a workshop¹⁴³ to harmonize and validate SDG indicators and their interrelationships (November 15-17).

The Tajik delegation participated in: 10th Asia-Pacific Forum on Sustainable Development (Bangkok, Thailand, March 27-30); High-Level Political Forum (New York, [July 10-20](#)); SDG Summit (New York, September 19-20).

Emergencies and Natural Disasters

Latest developments in legislation. The "State Program for Bank Protection in the Republic of Tajikistan, 2023-2027" (PP RT No.186 of 29.04.2023) was adopted to organize bank protection, build dikes and other relevant structures, enhance other protection measures for the population and national economy, and increase public awareness and responsibility.

The implementation of the "Medium-term State Program for Protection of the Population and Territories against Emergency Situations, 2023-2028" is currently underway. This significant development was discussed at the extended meeting of the National Platform for Disaster Risk Reduction (September 22)¹⁴⁴.

Emergency situations. In 2023, Tajikistan experienced 557 natural disasters and emergencies, a decrease from the 697 recorded in 2022. Avalanches were the most frequent, accounting for 60.14% of all incidents. Other disasters included heavy rains, floods, mudslides.

Tajikistan

Eastern Europe and Central Asia



OVERVIEW INDICATORS



SDG Dashboards and Trends



Dashboards: ● SDG achieved ● Challenges remain ● Significant challenges remain ● Major challenges remain ● Information unavailable
Trends: ↑ On track or maintaining SDG achievement → Moderately improving → Stagnating ↓ Decreasing → Trend information unavailable

Source: <https://dashboards.sdindex.org/profiles/tajikistan>

¹⁴² First VNR was prepared by Tajikistan with the UN support in 2017

¹⁴³ as part of the project on development of a regional information platform on the SDGs for Central Asian countries, implemented by the UNDP in Kazakhstan and the Institute for Economic Research with the support of EU

¹⁴⁴ established by Government Resolution No. 98 of March 2012

des (19.38%), landslides (3.95%), earthquakes (8.44%), and rockfalls (4.67%). These natural disasters resulted in material damage to the population and economy amounting to 76.7 million TJS.

Preventive measures. To mitigate the risks associated with the flood season and prevent potential natural disasters in hazardous areas, proactive measures were undertaken. These included strengthening riverbanks, clearing mudflats, and improving drainage systems by clearing drains, channels, flumes, and gutters.

Projects. As part of the: (1) [National Disaster Risk Management](#) project (ADB), dedicated and medical equipment was transferred to divisions of the Tajik Committee for Emergency Situations and State Defense¹⁴⁵ (CESSD) (Dushanbe, October 18), and medical equipment was also transferred to the medical center of Sanoat village of Zoli Zar rural council in J. Balkhi district (Khatlon province, December 6); (2) [Preparedness and Resilience to Disasters](#) project (WB, IDA), a Framework Document for Environmental and Social Measures was prepared; divisions of the CESSD were provided with modern equipment and technical facilities; work is underway to create a digital map for the CESSD on the territory of the Republic of Tajikistan; (3) [Strengthening Critical Infrastructure against Natural Hazards](#) project (IDA, 2017-2024), assistance was provided to construct the CESSD's National Crisis Management Center (Dushanbe, December 13), protect banks (27.5 km), and develop the "Strategy of Financial Protection against Natural Disasters in the Republic of Tajikistan until 2037".¹⁴⁶

Events. Dushanbe hosted: Asian Conference on Disaster Risk Reduction (October 20), 8th Regional Expert Group Meeting on "Building Disaster Resilience: Using Data, Technology and Policy for a Safer Future" (December 7-8).

Tajikistan organized a number of events dedicated to the International Day for Disaster Reduction in Bokhtar, Kulyab, Nurek, Khujand, Guliston, Buston, Khorog, Tursunzade cities and Rudaki district (October 10) and in Dushanbe (October 12, October 13 and October 14).

The Tajik delegation participated in the Asian Conference on Disaster Risk Reduction (Sendai, Japan, March 10-12) and the Regional Forum – Meeting of Heads of Emergency Agencies of CA countries (Almaty, November 10).

International cooperation. Tajikistan and Iran signed a Memorandum of Understanding on natural and man-made emergency management (November 8).

The issues of cooperation and implementation of projects on disaster risk management were discussed in Dushanbe by the CESSD with the delegations from: King Salman Humanitarian Aid and Relief Center (KSRelief) of the Kingdom of Saudi Arabia (Februa-

ry 23); USAID's Bureau for Humanitarian Assistance headed by Mr. B. Hemingway, USAID Regional Director for South and Central Asia (April 5); Directorate-General for European Civil Protection and Humanitarian Aid Operations (DG ECHO) for East, South-East Asia, Pacific and the Red Crescent Society of Tajikistan (September 25); ADB (October 31).

Foreign Policy and International Cooperation

Working and official visits. In 2023, President E. Rakhmon paid state, official and working visits to Kazakhstan, China, Russia, Kyrgyzstan, Saudi Arabia, the United States, Germany, Uzbekistan, Azerbaijan and the UAE.

Major significant events in Foreign Policy of the Republic of Tajikistan. Tajikistan adheres to an open-door foreign policy, which involves the establishment and development of friendship, good-neighboring relations, partnership, and fruitful cooperation.

The 5th Consultative Meeting of Heads of State chaired by the President of Tajikistan E. Rakhmon was held in Dushanbe. The meeting led to the adoption of several documents, including a Joint Statement of the Heads of State, which noted, inter alia, that the Heads of State were in favor of strengthening regional cooperation on: (1) climate change mitigation and adaptation; (2) disaster risk reduction and elimination of the consequences of emergency situations; (3) desertification control; (4) rational and integrated use of water and energy resources; (5) provision of clean drinking water to the population; (6) environmental protection, ecology, and biodiversity conservation; (7) glaciers; (8) reclamation of uranium tailings dumps. The meeting comprised a number of side events, including: EXPO Central Asia 2023, Economic Forum, regional meeting of members of the Dialogue of Women Leaders of Central Asia, Forum of Scientists, Forum of youth organizations, 1st meeting of Transport Ministers of the CA states (September 14-15).

Dushanbe also hosted: (1) 39th meeting of the Co-ordination Electricity Council of CA, where the heads of energy sectors from Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan and CDC "Energy" discussed the issues of cooperation in the field of integrated and rational use of fuel, energy and water resources (May 3-5); (2) 5th Central Asia Climate Change Conference (May 16-17); (3) meeting of foreign ministers of the CA countries (September 13); (4) Dushanbe 2023 International Investment Forum (September 29-30).

Development of alliances and strategic partnerships. In May, E. Rakhmon paid a state visit to Kazakhstan, where a number of documents on bilateral cooperation were signed. These documents included the Declaration on Allied Cooperation between the Republic of Tajikistan and the Republic of Kazakhstan. The parties also discussed different aspects of bilateral cooperation, including water and energy (May 3-4).

¹⁴⁵ Committee for Emergency Situations and State Defense under the Government of the Republic of Tajikistan

¹⁴⁶ approved by PP RT No.504 of 25.10.2022

See [Cooperation between the Countries of Central Asia on Water and Other Matters](#).

The President of Tajikistan participated in the 1st Trilateral Summit of the Presidents of Turkmenistan, Tajikistan and Uzbekistan, where rational use of water resources of the Amu Darya River, development of cooperation on energy, transportation, and logistics, etc. were discussed. A Joint Statement was adopted as a result of the Summit (Ashgabat, Turkmenistan, August 4). See [Cooperation between the Countries of Central Asia on Water and Other Matters](#).

Within the **CIS**, Tajikistan attended the meetings of: (1) CIS Council of Heads of State (Bishkek, October 13), Council of Heads of Government (Sochi, Russia, June 8; Bishkek, October 26; Moscow, December 18); (3) Council of Foreign Ministers (Samarkand, Uzbekistan, April 14; Bishkek, October 12); (4) Economic Council (Moscow, March 17; September 22, online; Moscow, December 8), as well as the informal Summit of the Heads of CIS Member-States (Saint Petersburg, Russia, December 26).

Within the **SCO**, Tajikistan participated in the meetings of the SCO Council of Heads of State (July 4, online), the SCO Council of Heads of Government (Bishkek, October 26), and the SCO Council of Foreign Ministers (Panaji, India, May 4-5).

Within the framework of regional cooperation, the Tajik delegation participated in: (1) expert meeting "Central Asia-2030: Images of the Future" (Astana, January 20); (2) 1st Central Asian Interparliamentary Forum, which adopted the Turkistan Declaration (Turkistan, Kazakhstan, February 9-10); (3) 6th Central Asia-Russia Ministerial Meeting (Samarkand, Uzbekistan, April 14); (4) 4th Central Asia-China Ministerial Meeting (Xi'an, PRC, April 27); (5) 13th meeting of Deputy Foreign Ministers of the CA states (Bishkek, November 27-28).

Chairmanship in IFAS¹⁴⁷. IFAS celebrated its 30th anniversary in 2023. In the course of the year, the following events were held: (1) international conference "Central Asia: Towards Sustainable Future through a Strong Regional Institution" (Dushanbe, 5-7 June), ahead of which IFAS organizations organized national and regional events; (2) meeting of the IFAS Board, where topical issues were discussed on the Fund's activities and prospects for further interaction between the Founder-States within the Organization (Dushanbe, June 5); (3) meetings of the Working Group on Institutional and Legal Improvement of IFAS.

A regular meeting of the Council of Heads of IFAS Founder-States was held. It resulted in a number of documents, including the Dushanbe Statement of the Heads of IFAS Founder-States (Dushanbe, September 15). Chairmanship in IFAS passed from Tajikistan to Kazakhstan. The EC IFAS prepared [IFAS Report for 2020-2023](#). See ["International Fund for Saving the Aral Sea"](#).

Promotion of the national interests and reinforcement of the country's image. Tajikistan leads the [Dushanbe Water Process](#)¹⁴⁸. The Republic of Tajikistan and the Kingdom of the Netherlands, as Co-Chairs¹⁴⁹ of the UN Water Conference¹⁵⁰, held several events, including: (1) multilateral thematic webinars for stakeholders "Preparing for the Water Conference and Water Agenda" (January 17-18, online); (2) panel discussion "Water, Economics and Trade: Exploring Commitments for the UN 2023 Water Conference" (Geneva, Switzerland, February 6); (3) briefings on the UN Water Conference (Beijing, February 8; Hague, the Netherlands, [February 17](#); Paris, [March 6](#); Kuwait, March 8; Islamabad, Pakistan, [March 13](#); Astana, March 13; Tehran, IRI, [March 15](#); Rabat, Morocco, [March 16](#)); (4) IWMI led conference "Transformative Future for Water Security" (Cape Town, SRA, February 15-1); (5) meeting on the forthcoming UN Water Conference (Seoul, [March 2](#)), etc.

In the run-up to the UN Water Conference and as part of the New York Water Week, the Water House started its work¹⁵¹ (March 20). The opening ceremony of the exhibition "History of Development of Tajikistan", where the President of Tajikistan delivered a welcoming speech, took place; "Water and Navruz – Two Sources of Human Life" and ["Water Unites Us"](#) (March 21) were organized as well.

The UN Water Conference¹⁵² was organized in conjunction with World Water Day (New York, March 22-24). The [Conference agenda](#) included: opening and closing ceremonies; 6 plenaries; 5 interactive dialogues; 2 leadership segments; 4 special and 500 additional interventions, including side-events on the International Year of Glaciers' Preservation-2025¹⁵³ (March 22) and "Transforming Global Economic Institutions for the Common Good: A Wake Up Call from the Global Commission on the Economics of Water" ([March 22](#)); cultural events.

Ahead of the Conference, the RUN BLUE Global Water Marathon ended¹⁵⁴.

¹⁴⁷ Tajikistan chaired the IFAS in 2019-2023

¹⁴⁸ Initiative to support the goals of the International Decade of Action "Water for Sustainable Development", 2018-2028, which is implemented through international conferences held once every two years by the Government of the Republic of Tajikistan in cooperation with the UN

¹⁴⁹ noted by the Resolution [A/75/212](#) of 21.12.2020 at the 48th plenary meeting of the 75th UNGA Session

¹⁵⁰ UN Conference on the Midterm Comprehensive Review of the Implementation of the Objectives of the International Decade for Action, "Water for Sustainable Development", 2018-2028

¹⁵¹ a platform for carrying out and localizing water-related activities

¹⁵² UN Conference on the Midterm Comprehensive Review of the Implementation of the Objectives of the International Decade for Action, "Water for Sustainable Development", 2018-2028

¹⁵³ Pursuant to the Resolution [A/77/158](#) of 14.12.2022 of the 53rd plenary meeting of the 77th UNGA Session

¹⁵⁴ started on March 22, 2022 on World Water Day in Australia at the initiative of Min Guli. 200 marathons were held around the world with the participation of more than 200 million people. The marathon aims to draw international attention to the growing water challenge, efforts to make a real difference on the Earth, and to promote the International Decade for Action "Water for Sustainable Development", 2018-2028 and the UN Water Conference in 2023



In 2023, the “Government of Tajikistan and United Nations Sustainable Development Cooperation Framework for the period 2023-2026” was launched; the Framework focuses on inclusive human development, sustainable, inclusive, and green economic growth, integrated management of climate and environmental risks, people-centered governance and rule of law.

The UN General Assembly, at its 99th plenary meeting during the 77th session, unanimously approved Resolution A/77/334,¹⁵⁵ focusing on the “Follow-up to the United Nations Conference on the Midterm Comprehensive Review of the Implementation of the Objectives of the International Decade for Action, “Water for Sustainable Development”, 2018-2028.” The Resolution outlines two key decisions: (1) the convening of a UN Water Conference in 2026. This conference will play a crucial role in accelerating the implementation of SDG 6, which aims to ensure the availability and sustainable management of water and sanitation for all; (2) in 2028, the UN Conference on the Final Comprehensive Review of the Implementation of the Objectives of the International Decade for Action, “Water for Sustainable Development”, 2018-2028 to take stock of the progress.

Speaking at the general debate of the 78th UNGA session, E. Rakhmon: (1) noted that Tajikistan attached special importance to the Sendai Framework for Disaster Risk Reduction and was ready to work with the UN and its structures in this area; (2) expressed gratitude to all member-states for cooperation in adopting the UNGA resolution on declaring 2025 the “International Year of Glaciers’ Preservation” and called for united efforts to implement it; noted that in 2024 Dushanbe will host the 3rd High-Level Conference on implementation of the International Decade of Action “Water for Sustainable Development”, 2018-2028, and in 2025 – International Conference on the Preservation of Glaciers, etc. (New York, September 20).

A Memorandum of Understanding was signed between the Government of the Republic of Tajikistan and the **UN World Food Program**; it lays the foundation for the WFP’s Country Strategic Plan for 2023-2026 (Dushanbe, December 12).

The President of Tajikistan, speaking at the Summit of the **United Nations Special Program for the Economies of Central Asia (SPECA)** in Baku, Azerbaijan on November 24, proposed leveraging SPECA’s potential to drive economic development, promote green energy, foster regional integration, and mitigate the adverse impacts of climate change. He emphasized the importance of focusing on national economic growth and adapting to the challenges of climate change. Notably, Tajikistan is set to assume the chairmanship of SPECA in 2024.

Cooperation between Tajikistan and the **EU** was discussed at the meeting of the President of Tajikistan with the European Council President (June 2, Cholpon-Ata, Kyrgyzstan) and the 10th meeting of the Tajikistan-EU Cooperation Council (Luxembourg, June 26). On the margins of the Global Gateway Forum, Tajikistan’s Foreign Minister and the EU Commissioner for International Partnerships signed a Declaration to allocate €30 million for development of vocational education in Tajikistan. The funds will be used to implement programs to ensure employment for youth and women in agriculture, energy, green and digital industries (Brussels, Belgium, October 25).

The Tajik delegation also took part in: 2nd Meeting of the Heads of the Central Asia States and the EU President (Cholpon-Ata, June 2); Gulf Cooperation Council and Central Asia Summit (Jeddah, Saudi Arabia, July 19); Economic Forum of the CA countries and Germany (Berlin, September 29); 16th Summit of the Council of Heads of ECO Countries (Tashkent, November 9).

Sources:

Official sites of:

President of the Republic of Tajikistan (www.president.tj);

Ministry of Foreign Affairs (<https://mfa.tj>);

Ministry of Economic Development and Trade (<https://medt.tj>);

Ministry of Justice (<http://www.adlia.tj>);

Ministry of Energy and Water Resources (<https://www.mewr.tj>);

Ministry of Agriculture (<https://moa.tj>);

Committee for Emergency Situations and Civil Defense (<https://khf.tj>);

Committee for Environmental Protection (<http://tajnature.tj>);

Agency for Land Reclamation and Irrigation (<https://www.alri.tj>);

Agency for Hydrometeorology (<http://www.meteo.tj>);

Executive Committee of IFAS (<https://ecifas-tj.org>);

“Center for Glacier Research of the National Academy of Sciences of Tajikistan” (<https://cryosphere.tj>);

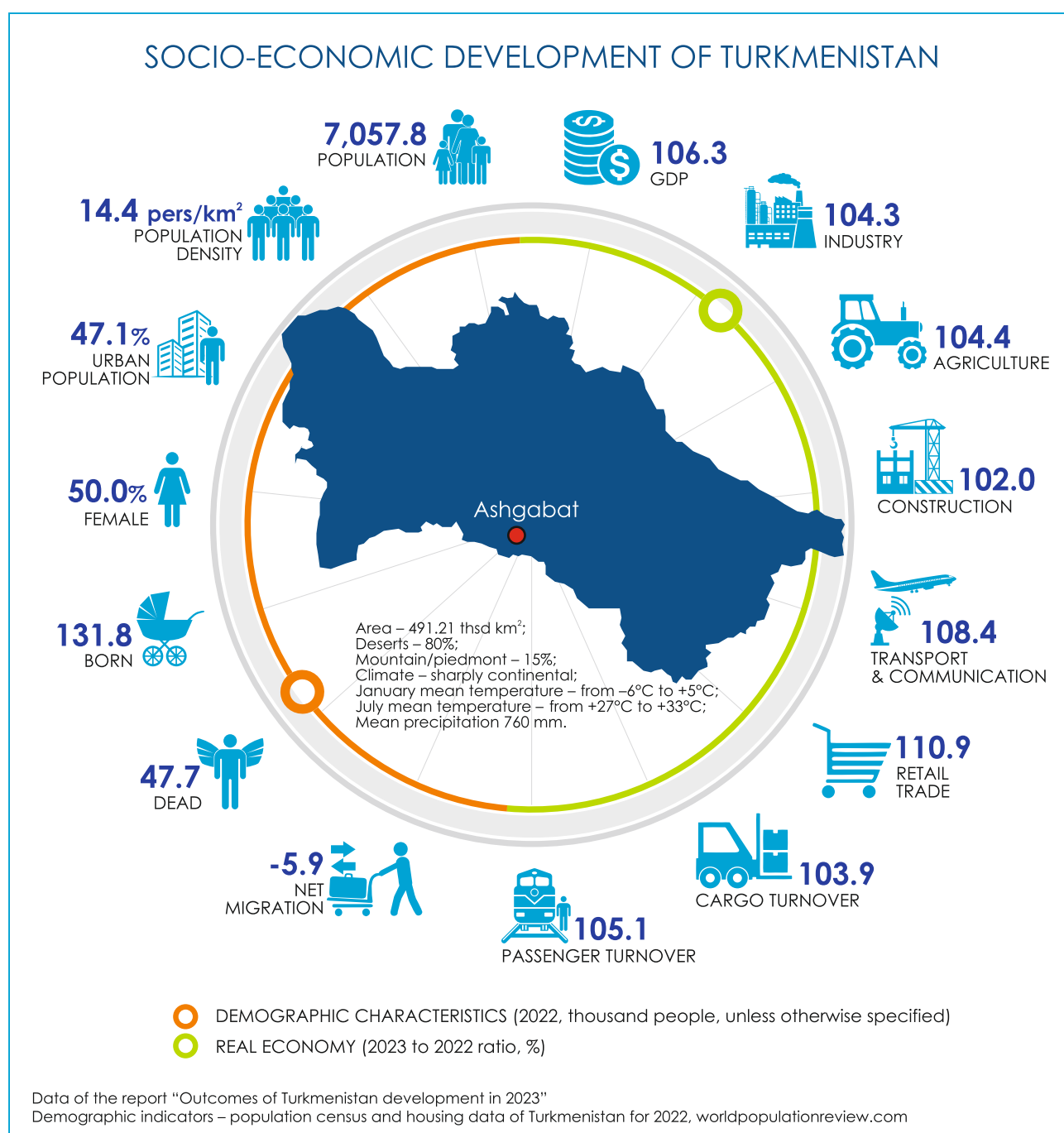
Dushanbe Water Process (<https://dushanbewaterprocess.org>)

Information agencies and sites:

khovar.tj; dialog.tj; east-fruit.com; tajikta.tj; avesta.tj; tj.sputniknews.ru; sugdnews.com; eco.uz; spinform.ru

¹⁵⁵ Resolution was put forward by Tajikistan together with the Kingdom of the Netherlands and the Republic of Senegal and adopted on 01.09.2023

5.4. Turkmenistan



Water sector

Water resources. The water resources of Turkmenistan are comprised of the surface runoff of the Amu Darya (88%), Murgab (6.5%), Tejen (3.5%), and Atrek, Sumbar and Chandyr (1.4%) rivers, as well as the small watercourses of the northeast slopes of Copetdag (0.6%), and the insignificant amounts of groundwater resources and collector-drainage waters. All large rivers of Turkmenistan are transboundary. This means that ap-

proximately 95% of surface water originates outside the country's borders.

Latest developments in legislation. The Law of Turkmenistan "On Amending and Supplementing the Water Code¹⁵⁶ of Turkmenistan", dated June 3, 2023: (1) prescribes to install modern water measurement facilities and devices at watercourses and water conduits at the expense of own funds to ensure accurate accounting of diverted water quantities (Article 41);

¹⁵⁶ Water Code of Turkmenistan was approved in 2016

and (2) changes the title of Article 111 to "Water pricing and tariffs" and adds the following clause: "The rules for water pricing in Turkmenistan shall be approved by the Cabinet of Ministers of Turkmenistan".

National programs. The "Social and Economic Development Program for 2019-2025" is currently being implemented. This program prioritizes the integrated water resource management and collaboration among riparian nations. It aims to conserve water, develop new water sources, prevent soil salinization, and enhance agricultural land reclamation efforts. As part of this program: (1) a dam has been commissioned in the Gyzylarbat Etrap of the Balkan region. This dam is designed to effectively regulate the water level of the 5th aquifer at the 1,002 km of the Karakum Canal; (2) second construction phase of a 1.6 billion m³ reservoir is underway. The new reservoir is to replace the largest silted Zeyid ("15 Years of Turkmenistan's Independence") reservoir in the country. Additionally, the third phase is designed. The total reservoir system capacity will reach 3.8 billion m³; (3) in Mary province, the "Garagumderýagurluşyk" company extended the Karakum Canal's width by 173-456 km; (4) the Technology Center of Turkmenistan's Academy of Sciences developed an innovative drip irrigation injector, which saves water, and eco-granules to desalinate and improve microflora in soil; (5) production of high-tech drip irrigation systems has been launched by "Turkmen Senagat" entity.

Projects. As part of the [demonstration project](#) "Tuyamuyun Hydroelectric Complex,"¹⁵⁷ aimed at promoting regional water-energy cooperation at the facility level, focusing on sedimentation in the Channel Reservoir, training sessions for trainers on interactive Nexus Simulation were conducted in Turkmenistan (Ashgabat, Dashoguz, [February 7 and 10](#)). The project outcomes included the publication of [Nexus Stories](#).

As part of the [USAID Regional Water and Environment Activity](#), the following events were held: (1) 4th and 5th meetings of the National Intersectoral Committee (Ashgabat, February 28, September); (2) Amu Darya River Day: series of events were organized to celebrate this day and included a cleanup and tree planting campaigns and an award ceremony for a children's drawing contest "Amu Darya – a river of friendship" (Dashoguz, April 27); (3) a national robust decision-making support workshop on Amu Darya River basin (Ashgabat, [August 29-30](#)); (4) a workshop on basin planning and management (Ashgabat, [November 2-3](#)).

Representatives of Turkmenistan's water sector took part in the round table "Smart Agriculture: Technologies and Benefits for Central Asia" (September 5, online), 2nd regional robust decision-support workshop on the Amu Darya basin and the 5th Regional Coordination Committee meeting (Khiva, Uzbekistan, [September 25-September 26](#)).

The FAO project "Enhancing Capacities for Climate-Resilient Water Management" was launched to study indigenous hydraulic methods, the country's irrigation and drainage system patterns, and the efficiency of applied innovative irrigation methods and their effectiveness. The project's field practices will be studied in a north-western region, where water sensors and a weather station will be installed, the inter-farm irrigation networks will be improved, and practical training will be conducted.

Capacity building. A series of seminars and meetings on water diplomacy were held at the Training Center for Priority Areas of Diplomacy at the Turkmen MFA's Institute of International Relations (Ashgabat, March 16, 20, April 4, 13, 24-26, May 11, 24, June 22).

As part of the "Embassy Science Fellows" Program, USAID in Turkmenistan and the U.S. Department of State organized a series of lectures for students and faculty of agricultural universities, as well as researchers from the "Turkmensuvlymytlama" Design Institute. Additionally, three-week online training sessions were conducted for specialists from the State Committee for Water Resources and the Technology Center of the Academy of Sciences of Turkmenistan, focusing on water use efficiency and water desalination (September, Ashgabat).

Regional and international cooperation. The next meeting of the Joint Uzbek-Turkmen Intergovernmental Water Commission was held on April 23 in Tashkent. The meeting addressed the issues of water sharing along the Amu Darya River, automation, information sharing, and other points of concern. See [Cooperation between the Countries of Central Asia on Water and Other Matters](#).



The first trilateral Summit of the Heads of State of Turkmenistan, Tajikistan, and Uzbekistan was held on August 4 in Ashgabat. As a result, a Joint Statement was adopted. This statement outlined the parties' agreement to collaborate on: joint research and de-

¹⁵⁷ implemented by Turkmenistan and Uzbekistan under the "Central Asia Nexus Dialogue Project: Fostering Water, Energy and Food Security Nexus and Multi-Sector Investment" (Phase 2, CAREC)

velopment on effective water resource management, protection, and rational use; ensuring the safety of hydraulic structures, reclamation of irrigated lands; effective operation and modernization of water infrastructure; water conservation and reuse, including leveraging existing authorized regional water management organizations. See [Cooperation between the Countries of Central Asia on Water and Other Matters](#).

The President of Turkmenistan, as part of his working visit to Tajikistan, attended the meeting of the Council of Heads of IFAS Founding States. In particular, he highlighted the need for stronger regional cooperation on environmental protection and sustainable development in Central Asia, emphasizing the Aral Sea crisis as a global priority. The President also proposed creating a Regional Center for Climate Technologies in Central Asia (Dushanbe, September 15). See [International Fund for Saving the Aral Sea](#).

The Turkmen delegation actively participated in: (1) 84th (Dushanbe, May 10) and 85th (Tashkent, November 1-2) meetings of ICWC; (2) IFAS Board meeting (Dushanbe, June 5). Representatives of Turkmenistan also took part in meetings of the Working Group on improvement of institutional and legal framework of IFAS. For more details, see [International Fund for Saving the Aral Sea](#).

Events. Ashgabat hosted three important events: (1) scientific conference "Water Resource Management in the Context of Climate Change" (April 22); (2) online forum titled "Creative Ideas for Water Management for the Resilient Water Development in Central Asia" (June 5); (3) international conference on "Financial and Investment Support for Initiatives Aimed at Rational Water Use" ([June 20](#)).

Turkmen delegation participated in a number of events, including: (1) regional workshop on monitoring, assessment and information exchange in Central Asian transboundary basins (Astana, February 1-2); (2) 2023 UN Water Conference and a high-level side-event "Central Asia: Commitments to Water Action Agenda" (New York, [March 22-24](#)); (3) conference "Central Asia: Towards a Sustainable Future through Strong Regional Institution," commemorating IFAS's 30th anniversary (Dushanbe, [June 5-7](#)); (4) workshop "From Climate Modelling to River Flow: High-Resolution Scenarios and Hydrology in Central Asia's climate change context" (Tashkent, October 24-26); (5) extraordinary session of the Intergovernmental Council of the Hydrological Program (Paris, November); (6) Central Asian expert meeting on rational use of water in the context of climate change (Ashgabat, December 7).

Drinking Water Supply

As part of the National Program "Village" and the "General Program for Clean Drinking Water Supply to Settlements," the construction of water treatment

plants and desalination facilities are underway, existing water treatment and pipeline systems are reconstructed, and modern technologies are adopted to ensure water saving. A sewage pumping station and a water supply system connected to a 25,000 m³/day treatment plant are nearing completion in Lebap province.

In Balkan province, it is planned to modernize Jebel-Hazar pipeline, procure equipment for water supply and sanitation in Turkmenbashi and desalination units (50,000 and 70,000 m³/day) for the Avaza and Kiyarly touristic zones, and upgrade water treatment plants and water distribution station in Oglandy and Bereket settlements, respectively. In Ahal province, new "Govshut" (4.15 m³/sec) and "Yashyldep" (2.13 m³/sec) pumping stations are to be constructed in Kakkha and Ak Bugday districts.

Specialists from (1) Dashoguz Hydrogeological Field Office have studied the water quality in several settlements in Akdepe and Boldumsaz etrap; (2) Hydrogeological Field Office of the State Corporation "Turkmengeology" explore aquifers, estimate their stock, study quality and chemical composition, and assess conditions of operating wells.

Agriculture

In 2023, agricultural production growth rate showed 102.6%. Agricultural exports also rose by 10% (as compared to 2022), generating \$135 million in revenue.

Latest developments in legislation. Amendments to Turkmenistan's Land Code¹⁵⁸, addressing administrative setup, were enacted on June 3, 2023.

Agricultural reformation and modernization. As part of efforts to reform the agricultural sector and enhance its efficiency, a separate Ministry of Agriculture was established on the base of the existing Ministry of Agriculture and Environmental Protection (Presidential Decree 240 of July 14, 2023). Mr. Nazarmyrat Nazarmyradov was appointed as the Minister of Agriculture. The setup of the Ministry's Central Office and the Charter were approved in August. Subsequently, the State Commission on Land Resources has been established. This Commission is responsible for rational and efficient use of land resources and regulation of land-related matters. In line with the Resolution "On establishment of research institutes at the Ministry of Agriculture", the existing Agricultural Research and Production Center at the Turkmen Agricultural Institute will be restructured to establish the Grain Growing Research Institute, the Farming Research Institute, and the Cotton Growing Research Institute.

Implementation of national programs. Turkmenistan continues to implement: (1) the Xalq Maslahaty Resolution (of September 25, 2018) on further improvement of reforms in agricultural sector; (2) the Program of Socio-Economic Development in Turkmenistan for

¹⁵⁸ The Land Code of Turkmenistan was approved in 2004

2019-2025 (of February 1, 2019); (3) the Program "Revival of a new era of a powerful state: National Program for Socio-Economic Development in Turkmenistan for 2022-2052 (of February 11, 2022).

Scientists are exploring hydroponics, biological methods to boost soil fertility, combat salinity, and improve seed preparation. The new fine-fiber cotton variety "Yoleten-58", yielding 33.2 centners per hectare – 2.1 centners more than standard – is being tested in Mary and Axal provinces.

The country is modernizing its agricultural sector. Agricultural clusters are established, new greenhouses are being built, while existing ones are expanded, creating jobs and providing fresh produce year-round. The recently developed Daragt app, available on Android and iOS, helps diagnose and treat plant, vegetable, and fruit diseases.

Projects. 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," the following activities were accomplished: a working group meeting (April); two 1-hectare nurseries were established in Baherden and Dashoguz, and a 3-hectare demonstration plot was created at the S.A. Niyazov Agricultural University (January); equipment for rapid analysis of soil, water, and plants was purchased. To supply livestock farms and population in desert communities, water infrastructure was built, including 6 wells and 6 sardobas (60 m³ each) in Baherden district, Akhal province and 2 wells and 2 sardobas in Dashoguz and Lebap provinces. Workshops were held on sustainable pasture management and preventing salinization in pilot regions (June-October).

In 2023, the Project "Conservation and Sustainable Management of Land Resources and Ecosystems in the Aral Sea Basin" (UNDP/GEF) organized in Turkmenistan: (1) roundtable discussion; (2) dialogue "The Role of Women and Girls in Combating Climate Change" (March 7); (3) practical horticulture training (March 14 and September 14); (4) workshop on water diplomacy (April 25); (5) information youth campaigns on climate for the World Day to Combat Desertification (June 17); (6) poster contest for #HerLand #HerRights campaign (June 17-July 10); (7) capacity-building workshop on land degradation neutrality (July 27); (8) environmental quiz event for youth, co-organized by UNDP and USAID (December 2).

The FAO Project "Support for the Establishment of a Digital Land Cadastre" was launched with: (1) an inception workshop (June 6); (2) the online training on remote sensing to aid in the identification and mapping of crops (June 7-9); (3) trainings for project participants, which covered the basics of Global Navigation Satellite System technologies and their application in geodesy and cadastre, coordinate systems used in geodesy, and the main methods of condu-

cting satellite cadastre and geodetic work (November 28-29).

Regional and international cooperation. A Turkmen delegation visited Uzbekistan to explore early and fine-fiber cotton varieties for their further cultivation in Turkmenistan and discussed cooperation in horticulture and potato seed production (January 7-14).

During President S. Berdymuhamedov's visit to Tajikistan, a "Roadmap" for enhanced agricultural cooperation for 2023-2025 was signed between the Tajik Ministry of Agriculture and the Turkmen Ministry of Agriculture and Environmental Protection¹⁵⁹ (May 10-11). See [Cooperation between the Countries of Central Asia on Water and Other Matters](#).

Meetings were held in Ashgabat between: (1) the President of Turkmenistan and the Deputy Chairman of the CIS Seed Production Council and the President of the "Seeds" Association (June 15), and the Chairman of CLAAS and the Eastern Committee of the German Economy (September 26); (2) farmers and Grimme Company's expert on potato and sugar beet cultivation (August 23-24); (3) the Halk Maslahaty Chairman and the heads of John Deere, CLAAS, and the Eastern Committee of the German Economy (September 26); (4) the Minister of Foreign Affairs and the FAO Subregional Coordinator for Central Asia (December 10).

Events. Ashgabat hosted: (1) roundtable discussion (January 20); (2) International conference "Partnership for Food Security in the context of Climate Change" (March 9-10).¹⁶⁰ The Conference communiqué was published in six UN languages as an official document of the 77th UN General Assembly; (3) Conference "Opportunities of using geospatial technologies in agriculture" (November); (4) International food technology exhibition "Agro-Pak Turkmenistan-2023" (November 28-30).

Turkmen delegation took part in: (1) online meeting of Central Asian agriculture ministers on financing agriculture to boost production (February 15); (2) "GreenTech Amsterdam" exhibition (Amsterdam, June 13-15); (3) Summit "Agribusiness in Central Asia: Integration, Modernization, Success" (Issyk-Kul, Kyrgyzstan, August 27-29); (4) 2nd Meeting of Agriculture Ministers of the Organization of Turkic States and Agribusiness Forum (Baku, September 26); (5) AGRITECHNICA-2023 exhibition (Hanover, Germany, November 12-18).

Energy

The Ministry of Energy operates 12 power plants with a total capacity of 6,511.2 MW. From January to November, power generation and related services reached 112.6%. Power generation growth rates were 102.7%.

¹⁵⁹ by Presidential Decree No.240 of July 14, 2023, the Ministry of Agriculture and Environmental Protection was reorganized into the Ministry of Agriculture

¹⁶⁰ organized in collaboration with FAO and supported by UNDP Turkmenistan

In 2023, the Gindukush Hydro Power Plant on the Murgab River celebrated its 110th anniversary¹⁶¹. This is one of twelve largest plants. The HPP has a total capacity of 1.2 MW with three 400 kW turbines and is considered a historical structure.

Latest developments in legislature. The Law "On Renewable Energy Sources" was amended on November 25, 2023, clarifying the roles of government agencies in regulating renewable energy, in particular "State regulation in the field of renewable energy sources is under authority the Cabinet of Ministers, the Ministry of Energy, the Ministry of Agriculture, the Ministry of Environmental Protection, and local executive bodies."

A Law "On Energy Efficiency and Energy Saving" has been drafted to create legal, economic and institutional framework for energy conservation and energy efficiency.

Mr. Annageldi Saparov was appointed as the Minister of Energy (Presidential Decree of July 14, 2023).

National strategies and programs. Turkmenistan is actively working under the "State Program on Energy Saving (2018-2024)," the "Program for Energy Diplomacy Development, 2021-2025," the "National Strategy for Renewable Energy Development until 2030," and the "Roadmap for Hydrogen Energy Cooperation, 2022-2023."

The construction of a 1,574 MW combined-cycle power plant was launched in Turkmenbashi district, Balkan province.¹⁶² New gas turbines were commissioned for electricity generation at the Turkmenbashi Oil Refinery. Additionally, the Mary-Ahal transmission line was launched, connecting to the national grid via digital communication systems (November 3).

A meeting of the Inter-departmental Working Group on hydrogen energy development in Turkmenistan was held on July 11 in Ashgabat. The meeting focused on the implementation of the Roadmap for development of international cooperation in hydrogen energy in 2022–2023 and the study of international best practices in this field. Scientists from the Hydrogen Energy Center at the International University of Oil and Gas of Turkmenistan are conducting research on hydrogen fuel production.

Projects. Under the "Sustainable Energy Connectivity in Central Asia (SECCA)" project, several events were held: (1) a Steering Committee meeting (Astana, April 4); (2) a regional workshop on end energy consumption statistics (Tashkent, July 11-13); (3) a lecture was delivered for senior students of the State Energy Institute of Turkmenistan on integrated energy and climate planning, RE project cycle, and climate financing (Mary, September 12); (4) EU-Turkmenistan Sustainable Energy Days 2023 campaign, featuring con-

ferences "Sustainable energy in Turkmenistan: prospects and challenges" (December 14) and "Energy efficiency in Turkmenistan: successes and prospects" (December 14-15) in Mary, environmental activities for schoolchildren, and an awarding ceremony for the most energy-efficient school in Mary (December 15). Lectures were also held for university staff and students of the State Energy Institute (December 15).

On December 18, SECCA key experts delivered a presentation on "Sustainable Energy Development in the Context of Global Climate Change: SECCA Project Approaches" for the students of the Institute of International Relations (IIR) under the Ministry of Foreign Affairs of Turkmenistan. A student of IIR and winner of the regional contest #Reels4SustainableEnergy was awarded a certificate (Astana).

The "Sustainable Cities in Turkmenistan: Integrated Green Urban Development in Ashgabat and Awaza" project (UNDP/GEF) held workshops in Mary: (1) "Exploring the possibilities of developing renewable energy sources in the climatic conditions of Turkmenistan. Methods of conducting an energy survey of residential and public buildings" (March 28); (2) "Studying the features of the operation of energy-saving lamps in climatic conditions of Turkmenistan. Possibility of using waste as an alternative source of energy" (May 16); (3) "Studying international experience in the development of legal framework with respect to energy conservation and energy efficiency, as well as on the solid waste management as a renewable energy resource" (September 13). Additionally, a meeting on energy-efficient practices in the hotel sector took place on October 20 in Avaza.

Capacity building. The OSCE Center in Ashgabat held online workshops on integrating renewable energy into the power grid (April 25-26) and "Energy Diplomacy Tools: OSCE Best Practices" (May 22-23).

A seminar series on "Energy Diplomacy" was ended at the Training Center of the Institute of International Relations on July 7 (Ashgabat). The Technology Center of the Academy of Sciences of Turkmenistan hosted a workshop themed "The Role of Energy in National Economy of Turkmenistan" on September 5 (Ashgabat). The State Energy Institute of Turkmenistan organized a workshop in Mary titled "Joint Efforts of UAE and Turkmenistan in Renewable Energy" on September 20.

Regional and international cooperation. National energy companies of Turkmenistan "Turkmenenergo" and Afghanistan Da Afghanistan Breshna Sherkat (DABS) have signed: (1) an agreement to extend the contract for supplies of Turkmen electricity at preferential prices in 2023 (Ashgabat, January); and (2) a protocol on the project of electricity transmission to the Nur-al-Jihad substation in Herat province (Kabul, August).

¹⁶¹ construction started in 1909 in Bairamali town, commissioned in 1913

¹⁶² four gas and two steam turbines will be installed at the combined cycle power plant

Projects. As part of the project "Developing a National Adaptation Planning Process in Turkmenistan" (UNDP/GCF), multiple events were organized, including: (1) a series of trainings on climate adaptation and water, transboundary cooperation (June 13-14, July 11-12, September 12-14, September 19-21, November 13-15, and November 16-17); (2) roundtables in Ashgabat on establishment of a coordination mechanism for inter-sectoral adaptation planning (April 14) and on approaches for the development of the monitoring and evaluation system for assessing the climate change adaptation efforts (November 23); (3) meetings with experts from the Austrian company Hydrophil GmbH to discuss challenges related to climate change (Ashgabat and Dashoguz province, November 27-December 6); (4) trainings¹⁶⁵ review institutional and practical aspects of climate change adaptation at different levels of management and their integration into the national adaptation planning process (Ashgabat, February 21-22, May 30-31).

The "Sustainable Cities in Turkmenistan: Integrated Green Urban Development in Ashgabat and Awaza" Project (GEF/UNDP) organized: (1) a dialogue on the role of women and girls in climate actions (Ashgabat, March 7); (2) a working meeting (Ashgabat, April 12); (3) series of events on occasion of the World Environment Day (Balkan region, June 5).

As part of the "Regional Climate Action Transparency Hub for Central Asia" Project (ReCATH/ICAT), Turkmenistan's representatives joined: (1) regional training sessions on greenhouse gas inventory tools (Tashkent, February 27-March 3) and improvement of data collection and analytical tools for forecasting greenhouse gas emissions in Central Asian countries¹⁶⁶ (Dushanbe, May 18-19); (2) first meeting of the Technical Working Group on Transparency in Adaptation to Climate Change in Central Asia (Bishkek, July 13-14); (3) regional training on climate action transparency (Ashgabat, October 9-12); (4) side event at COP28 (Dubai, December 3).

Capacity building. The Ministry of Education and the National Institute of Education of Turkmenistan, in partnership with UNICEF, developed and distributed new *methodological manuals on climate adaptation*¹⁶⁷ for secondary school teachers.

In 2023, the Turkmen State Pedagogical Institute named after S. Seydi established a UNESCO Chair on "Environmental Education for Sustainable Development." The Turkmen Agricultural Institute in Dashoguz also launched a UNESCO Club titled "Environmental Protection – Key Concept of Sustainable Development."

The Innovative Scientific and Educational Center of the International University of Oil and Gas has got a

license for environmental activities, including development of ecological passports, technology regulations, technical specifications, and state standards for new products.

Regional and international cooperation. The Turkmen delegation participated in the 3rd Meeting of the ICSD Advisory Council (Astana, September 4-5). See *ICSD of Central Asia*.

As part of *German Green Central Asia Initiative*,¹⁶⁸ experts from Turkmenistan took part in: (1) a workshop on the *Droughtmap ASB* tool (Tashkent, May 3-5); (2) a subregional workshop on mine tailings safety and the prevention of accidental water pollution in Central Asia (Dushanbe, May 25-26); (3) 4th regional inter-governmental working group meeting on the Regional Climate Change Adaptation Strategy in Central Asia (Almaty, July 4-5).

UNDP and the British Embassy in Turkmenistan hosted the 6th Coordination Meeting of the Climate Development Partners Group in Ashgabat on September 15. Discussions covered preparations for COP28, progress on Turkmenistan's 4th National Communication (NC4¹⁶⁹) on Climate Change to the UNFCCC, and the development of a National Greenhouse Gas Inventory System, as part of the country's *Nationally Determined Contribution* submitted in 2022.

The Ministry of Environmental Protection signed Memoranda of Understanding with: (1) International Union for Conservation of Nature (IUCN), to enhance cooperation in policy management, biodiversity protection, and related areas (November 10); (2) UNEP, outlining activities for exchanging information on innovative climate technologies and solutions (November 13).

Several important meetings took place between: (1) the President of Turkmenistan and the U.S. Special Presidential Envoy for Climate (New York, September 19); (2) the Foreign Minister and the UNEP Executive Director Inger Andersen (January 16), GGGI Director-General Frank Rijsberman, who proposed signing a "Host Country Agreement" and establishing a GGGI office in Turkmenistan (February 23), Head of Iran's Environmental Protection Organization Ali Salajegheh (March 10); (3) the Turkmenistan's Permanent Representative to the UN, Aksoltan Ataeva and the UN Deputy Secretary-General and ESCAP Executive Secretary Armida Salsiah Alisjahbana (July 12).

The OSCE Center in Ashgabat organized seminars on the procedures and protocols under the *Espoo Convention*¹⁷⁰ (April 27-28, online) and on monitoring and scientific research on the reduction of methane emissions (Ashgabat, November 6-7). Additionally, a

¹⁶⁵ jointly with the IOM project "Mainstreaming the Migration, Environment and Climate Change Nexus into Climate-Related National Planning Processes"

¹⁶⁶ within the framework of CACCC 2023

¹⁶⁷ to incorporate climate change adaptation into the 5 environment-related subjects of primary and secondary education

¹⁶⁸ aimed to improve access to information and risk analyses to enable participating countries to assess the impact of climate change more accurately and to take preventive measures

¹⁶⁹ to fulfil its commitments under UNFCCC, Turkmenistan launched its NC1 in 2000, NC2 in 2010 and NC3 in 2015

¹⁷⁰ Convention on Environmental Impact Assessment in a Transboundary Context, adopted in Espoo, Finland in 1991, in force since 1997

training course on the production of TV programmes covering environmental issues for media professionals was held on [October 10-13](#) in Ashgabat.

Youth delegates from Turkmenistan participated in the Central Asian Youth Environmental Camp held from October 1-5 in Samarkand, Uzbekistan.

Events. Many important events were organized in Turkmenistan, including: (1) roundtable for government institutions, civil society, and private companies to discuss and draft regulations to the 2019 Law on Environmental Audit (January 18); (2) tree-planting campaign (March 18); (3) eco-festival in honor of Earth Day (April 22); (4) scientific-practical conference on environmental achievements and international cooperation (May 5 and June 5); (5) roundtable on "green" economy and digital transformation ([May 11](#)); (6) competition on "Environmental Protection and Culture" for 10th- and 11th-grade students (May 17); (7) international conference titled "Arkadag City – An Environmentally Friendly Land of Beautiful Nature" (July 3); (8) youth conference on climate change (October 3); (9) regional conference on the role of youth in addressing climate issues (November 21); (10) roundtable on approaches to combating desertification and land degradation, featuring expertise from the National Institute of Deserts, Flora, and Fauna (NIDFF, Turkmenistan) and the Kostyakov All-Russian Research Institute of Hydraulic Engineering and Melioration (November).

Turkmen delegation took part in key international events, including, among many others: (1) 7th High-Level Conference "EU-Central Asia" on Environment and Water Resources (Rome, February 23-24); (2) UNGA High-Level Meeting on the transition to zero waste (New York, [March 29-31](#)); (3) 9th Meeting of Foreign Ministers and Parliamentarians of Central Asian Countries on Climate Change (Tashkent, April 19); (4) 79th ESCAP session (Bangkok, [May 15-19](#)); (5) 5th Central Asian Climate Change Conference (Dushanbe, May 16-17); (6) 10th Nevsky International Ecological Congress (St. Petersburg, [May 26](#)); (7) International Conference "Central Asia: Towards Sustainable Future through Strong Regional Institution" (Dushanbe, [June 5-7](#)); (8) 7th Ministerial Conference on Environment and Health (Budapest, July 5-7); (9) OSCE High-level Conference on Climate Change (Vienna, [July 7](#)); (10) 1st International Conference on Enhancing Expert Services for Environmental Issues in Central Asia (Almaty, September 25-26).

At Turkmenistan's [initiative](#), 79th ESCAP session unanimously adopted a [resolution](#) on "Consideration of the modalities for the establishment of the United Nations special programme for the Aral Sea basin". The resolution highlights the need for regional and international cooperation to address and minimize disasters in the basin and proposes to carry out a study on the necessity, viability and modalities of establishing the United Nations special programme for the Aral Sea basin (Bangkok, [May 15-19](#)).

The desert ecosystems of Turkmenistan – Bereketli Garagum, Gaplanyr, Repetek, and Yerajy – were formally inscribed on the UNESCO World Heritage List as components of the transnational serial nomination "Cold Winter Deserts of Turan" during the 45th session of the World Heritage Committee (Riyadh, [September 20](#)).

During his speech at COP28, the President of Turkmenistan: (1) announced the country's accession to the Global Methane Pledge; (2) highlighted the importance of the recently signed [Memorandum of Understanding](#) between the Ministry of Environmental Protection of Turkmenistan and UNEP; (3) welcomed the proposed Declaration on Climate and Health; (4) expressed full support for the Emirates Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action and stated Turkmenistan's readiness to back the initiative for establishing the COP28 Coalition for High Ambition Multilevel Partnerships for Climate Actions. The President emphasized Turkmenistan's commitment to fostering regional and global cooperation in areas such as agriculture, ecology, energy, finance, and health, aligning with the objectives of the Emirati Declaration while safeguarding national interests (December 1-2).

Emergencies

Turkmenistan is making progress in strengthening its capacity for disaster risk management and fulfilling its obligations under the Sendai Framework for Disaster Risk Reduction 2015-2030. Speaking at the recent Meeting of the Heads of Emergency Agencies of Central Asia, the head of Turkmenistan's delegation noted that the Regional Forum is an effective mechanism for strengthening international and regional cooperation in disaster risk reduction and contributes to the emergence of regional initiatives in the field of climate change adaptation, prevention, and response to emergencies (Almaty, [November 10](#)).

Breach of the Karakum Canal.¹⁷² In January, ice jams caused by unusually severe frosts, combined with the unique features of the terrain, led to a breach in the Karakum Canal. As a result, a significant portion of water was diverted into the desert. This caused flooding in some settlements, while leaving others, conversely, without water.

For more than 15 days, a substantial amount of water from the Karakum Canal flowed into the desert, spreading over 35 kilometers into the sands. At the breach site, the water split into smaller streams, creating thousands of small lakes among the dunes and larger lakes on flat areas such as takyr and salt marshes. By February 11, the largest of these lakes covered approximately 10 square kilometers. The image shows that the dam has been fully repaired, the breach sealed, and the flow of water into the desert halted.

¹⁷¹ in co-authorship with Azerbaijan, Armenia, China, Singapore, Turkey and Philippines

¹⁷² based on <https://meteojournal.ru/>



Source: <https://meteojournal.ru/eshhyo-raz-o-vozmozhno-krupneishem-proryve-karakumskogo-kanala/>

Drought. Since late 2022, a lack of rainfall in parts of the Dashoguz, Balkan, and Ahal provinces, coupled with unusually warm weather in March and April, has led to drought conditions across much of the country.



Hauzhan Reservoir (Source: <https://meteojournal.ru/vodohranilishha-turkmenistana-rekordno-obmeleli/>)

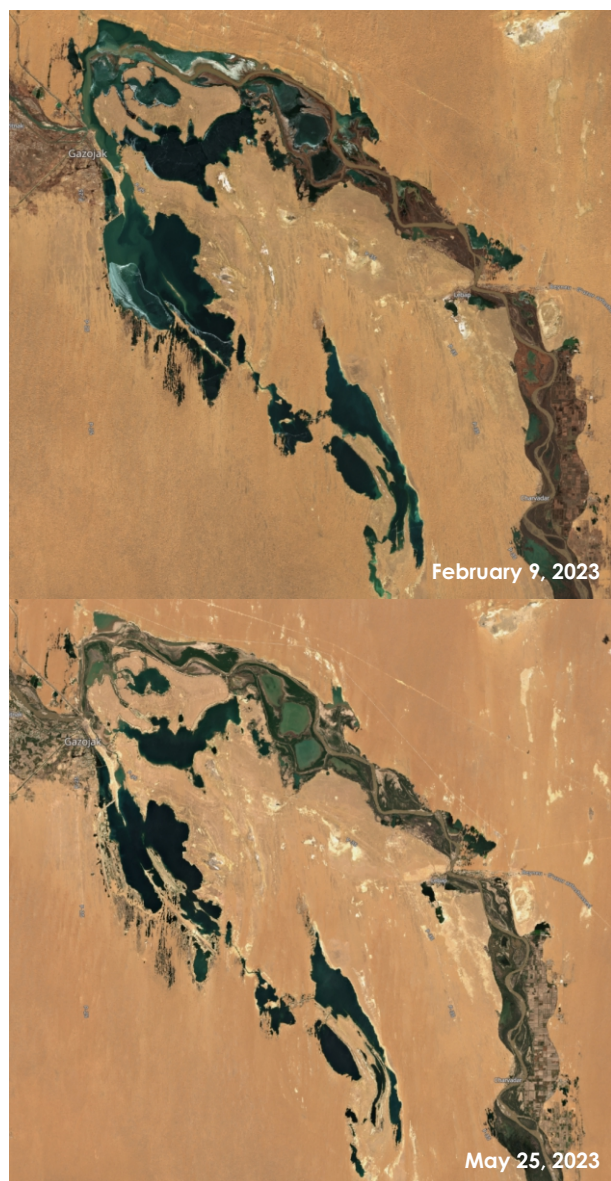
By May, water levels in reservoirs along the Karakum Canal, including the Hauzhan and Kopetdag reservoirs, had dropped significantly. As of May 25, 2023, the Hauzhan Reservoir covered an area of 75.4 km², nearly half its size during the same period in the dry year of 2021, when it measured 135.5 km².

The water surface area of the Kopetdag Reservoir decreased from 25.5 km² to 17.7 km² between April 26 and May 25, 2023, a reduction of 7.8 km² or 30.6%. Along with the previously mentioned factors, the breach in the Karakum Canal is likely another contributing cause of the reservoir's depletion.



Kopetdag Reservoir (Source: <https://meteojournal.ru/vodohranilishha-turkmenistana-rekordno-obmeleli/>)

Low water levels were also observed in the reservoirs of the transboundary Tuyamuyun hydroscheme. By the second half of May, the water volume had dropped to 2.3 km³.



Reservoirs of the Tuyamuyun Hydrocomplex
(Source: <https://meteojournal.ru/vodohranilishha-turkmenistana-rekordno-obmeleli/>)

Projects. As part of the program¹⁷³ "Strengthening Local and National Capacities for Emergency Preparedness and Response in High Earthquake and Natural hazard prone Countries of Central Asia" (USAID), the following events were held: (1) series of capacity-building events on emergency preparedness, involving 10 target schools and over 300 staff members and volunteers from the National Red Crescent Society of Turkmenistan in Ashgabat, Ahal, Lebap, and Dashoguz regions; (2) regional training on disaster preparedness (Almaty, July 19-21).

The regional project "Climate Risk Management in Central Asia" (GIZ) has been launched. Specialists from Turkmenistan took part in the kick-off meeting of the Steering Committee (Tashkent, June 13-14) and a study tour to Germany (Bonn, December 3-8).

Capacity building. The UNDP office in Turkmenistan organized a national training on post-disaster recovery planning and needs assessment (Ashgabat, April 11-12). Experts from Turkmenistan also participated in an online CIS emergency notification drill for natural and man-made disasters, conducted by the Ministry of Emergency Situations of Belarus (July 31).

SDGs in Turkmenistan

Turkmenistan continued working on the Sustainable Development Cooperation Framework between United Nations and the Government of Turkmenistan, 2021-2025. Meetings of the Joint Steering Committee focused on safety, environmental protection, and food security (Ashgabat, April 20 and December 14).

The Government of Turkmenistan and the UN held the 7th meeting of the Joint expert group on SDGs financing. The participants outlined a roadmap on the basis of the Development Finance Assessment report, reviewed a step-by-step guidance on the development of financial strategies of the Integrated National Financing Framework, possible SDG accelerators (Ashgabat, May 8).

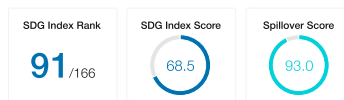
At the High-Level Political Forum on Sustainable Development, Turkmenistan presented its second¹⁷⁴ Voluntary National Review (VNR). It covered progress on SDGs set before the country by 2030, COVID-19 response, strategic policy documents, and six extra goals for Turkmenistan (healthcare, inclusive education, food security, gender equality, improved well-being, and environmental protection) (New York, July 10-19).

Turkmenistan

Eastern Europe and Central Asia



OVERVIEW INDICATORS



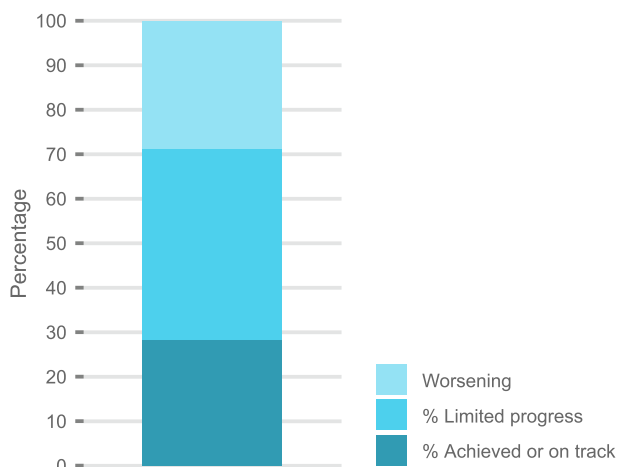
SDG Dashboards and Trends



¹⁷³ financed by USAID and implemented in five CA countries

¹⁷⁴ first VNR was launched in 2019

Status of SDG targets for Turkmenistan (% trend indicators)



Progress on the SDGs in Turkmenistan was discussed at a roundtable of the National Working Group on the Implementation of the SDGs (Ashgabat, [August 25](#)).

Turkmenistan ranked 91st out of 166 countries in the annual Sustainable Development Goals Index published by the UN and the Bertelsmann Foundation.

Projects. As part of the project "[Partnering for SDG acceleration, phase II](#)" (UNDP): (1) technical assistance was provided in the [preparation](#) of the second Voluntary National Review (VNR) and to the State Committee of Turkmenistan on Statistics in the [development](#) of an online national SDG reporting platform¹⁷⁵; (2) a webinar on "Formation of indicators of the State budget with reference to the SDGs" ([May 31](#), online) and a workshop on establishing a Regional Sustainable Development Goals (SDGs) Information Platform for Central Asian countries ([November 6-10](#), Ashgabat) were held.

SUSTAINABLE
DEVELOPMENT GOALS



[Home](#) [About SDG](#)

SUSTAINABLE DEVELOPMENT GOALS

The Sustainable Development Goals are a global call for action to end poverty, protect the earth's environment and climate, and ensure that people around the world can enjoy peace and prosperity.



Source: SDG Main Page on the State Committee on Statistics, <https://sdg.stat.gov.tm/en/>

As part of "Young SDG Ambassadors" project¹⁷⁶ (UNDP), the Ambassadors took part in: (1) a meeting on the SDGs (Ashgabat, January 25); (2) 2nd International Conference and Exhibition "International Transport and Transit Corridors: Interconnection and Develop-

ment-2023" (Ashgabat, [May 3](#)); (3) panel discussion "Affordable and Clean Energy from a Youth Perspective"¹⁷⁷ (Ashgabat, [June 14](#)); (4) youth conference on climate change (Dashoguz, October 3). A tree-planting campaign was also held (April 20, Ashgabat).

¹⁷⁵ a set of indicators to measure progress on each of SDGs

¹⁷⁶ young SDG Ambassadors were selected from April 4 to May 30 2022 to raise awareness on SDGs (3rd cohort of Ambassadors)

¹⁷⁷ within the framework of the International scientific and practical conference "Energy prospects, new technologies for the development of hydrocarbon deposits"

Capacity building. To raise awareness among youth about SDGs, the following events were held: (1) meetings by UNDP specialists with students of various universities in the country, where such issues as the role of the younger generation in combating the climate crisis, Turkmenistan's international climate initiatives, etc. were discussed (Ashgabat, May, June); (2) an introductory workshop on the assessment and strategic planning of the SDG process (Ashgabat, November).

Events. Ashgabat hosted: (1) international scientific-practical conference "Sustainable Development Goals: Youth Policy and Innovative Technologies" (February 15); (2) roundtable on SDG implementation at the Institute of International Relations (March 20); (3) youth conference at the UNDP office (April 4-5), (4) training on SDGs (April 17).

Turkmen delegation attended the 10th Asia-Pacific Forum on Sustainable Development (Bangkok, March 27-30), the High-Level Political Forum on Sustainable Development (New York, July 10-20), and the SDG Summit (New York, September 19-20).

Cooperation on the Caspian Sea

Throughout the year, the Inter-ministerial Commission of Turkmenistan on the Caspian Sea had meetings to review its activities in 2022 and set plans for 2023, discuss outcomes of the 6th Caspian Summit, and

evaluate progress on decisions and agreements made during the meeting of the heads of the Caspian states. Other topics included preparations for events marking the Day of the Caspian Sea and other related activities (Ashgabat, February 1, July 29, August 30).

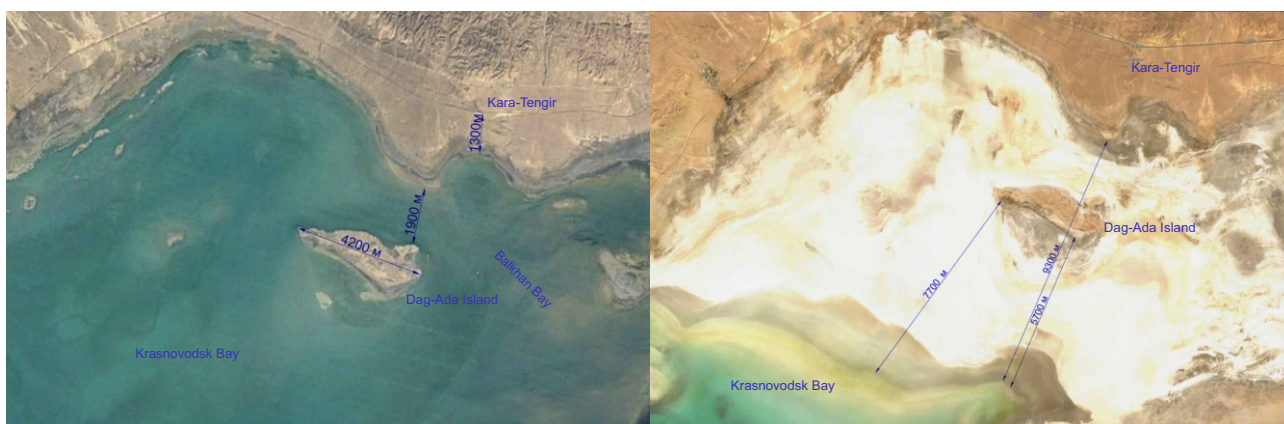
The Ministry of Foreign Affairs of Turkmenistan hosted the sixth meeting of the High-Level Working Group on Caspian Sea Issues. Discussions continued on a draft agreement regarding the method for establishing baselines in the Caspian Sea, with several provisions agreed upon. The meeting concluded with the adoption of a communiqué (September 11-13, Ashgabat).

The International Seaport in Turkmenbashi has been awarded the EcoPorts¹⁷⁸ certificate, granting it the status of a green port integrated into Europe's transport system. The port features carbon protection measures, uses electric cranes, adheres to waste management regulations, and implements innovative technologies to minimize environmental impact.

Fluctuations of the sea level. The Caspian Sea's water level continues to decline, significantly impacting biodiversity and other environmental factors. The primary causes are climate change, reduced river inflows, and increased evaporation rates. As of January 2023, the sea level was approximately 30 cm lower than it was in January 2022.



Images of the coastline near the city of Turkmenbashi in 2004 and 2023 ([Source: https://meteojournal.ru/kaspkom-2023-godu-iz-za-malovodya-na-volge-tretij-god-podryad-uroven-kaspijskogo-morya-prodolzhit-ponizhatsya/](https://meteojournal.ru/kaspkom-2023-godu-iz-za-malovodya-na-volge-tretij-god-podryad-uroven-kaspijskogo-morya-prodolzhit-ponizhatsya/))



Images of Dag-Ada Island in 2009 and 2023 ([Source: https://meteojournal.ru/dag-ada-ostrov-kotorogo-net/](https://meteojournal.ru/dag-ada-ostrov-kotorogo-net/))

¹⁷⁸ this certificate was issued as part of the OSCE Project "Promoting green ports and connectivity in the Caspian Sea region" and provides for establishment of a digital platform for easier data sharing between the ports of Turkmenistan, Azerbaijan and Kazakhstan. This system, in turn, will be connected to larger modern ports in Europe

As a result of the declining sea level, the northeastern part of Turkmenbashi Bay has completely vanished. Over the past six years, the shoreline has receded by 12 kilometers, with the sea level dropping by 71 cm since 2017 and 145 cm since 2011.



Northeastern part of Turkmenbashi Bay
(Source: <https://www.hronikatm.com/2023/10/caspian-shoreline-moved-12-km/>)

Events. Turkmenistan hosted: (1) a scientific-practical conference "Caspian Sea – the sea of peace and friendship"¹⁷⁹ and an exhibition (August 12); (2) 9th training course "Caspian Sea – Sustainable Development and Management," during which a Memorandum of Understanding and Cooperation was signed between the Caspian Sea Institute and the International Ocean Institute (September 11-20); (3) online five-party expert consultations on finalizing the draft intergovernmental agreement on research cooperation on the Caspian Sea (October 30).

At the 78th session of the UN General Assembly, the President of Turkmenistan proposed creating the "Caspian Environmental Initiative" as an international platform to address the protection of the Caspian Sea, its biological resources, and key environmental issues (New York, September 19).

Turkmen delegation participated in multiple events, including: (1) 15th Caspian Energy Forum (Moscow, April 20); (2) international forum "Transport Logistics of the Caspian Sea Region 2023" (Astrakhan, Russia, April 26-27); (3) 1st Caspian Scientific and Educational Congress (Astrakhan, Russia, May 29); (4) Forum "Caspian Sea 2023: Paths to Sustainable Development" (Astrakhan, Russia, May 30-31); (5) 32nd session of the UNESCO's Intergovernmental Oceanographic Commission (Paris, June 21-30); (6) Caspian Media Forum (Astrakhan, Russia, September 18-19); (7) Ministerial consultations under the Framework Convention for the Protection of the Marine Environment of the Caspian Sea (Geneva, Switzerland, September 21-22);

(8) 9th conference "Preserving the Caspian Ecosystem amid Oil and Gas Development" (Astrakhan, Russia, November 10); (9) Meeting of Foreign Ministers of the five Caspian states (Moscow, December 5); (10) meeting of the Ad Hoc Expert Group on the organization of the Secretariat of the Framework Convention (Baku, December 18-19).

Regional and international cooperation. A Memorandum of Understanding was signed between Russia's Federal Fisheries Agency and Turkmenistan's Ministry of Finance and Economy, establishing a foundation for bilateral cooperation in fisheries. The focus is on managing shared marine biological resources in the Caspian Sea (Ashgabat, January 20). A regular meeting of the Joint Working Group on the delimitation of the bottom of the Caspian Sea between the Republic of Azerbaijan and Turkmenistan was held. Discussions on the provisions of the draft agreement between the two countries were continued (Ashgabat, January 24-25).

Foreign Policy and International Cooperation

During 2023, the President of Turkmenistan paid state, official, and working visits to a number of countries, including China (January, May), Bahrain (February), Azerbaijan (March), Qatar (March), Russia (May), Tajikistan (May, September), the United Kingdom (May), Turkey (June, October), Saudi Arabia (July), Hungary (August), the United States (September), Kyrgyzstan (October), Uzbekistan (November), and the United Arab Emirates (December).

Key developments in the foreign policy of Turkmenistan

Turkmenistan continues to pursue its foreign policy strategy as outlined in the Concept of Turkmenistan's Foreign Policy for 2022-2028¹⁸⁰. This strategy focuses on ensuring peace and security at both the regional and global levels, maintaining the country's permanent neutrality, and enhancing cooperation in areas such as diplomacy, trade, culture, energy, transport, and environment.

Turkmenistan initiated a UNGA resolution¹⁸¹ to declare 2023 the **International Year of Dialogue as a Guarantee of Peace**. The Strategy for International Cooperation of the Youth of Turkmenistan, 2023-2030 has been adopted.

Related events hosted in Turkmenistan included: (1) international conference "The Role of Neutral States in Strengthening Security, Stability and Dialogue in the OSCE Region", bringing together parliamentarians of CA countries, Eastern and Western Europe,

¹⁷⁹ on occasion of the Day of the Caspian Sea, which is celebrated since the Framework Convention for the protection of marine environment of the Caspian Sea (Tehran Convention) entered into force in 2006

¹⁸⁰ approved by Presidential Decree of 12.07.2022

¹⁸¹ A/77/L.10, the resolution adopted by consensus on 6 December 2022 during the 45th plenary meeting of the 77th UNGA. The resolution was co-authored by 68 Member States

diplomatic missions, academia and media (Ashgabat, [May 16](#)); (2) international youth forum "Dialogue as a Guarantee of Peace"¹⁸², which discussed topics like climate change, digital diplomacy, and youth initiatives, along with the first meeting "Dialogue of Youth from the Central Asian Countries" (Arkadag, October 2); (3) Cooperation Forum "Central Asia – Republic of Korea", focusing on regional issues, youth policies, and joint initiatives for international cooperation and achieving SDGs (Ashgabat, November 1).

Development of alliances and strategic partnerships.

Ties are expanding and comprehensive cooperation between Turkmenistan and the countries of Central Asia and the CIS is strengthening.

During the official visit of the President S. Berdymukhamedov to Tajikistan, 23 documents on bilateral cooperation were signed, and a wide range of current regional and international issues were discussed (May 10-11). In the run-up to the visit to Dushanbe, a joint Turkmen-Tajik business forum (May 8) and a round table "Development of scientific and technical cooperation between research institutions of Tajikistan and Turkmenistan: challenges and prospects" (May 8) were held. See [Cooperation between the Countries of Central Asia on Water and Other Matters](#).

The matters related to rational use of water resources of the Amu Darya River, development of cooperation in the area of energy, transport, logistics, etc. were discussed at the first trilateral Summit of the Presidents of Turkmenistan, Tajikistan, and Uzbekistan. A Joint Statement was adopted following the summit (Ashgabat, [August 4](#)). See [Cooperation between the Countries of Central Asia on Water and Other Matters](#).

Turkmenistan, as an associate member of the CIS, participated in the following CIS meetings: (1) Council of Heads of State (Bishkek, October 13); (2) Council of Heads of Government (Sochi, Russia, June 8; Bishkek, October 26; Moscow, December 18); (3) Council of Foreign Ministers (Samarkand, Uzbekistan, April 14; Bishkek, October 12); (4) Economic Council (Moscow, March 17; June 23, online; September 22, online; Moscow, December 8), as well as in the informal Summit of Heads of State (Saint Petersburg, Russia, December 26).

In the capacity of an honorary guest of the Shanghai Cooperation Organization (SCO), the President of Turkmenistan participated in the meeting of the Council of SCO Heads of States ([July 4](#), online). Turkmen delegation attended also the 22nd Meeting of the Council of SCO Heads of Governments (Bishkek, [October 26](#)).

As part of its regional cooperation efforts, the delegation of Turkmenistan participated in important events, including: (1) Expert Meeting "Central Asia-2030: Visions of the Future" (Astana, January 20); (2) First Inter-

Parliamentary Forum of Central Asian States, resulting in the adoption of the Turkistan Declaration (Turkistan, [February 9-10](#)); (3) 6th Ministerial Meeting in the "Central Asia – Russia" format (Samarkand, Uzbekistan [April 14](#)); (4) 4th Meeting of Foreign Ministers in the "Central Asia – China" format (Xi'an, China, [April 27](#)); (5) XIV Kazan International Economic Forum "Russia – Islamic World: Kazan Forum 2023" (Kazan, Russia, [May 18-20](#)); (6) XVI Forum of Creative and Scientific Intelligentsia of CIS Countries (Bishkek, September 12-13); (7) First Meeting of Transport Ministers of Central Asian states (Dushanbe, [September 13](#)); (8) Meeting of Foreign Ministers of Central Asian countries (Dushanbe, [September 13](#)); (9) 5th Consultative Meeting of the Heads of Central Asian States (Dushanbe, [September 14](#)); (10) Meeting of the Council of Heads of IFAS Founding States (Dushanbe, [September 15](#)); (11) Economic Forum of Central Asian States "Digital Economy, E-Commerce, and Innovation" (Dushanbe, [September 14](#)); (12) 13th Meeting of Deputy Ministers of Central Asian States (Bishkek, [November 27-28](#)).

Turkmenistan has joined to the Basic Multilateral Agreement¹⁸³ on International Transport for the development of the Europe-Caucasus-Asia corridor ([November 14](#)).

Promotion of the national interests and reinforcement of the country's image

Turkmenistan actively cooperates with the UN, EU, OSCE, OIC, ECO, and other organizations.

United Nations. At Turkmenistan's initiative, the UN adopted the following resolutions in 2023: (1) [A/77/L.53](#) "Role of the United Nations Regional Centre for Preventive Diplomacy for Central Asia" (February 17); (2) [A/RES/78/148](#) "Strengthening the links between all modes of transport to achieve the Sustainable Development Goals" (December 19); (3) [A/RES/78/149](#) "The pivotal role of reliable and stable energy connectivity in driving sustainable development" (December 21).

The following final documents of international conferences held in Ashgabat were published as official documents of the 77th session of the UN General Assembly: (1) Final declaration of the first ministerial meeting of the Group of Friends of Neutrality for Peace, Security and Sustainable Development, [A/77/778](#) ([December 10, 2022](#)); (2) Communiqué of the international conference on cooperation on food security in the context of climate change, [A/77/837](#) ([March 9-10](#)); (3) Summary statement of the participants of the international conference on international transport and transit corridors: interconnectedness and development 2023, [A/77/899](#) ([May 3-4](#)); (4) Outcome statement of the Central Asian regional conference on the role of neutral States in strengthening security, stability and dialogue in the Organization for Security and Cooperation in Europe region, [A/77/909](#) ([May 16](#)).

¹⁸² organized by the Parliament of Turkmenistan jointly with the OSCE Parliamentary Assembly under the "Call for action – Helsinki +50" Initiative

¹⁸³ Agreement was adopted in 1998 in Baku, Azerbaijan. The document aims to develop economic relations, trade and transport communication in Europe, Black and Caspian Seas and Asia

UNGA at the initiative of Turkmenistan, resolution [A/77/L.67](#), declared November 26 as the World Sustainable Transport Day ([May 16](#)). The head of state addressed the 78th session of the UN General Assembly, where he emphasized the importance of tackling climate and environmental challenges (September 19).

Turkmenistan works actively with the **UN specialized agencies**. On February 27, the ceremony of signing documents between the ministries, state agencies, public organizations of Turkmenistan and the representative offices of the structural divisions of the UN in Turkmenistan – UNDP, UNFPA, UNICEF was held in Ashgabat. In 2023, Turkmenistan was elected to the Executive Board of UNICEF¹⁸⁴ for 2024-2026 ([April 5](#)) and to the ECOSOC Commission on Population and Development for 2024-2028 ([December 5](#)). Some of events that took place in 2023 included: (1) a meeting with UNESCO Cluster Office Director, Golda El-Khoury, to discuss including Turkmen cultural heritage in the UNESCO World Heritage List ([May 15](#)); (2) the ceremony of signing a Roadmap for cooperation between the Ministry of Education of Turkmenistan and the UNESCO's Institute for Information Technologies in Education for 2024-2025 ([November 9](#)); (3) a conference "Turkmenistan – UNESCO: Cooperation for Prosperity" ([August 17](#)).

Turkmenistan took part in: Ministerial Meeting of SPECA Member States (Geneva, Switzerland, [April 17](#)); 70th Session of the UN Economic Commission for Europe (UNECE) dedicated to digital and "green" transformation (Geneva, Switzerland, [April 18-19](#)); First Summit of Heads of State and Government of SPECA Member Countries (Baku, [November 24](#)).

As part of work within the **Economic Cooperation Organization (ECO)**, the Minister of Foreign Affairs participated in the 26th Meeting of the Council of Foreign Ministers of ECO Member States. The parties addressed such issues as enhancing regional cooperation in the area of investments, green economy, energy, food security, environment, agriculture, digitalization, and transport (Tashkent, January 24). The President of Turkmenistan attended the **16th ECO Summit** (Tashkent, [November 9](#)).

European Union. The 22nd annual meeting of the joint Turkmenistan-EU committee was held and focused on bilateral agenda issues and the implementation of the EU Strategy for Central Asia (Brussels, [December 19](#)). Key meetings included: (1) discussion with a delegation led by the EU Special Representative for CA, Ambassador Terhi Hakala ([April 20](#)); (2) meeting of Special Representatives for Afghanistan in the "EU-Central Asia" format, which concluded with a Joint Statement ([May 26](#)); (3) meeting between the President of Turkmenistan and the President of the European Council (New York, [September 18](#)). A press conference marking the 30th anniversary of the Turkmenistan-EU partnership was organized in Ashgabat ([November 22](#)).

OSCE. A new office of OSCE Center was opened in Ashgabat ([June 1](#)). Meetings were held with the

President of the OSCE Parliamentary Assembly, Margareta Cederfelt ([May 16](#)) and with the OSCE Secretary General, Helga Schmid ([June 1](#)). The discussions focused on the current state and future development of Turkmenistan's cooperation with the OSCE, particularly in political and economic spheres, energy and environmental security, and the promotion of parliamentary diplomacy. A meeting between the foreign ministers of CA countries and the OSCE Secretary General took place on [October 31](#).

Turkmen delegation took part in multiple international events, including: (1) meeting of the heads of foreign ministries of the countries of CA and the US in the "C5+1" format (Astana, [February 28](#)); (2) meeting of the Council of Foreign Ministers of the Organization of Islamic Cooperation (OIC) (Nouakchott, Mauritania, [March 16-17](#)); (3) First CA-China Summit (Xi'an, China, [May 18-19](#)); (4) High-Level Summit in the CA-EU format (Cholpon-Ata, Kyrgyzstan, [June 2](#)); (5) first High-Level Meeting of CA-US ("C5+1") (New York, [September 19](#)); (6) first meeting of Speakers of Parliaments of CA and the Republic of Korea "Development of mutually beneficial relations focused on the future" (Seoul, [September 19](#)); (7) meeting of heads of delegations in the "Central Asia + Germany" format (Berlin, [September 29](#)); (8) Belt and Road Forum (Beijing, October 17-18); (9) 19th ministerial meeting "Central Asia-European Union" (Luxembourg, [October 22-23](#)); (10) meeting of foreign ministers of CA and G7 (November 8, online).

Sources:

The official web-sites of:

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Ministry of Justice of Turkmenistan: <http://minjust.gov.tm/>;

Ministry of Energy of Turkmenistan: <https://www.minenergo.gov.tm/>;

Ministry of Economy and Finance of Turkmenistan: <https://fineconomic.gov.tm/>;

State Committee for Water Management of Turkmenistan: <http://turkmenwater.gov.tm/ru/glavnaya/>;

State Committee of Turkmenistan on Statistics: <https://www.stat.gov.tm/>;

Academy of Sciences of Turkmenistan: <https://science.gov.tm/>

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<https://turkmenistan.gov.tm/ru/>;

<http://tdh.gov.tm/ru/>;

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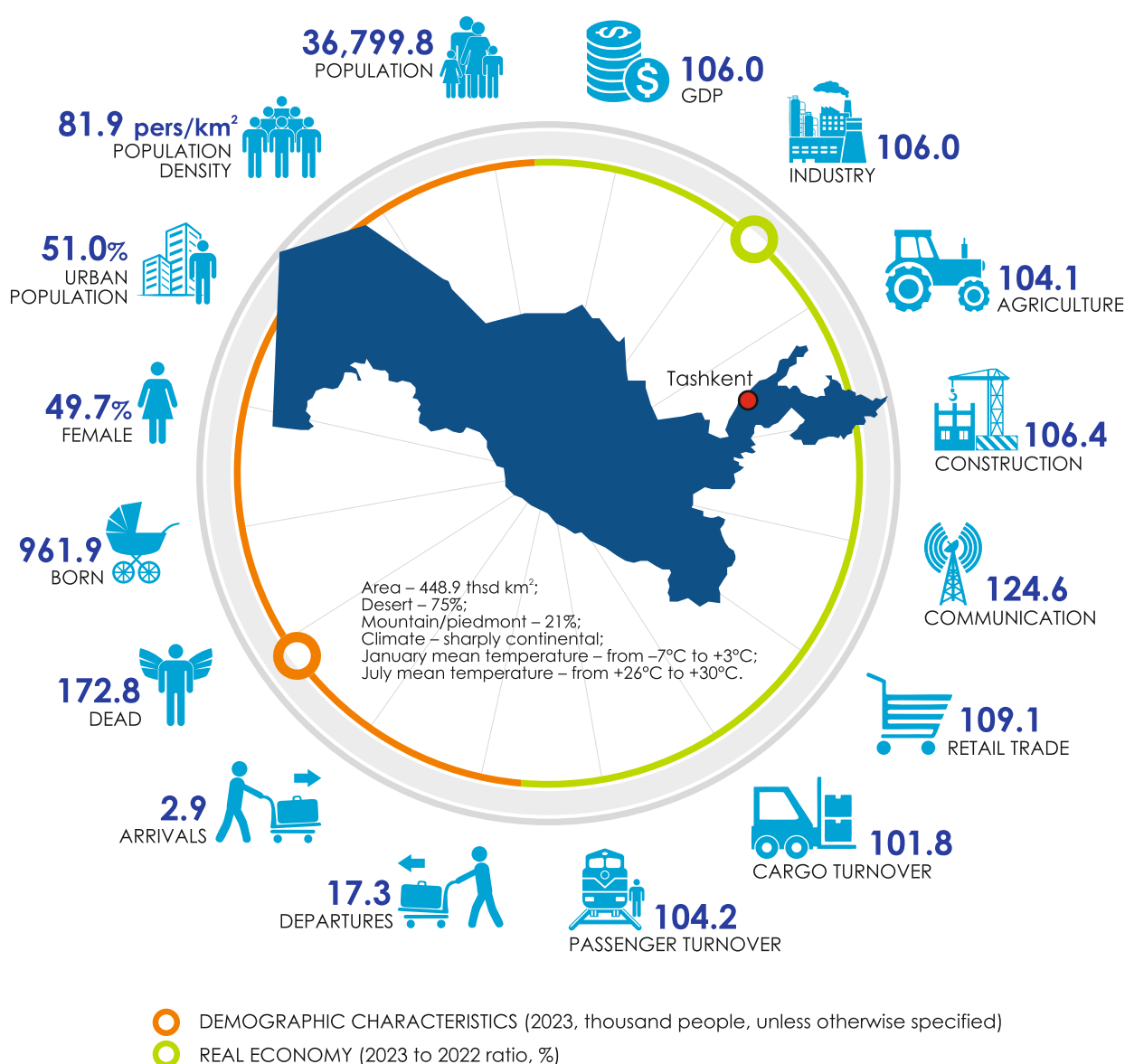
<https://www.parahat.info/>;

<https://ashgabat.in/?lang=ru>

¹⁸⁴ earlier Turkmenistan was elected and served as a member of the UNICEF Executive Board in 2018-2020

5.5. Uzbekistan

SOCIO-ECONOMIC DEVELOPMENT OF UZBEKISTAN



Data by the Statistics Agency under the President of the Republic of Uzbekistan

Water Sector

Water resources. The average annual quantity of water used in Uzbekistan is 51-53 billion m³, of which 80% (approx. 41 km³/year) is got from transboundary rivers. The estimated natural fresh and brackish groundwater deposits potentially yield 27.6 km³/year; however, they are unevenly distributed throughout the country. The water demand is met through a combination of surface water (50.9 km³/year), usable

groundwater (0.5 km³/year), and the reused collector and drainage water (1.6 km³/year). The average water use by sector is as follows: 90-91% – agriculture; 4.5% – municipal sector; 1.4% – industry; 1.2% – fisheries; 0.5% – thermal power; 1% – other sectors¹⁸⁵.

Latest developments in legislation.

■ The Strategy “Uzbekistan-2030” (UP-158 of 09.11.2023) outlines the following key areas for water-saving reforms: (1) fostering a culture of rational water use and

¹⁸⁵ UP-6024 of 10.07.2020 “On approval of the concept of water sector development in the Republic of Uzbekistan for 2020-2030”

enhancing water use efficiency across the nation; (2) guaranteeing the responsible utilization of water resources in the agricultural sector; (3) developing irrigation systems and water-saving technologies, actively promoting their adoption by the private sector and encouraging public-private partnerships; (4) reducing electricity consumption by pumping stations through the widespread implementation of green energy technologies;

■ "The State Program for the implementation of the Development Strategy of New Uzbekistan for 2022-2026 in the Year of Human Care and Quality Education"¹⁸⁶ (UP-27 of 28.02.2023). To ensure stable agricultural water supply in 2023, the document outlines the following objectives: (1) reduce natural water losses in the water supply system by 10% through the establishment of a well-coordinated system and the implementation of water-saving digital technologies; (2) save at least 7 billion cubic meters of water and utilize it for irrigating secondary crops on 300,000 hectares of land through widespread adoption of digital technologies, employing water-saving technologies, timely implementation of necessary irrigation and land reclamation measures.

Several decrees and laws have been adopted: (1) Decree "On urgent measures to improve the water use efficiency" (PP-107 of 04.01.2023) outlines the primary objectives for enhancing water use in 2023. Following this decree, a Resolution "On Measures to Digitalize the Water Accounting System in Agriculture of the Kasbinsky district, Kashkadarya province" (PKM No.371 of 14.08.2023) was issued; (2) Decree "On Measures for the Effective Organization of Public Water Management within the Framework of Administrative Reforms" (UP-101 of 20.06.2023) established the Ministry of Water Management's priority areas, institutional setup, and a "Roadmap" for advancing water management reforms. In accordance with this decree, a Resolution "On Approval of Some Regulatory Documents Governing the Activities of the Inspectorate for Control over the Safety of Water Management Facilities and Water Use under the Ministry of Water Management of the Republic of Uzbekistan" (PKM No.500 of 27.09.2023) was adopted; (3) Law on the safety of hydraulic structures (ZRU-865 of 30.08.2023); (4) Decree "On measures for the organization of work on flood protection by coastal protective dams and structures on the Amu Darya River crossing Khorezm province" (PKM No.365 of 08.11.2023).

Water management system. In the course of implementation of the "Strategy for water management and irrigation development in the Republic of Uzbekistan for 2021-2023"¹⁸⁷, control of 58 large waterworks facilities have been fully automated, including installation of about 9 thousand Smart water devices and more than 6 thousand Diver devices. 1.5 thousand pumping stations were equipped with online water quantity monitoring.

In 2023, a total of 959.9 billion UZS was used for the regular repair and restoration of the water management system. This investment was primarily used for irrigation facilities (711.6 billion UZS or 99% of the total) and land reclamation (248.3 billion UZS or 103% of the total). Key accomplishments under a State Program included infrastructure rehabilitation: reconstructed 392.9 km of canals, 57.7 km of flumes, 230.3 km of surface and 156.0 km of subsurface drainage system, 60 irrigation wells and 6 vertical drainage wells, 58 observation wells, 78 hydraulic structures, and 2 bridges. Additionally, 9.1 km of shorelines were strengthened.

Water-saving technologies. Uzbekistan ranks seventh in the world and first in Central Asia in terms of adoption of water-saving technologies against the total irrigated area. In 2023, water-saving technologies were implemented on 413.1 thousand ha of irrigated area, including drip irrigation – 77.3 thousand ha, sprinkling – 25.4 thousand ha, discrete irrigation – 13 thousand ha. Laser land planning was carried out on 222.8 thousand ha.

Projects. For development of the water sector, \$116.0 million were spent as part of a number of international projects, including: \$17.0 million – "Amu Bukhara irrigation system rehabilitation" (ADB), \$12.3 million – "Fergana Valley water resource management – Phase II" (WB), \$13.1 million – "Karshi pumping cascade rehabilitation-Phase-III" (SFD), \$42.5 million – "Modernization of 95 pumping stations in Bukhara, Navoi, Kashkadarya, Samarkand and Surkhandarya regions" (VEB.RF), \$20.1 million – "South Karakalpakstan water resource management improvement" (WB), \$4.8 million – "Modernization of 118 pumping stations in Andijan, Namangan and Ferghana provinces" (EBRD), \$6.2 million "Climate Adaptive Water Resources Management in the Aral Sea Basin" (ADB).

Other ongoing projects: (1) "Ferghana Valley water resource management – Phase II" (WB), modern equipment was purchased and transferred to water management organizations and training was conducted on its use; a 35 kW solar panel was installed; the Avval-Logon pumping station was built; work was completed on concreting the Akbura canal, reconstruction of the Robdon-1 and Savai-Akburasai canals; training programs were conducted for 1.8 thousand people, and more than 3 thousand farmers and water workers took part in various trainings and seminars (March, November); a delegation of women farmers had a study tour to agricultural and water facilities in Spain (July); (2) "National Water Resources Management Project in Uzbekistan" (NPWRM), Phase II" (SDC), special equipment, textbooks and laboratory equipment were transferred to colleges; a training seminar for women in water management was organized (February 17, March 14, August 31), as well as five-day trainings on the use of modern water measuring devices (April 10-14, May 1-5, May 8-13). A workshop on planning the 3rd phase of the project

¹⁸⁶ in accordance with the tasks defined in the "Development Strategy of New Uzbekistan for 2022-2026" (UP-60 of 28.01.2022 "On the development strategy of new Uzbekistan for 2022-2026")

¹⁸⁷ PP-5005 of 24.02.2021

was held (June 15); (3) "South Karakalpakstan water resource management improvement" (WB), the ceremonial commissioning of the southern part of the Bustan Canal took place (March 7), a seminar on laser land planning was held (June 14); (4) [USAID Regional Water and Vulnerable Environment Activity](#) organized the national celebration of the Amu Darya River Day (April 25-26, September 27), a week-long training course for hydrometers on the topic "IWRM, hydrometry and metrology" (August, October). For other projects, see <http://www.uzaifsa.uz/en/content/ongoing-projects>.

According to the results of the tender for the project "Karshi pumping cascade rehabilitation-Phase-III"¹⁸⁸, a total of \$34.6 million¹⁸⁹ was saved. According to the Resolution of the President of Uzbekistan (No.PP-382 of 30.11.2023), at the expense of the saved funds, a proposal was approved for the modernization of additional 9 pumping units, the purchase of 7 brands of special equipment and 4 dredgers.

Capacity building. The following training events were held among many others: (1) seminars for water professionals on water-saving irrigation technologies (January 20; March 17; July 27); on the use of the CROPAGRO program (July 4), on ensuring the safety of GTS (July 22), on saving electricity in the national grid (August 1), on development of digital technologies in the water sector (September 12); (2) for hydrometers and dispatchers (February 4); (3) for women water workers on the topic "Gender and climate change" (March 9); (4) for employees of the Specialized Water Management Service (March 29); (5) for hydrometers on the topic "On-field use of modern water measuring devices" (April 10-July 14); (6) for heads of ministries and departments of the Republic of Uzbekistan on the basics of water use development strategy (September 29-October 1).

For the effective agricultural water use, [Suvchilar Maktabi](#)/School of Water Workers was launched¹⁹⁰ (May 29).

Events. Several events were organized in the course of the year, including: (1) international conference "A close look at water in Central Asia" (Tashkent, May 18); (2) roundtable dedicated to the 30th anniversary of IFAS (Tashkent, May 23); (3) seminar "Improving the efficiency of water resources management and water use in the Lower Amu Darya basin" (Nukus, August 16); (4) roundtable "Solving environmental and water issues in Uzbekistan: strengthening cooperation between the UN and the government to advance the SDG agenda" ([September 29](#)).

Representatives of Uzbekistan took part in the 25th ICID Congress and the 74th IEC meeting (India, November 5-8).

Regional and international cooperation. Uzbekistan has joined the Protocol on Water and Health of the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes, signed on June 17, 1999 in London (Decree No.PP-362 of 19.11.2023).

The Republic of Uzbekistan and the Kyrgyz Republic: (1) signed the Roadmap for the Kambarata HPP-1 construction project on the Naryn River, (Bishkek, January 6) and the declaration on comprehensive strategic partnership, within which the parties advocated the integrated use of water and energy resources (Bishkek, January 27); (2) conducted the second meeting of the joint Water Management Commission (Tashkent, April 11).

The Adviser to the President of the Republic of Uzbekistan took part in: (1) the third meeting of the joint Uzbek-Turkmen intergovernmental water commission (Tashkent, April 23); (2) the fourth meeting of the IFAS Board (Dushanbe, June 5).

The first meeting on the establishing basin dialogues in the basins of the Amu Darya and the Syr Darya¹⁹¹ took place in Tashkent ([November 30](#)).

ICWC member from Uzbekistan Sh.R.Khamraev participated in the 84th (Dushanbe, May 10) and 85th (Tashkent, November 1-2) meetings of the ICWC. See [IFAS and Other Regional Organizations in Central Asia](#).

Drinking Water Supply

[According](#) to the Central Public Utility Organization (AO Uzsuvtaminot), the coverage by centralized drinking water supply expanded from 74.4% to 77.2%.

Latest developments in legislation. The Resolution "On additional measures for the improvement of drinking water supply and sewerage system" (PP-343 of 24.10.2023) defines the following priority tasks for the phased reform of the drinking water supply and wastewater disposal sector: (1) implement the effective drinking water supply system to the end user, record keeping of drinking water, digitalization of the sector, ensure the provision of uninterrupted, high-quality and secure services; (2) fundamentally improve the corporate governance system, providing for the independent performance of financial and economic functions by organizations of the system; (3) implement widely PPPs in the processes of drinking water distribution and mobilize private investment by creating an attractive investment environment; (4) establish full control of water volumes by installing water meters on existing facilities, networks and end users and reducing the net cost of production and supply costs through

¹⁸⁸ the project is implemented on the basis of PP-2977 and PP-4170

¹⁸⁹ \$19.82 million – borrowed funds of the SFD and \$14.78 million – loans from the Fund for Reconstruction and Development

¹⁹⁰ the project is implemented by Agrobank together with the Ministry of Agriculture of the Republic of Uzbekistan and "Tashkent Institute of Irrigation and Agricultural Mechanization Engineers" National Research University

¹⁹¹ the program was developed within the framework of the Green Central Asia initiative, in accordance with the regional action plan agreed by the Central Asian countries in November 2021

widespread application of energy-saving technologies and renewable sources; (5) improve the financial status of drinking water supply enterprises by establishing a systemic approach to enhance operational efficiency, reduce accounts receivable, and minimize accounts payable; (6) enhance tariff policy by incorporating best practices from international experiences, aligning capital investments and asset management with strategic objectives, and facilitating a gradual transition towards self-financing within the sector; (7) implement public awareness campaigns to promote responsible consumer behavior, including disciplined payment practices, the efficient use of water resources, and foster collaboration with media outlets. Simultaneously, update relevant regulations and standards to align with contemporary requirements.

The Cabinet of Ministers adopted a Resolution "On approval of the Regulations on the implementation of the Obod Kishlok and Obod Mahalla programs through proactive budgeting processes based on public opinion" (PKM No.183 of 03.05.2023) to set a number of measures for the improvement of drinking water supply and sanitation system.

Programs. 5.5 trillion UZS from the state budget and \$225 million (\$185.5 million in 2022) of foreign direct investment were allocated for provision of drinking water supply to the population.

Within the framework of: (1) targeted state programs, 11,207 km of water supply and 593 km of sewer network were laid, 1,740 drinking water supply and sanitation facilities were built and reconstructed; (2) an investment program, 425 km of water supply and 100 km of sewer network were laid under 22 projects.

Projects. As part of the projects: (1) "Improvement of drinking water supply through the Tupalang reservoir", 1.4 trillion UZS were used for laying 147 km of the network, improvement of water supply quality for 1.1 million (40% of the population) living in 273 communities of the Sariasi, Denau, Shurchinsky, Kumkurgan districts; (2) "Improvement of drinking water supply in Jizzakh province through the use of waters from the Zarafshan River", residents of Dustlik, Pakhtakor, Mirzachul districts and the city of Jizzakh have got better drinking water supply.

In 2023, as a result of implementation of all projects, 1.1 million residents in over 2,000 local communities gained access to centralized drinking water supply and 2.5 million residents got improved drinking water supply. In 1,134 settlements lacking centralized drinking water supply, water is provided by 214 specialized vehicles operated by water supply companies and 1,112 specialized vehicles owned by other individuals and legal entities.

Resolution "On measures for the implementation of the project 'Development and modernization of water supply and sewerage systems of Bukhara province (phase 2)' with the participation of the Asian Infrastructure Investment Bank" (PP-266 of 07.08.2023) approved the allocation of a loan in the amount of \$248.40 million. Another Resolution "On measures for the implementation of the project 'Program of comprehensive urban development in the Republic of Uzbekistan' with the participation of the Asian Development Bank"¹⁹² (PP-124 of 19.04.2023) set a preliminary agreement on signature of a loan agreement worth \$59.0 million.

An agreement was signed with the French company "Suez" on the project "Modernization of the drinking water supply system in Surkhandarya province".

Capacity building. Seminars/trainings were held: (1) for specialists of the Central Public Utility Organization (AO Uzsvta'minot)¹⁹³; (2) for employees of the compliance control service of territorial water supply enterprises; (3) on the topics "Improvement of hydraulic component and applying geoinformation systems in the drinking water supply system of cities of republican and regional subordination" (February 24) and "Construction and operation of local structures" (March 15). The meeting of the Korea Green Growth Trust Fund and the "K-Water" company on the online training program "Uzbekistan: Water Academy and capacity building" took place on May 10-23.



Training seminars for specialists of the Central Public Utility Organization (AO Uzsvta'minot)

The AO Uzsvta'minot training center saw significant participation in advanced training courses, with 4,298 employees taking part. To enhance personnel capabilities and gain international insights, 117 specialists undertook training programs in South Korea, Austria, Brazil, and Iran. Notably, at the South Korean academy "K-Water," these specialists focused on "Capacity building in the field of drinking

¹⁹² implementation period is 2023-2027

¹⁹³ within the framework of the project "Raising awareness of journalists and bloggers of Uzbekistan on covering issues of water use and water conservation", implemented since October 2022 by the Center for Journalist Retraining in cooperation with the Canadian Foundation for Support of Local Initiatives

water supply and sanitation in Uzbekistan" (March 6-19) and "The process of water purification and water quality" (April 17-30).

20 laboratories have received certification for fulfilling national quality standards (O'zDst 3410:2019). The number of water quality analyses conducted has increased by 18%, indicating a greater focus on monitoring water safety.

In order to improve the quality and transparency of services provided to consumers, an automated unified billing system for accounting and control of drinking water supply and sanitation services "Uzwater" has been launched. The SuvniAsra system has been implemented. The opening of the "Suvta'minot" | Water supply" Telegram chat and bot provides convenient channels for customer communication and service inquiries. Map-a-thon¹⁹⁴ was held in Uzbekistan for the first time (November 24-26).

International cooperation. In the course of the year, the national public utilities company had meetings with several international organizations and companies, including: AFD, Abu Dhabi Sewerage Services, ADB, EBRD, French company "EIFFAGE", China Agency for International Cooperation and Development, WB, Deokmoon Engineering, German company NETZSCH, Ernst & Young Advisory LLC.

During the visit of the Chairman of the Board of AO Uzsuvtaminot to Germany, the following agreements were signed: (1) agreements on implementation of a number of projects aimed at further expanding international cooperation; (2) memorandum of understanding with KfW Bank to raise €200 million to improve drinking water supply and sanitation services in Surkhandarya and Ferghana provinces; (3) the "Road map"; (4) a grant agreement; (5) memorandum of understanding with Aqua Consult Ingenieur GmbH, providing for the joint implementation of the project "Construction of sewage systems in 6 district centers and towns of Samarkand province"; (6) memorandum of understanding with German Water Partnership. Agreements have been established with the German Federal Agency for Environmental Protection (UBA) to provide Uzbek environmental specialists with annual access to medium-term refresher courses and internships in Germany.

AO Uzsuvtaminot signed memoranda with: (1) the Spanish company "IDOM CONSULTING, ENGINEERING, ARCHITECTURE SAU" on cooperation in developing a master plan for a project to improve drinking water supply and sanitation systems in Ferghana province (March 1); (2) the South Korean corporation "K-Water" "On strategic cooperation and technical assistance in the field of water resources" (October 5); (3) the German company "Bioworks" on mutual understanding and cooperation (October 27).

Agriculture

At year-end, agricultural production amounted to 404,648.6 billion UZS, including crop production – 202,679.1 billion UZS, livestock – 201,969.5 billion UZS. The growth rate in crop production was 104.2%, in animal husbandry – 103.7%. The total volume of produce (services) of agriculture, forestry and fisheries amounted to 426.3 trillion UZS (+4.1% by 2022). The volume of agricultural produce was as follows: grain – 8.4 million tons, potatoes – 3.6 million tons, vegetables – 11.6 million tons, melons – 2.4 million tons, fruits and berries – 3.1 million tons, grapes – 1.7 million tons; meat – 2.83 million tons (+3.9% by 2022), milk – 11.97 million tons (+2.9%), and eggs – 8.49 million (+4.4%).

Uzbekistan ranked 73rd out of 113 countries in the annual ranking of the Global Food Security Index "Global Food Security Index 2022" (GFSI) (78th in 2021).

Latest developments in legislation. In the context of the "Agricultural Development Strategy in the Republic of Uzbekistan for 2020-2030"¹⁹⁵, a number of resolutions were adopted, including: (1) "On measures to establish the International Institute of Food Technology and Engineering" (PP-22 of 26.01.2023); (2) "On additional measures to expand and support agricultural production and processing in 2023" (PP-113 of 05.04.2023), which included sub-resolutions "On measures for the introduction of advanced digital technologies in agriculture" (PP-257 of 02.08.2023) and "On measures to improve the system of subsidies to agro-industry and increase its efficiency" (PKM 331 of 03.08.2023); (3) "On additional measures to improve quality and efficiency through the integration of science, education and production in the agricultural sector" (PP-216 of 07.07.2023).

Other adopted governmental decrees and resolutions were focused on: protection and rational use of pastures (UP-24 of 16.02.2023); further development of the silk industry (PP-73 of 24.02.2023); modernization of agricultural facilities (PP-103 of 29.03.2023); development of viticulture in 2023-2026 (PP-260 of 03.08.2023); improvement of cotton production (PP-391 of 15.12.2023); combatting land degradation (PKM 50 of 02.02.2023); the National Program for the development of seed and seedling production in the Republic of Uzbekistan for 2023-2026 (PKM 51 of 02.02.2023); supporting bee-keeping network (PKM 239 of 12.06.2023) and greenhouses and enterprises exporting fruits and vegetables (PKM 567 of 27.10.2023).

New appointments. Mr. I. Abdurakhmonov was appointed as the Minister of Agriculture.

Strategies and programs. As part of implementing the "Agricultural Development Strategy in the Republic of Uzbekistan for 2020-2030," a pilot program was launched on April 15. This program introduces a new sys-

¹⁹⁴ Map-a-thon is a cartographic event and a kind of marathon to determine the actual coverage of the drinking water supply system, as well as filling the database of AO Uzsuvtaminot by visiting mahallas/local communities and conducting a survey of households on the ground

¹⁹⁵ UP-5853 of 23.10.2019

tem of project financing for initiators through the State Unitary Enterprise "Agroservice Operator," utilizing funds from International Financial Institutions.

To enhance transparency and streamline the process of allocating preferential loans for cotton, cereals, vegetables, and fruits, the Agroplatform information system has been integrated into the "Digital Agriculture" Unified Integration Platform since September 1st.

Agroclusters. As of today, over 800 agricultural clusters operate in Uzbekistan, responsible for 100% of cotton and cereal production and more than 60% of fruit and vegetable production. To support this sector, the Presidential Decree "On measures to support the activities of cotton and textile clusters, fundamentally reform the textile and clothing and knitwear industries, as well as further increase the export potential of the sphere" (UP-2 of 10.01.2023) was adopted.

To foster mutually beneficial relationships between cotton and textile clusters and farms and enhance the efficiency of raw cotton production, the Presidential Decree "On additional measures to further support the activities of producers of raw cotton" (PP-23 of 26.01.2023) was issued. Furthermore, to advance free market principles in agriculture, strengthen collaboration between cotton and textile clusters and agricultural producers, and foster a competitive market environment, the Presidential Decree "On additional measures for the further development of free market relations in agriculture" (UP-205 of 12.12.2023) was adopted. Finally, the Presidential Decree "On additional measures to improve quality and efficiency through the integration of science, education, and production in the agricultural sector" (PP-216 of 07.07.2023) introduces a support system for agricultural clusters actively engaged in collaboration with scientific and educational institutions.

Projects. As part of the "Sustainable management of forests in mountain and valley areas in Uzbekistan" project (FAO/GEF), significant progress has been made in improving forest and pastureland conditions: drainage facilities have been established on over 2,000 hectares to enhance water management; degraded pastures have been restored across 20,000 hectares; 180 cultivated areas have been established, and technical work has been conducted on natural reforestation across 4,200 hectares; sustainable forest management practices have been implemented over 78,000 hectares. Trainings on forest and pastureland inventory utilizing innovative GIS technologies have been organized for forestry workers, farmers, and entrepreneurs.

Continued projects: (1) "Smart farming for the next generation" (FAO), which presented to small farmers modern and optimized agricultural production systems and transferred advanced technologies; (2) "Sustainable development and increased added value in the cotton industry" (GIZ); a training seminar was organized in November 23; (3) "Diversification

and modernization of agriculture" (IFAD). Two veterinary clinics equipped with modern surgical and treatment facilities for pets have been established; projects for the construction of 25 irrigation wells have been developed; training seminar for women in the agricultural sector was held in February; (4) "Integrated natural resources management in drought-prone and salt-affected agricultural production landscapes in Central Asia and Turkey" (CACILM-2, FAO/GEF); a new GIS laboratory was opened at the Bukhara Institute of Natural Resource Management at TIAME; a [side event](#) dedicated to combating soil salinization on irrigated lands of Central Asia was organized; a seminar on planning integrated drought management in Central Asia was held; (5) "Support for an inclusive transition to a green economy in the agri-food sector and the development of a climate-optimized system of knowledge and innovation in agriculture in Uzbekistan (EU-AGRIN) (EU/UNDP)": a training seminar for specialists of relevant organizations, departments, representatives of science, education and farmers was held on January 30-February 4; a competition "Zamin yulduzlari" was initiated by the association "Women of the Agricultural sector of Uzbekistan" ([March 3](#)); laboratory and agricultural equipment was provided to five farms of the Akhangaran district, Tashkent province; (6) ["Preparing the grounds for digital transformation of agriculture"](#) (FAO). Workshops were organized on: transformation of agriculture in Uzbekistan through knowledge, innovation and digitalization" (March 1-2); digital agriculture (October 23-26); adoption of drip irrigation technology for crops grown in household plots using alternative energy in the context of water scarcity" (November 28).

The total number of joint projects between Uzbekistan and FAO reached 66 and amounted to \$70.05 million. To date, 33 projects worth \$15.03 million have been completed; work is underway on other 33 projects (\$55.14 million); 4 projects (\$41.3 million) are in the process of development.

Within the framework of cooperation between the Global Soil Partnership (GSP), the SubRegional Eurasian Soil Partnership (EAPP), the FAO Country Office in Uzbekistan and the Ministry of Agriculture of Uzbekistan, the project "Support for the promotion of sustainable soil management in the framework of the FAO Global Soil Partnership – Phase III" was signed.

The Ministry of Agriculture of Uzbekistan, in collaboration with the EU's ASK Facility project, has established a project management office. The initial phase involves systematizing agricultural activities.

Capacity building. Relevant Resolutions were adopted to (1) establish the Faculty of "Sericulture and Mulberry Farming" at the Andijan Institute of Agriculture and Agrotechnologies (PP-73 of 24.02.2023); (2) PPRUz No. approve the "Roadmap" for the integration of science, education and production in the agricultural sector (PP-216 of 07.07.2023); a specialized international school¹⁹⁶ will be established at the

¹⁹⁶ for 1st to 5th grade school students

International Agricultural University on the basis of the UK education system, as well as the Samarkand Institute of Agricultural Innovations and Research, the interdepartmental center for basic research in Agriculture and the directorate of the national research complex of field crops seed production.

The geographic information system of the Ministry of Agriculture of Uzbekistan was awarded for achievements within the framework of the ESRI¹⁹⁷ User Conference (San Diego, USA).

The Agricultural Product Quality Assessment Center has inaugurated a new laboratory complex, equipped with state-of-the-art testing devices.¹⁹⁸ This complex enables, for the first time in Uzbekistan, the determination of the 'Gluten Index' according to the international standard ISO 21415.

The Global Soil Laboratory Network – GLOSOLAN, FAO and the Ministry of Agriculture of Uzbekistan conducted trainings on the analysis of saline soil for specialists from more than 30 countries.

Series of trainings were focused on: information systems in agro-industry (February 1); training of facilitators in agriculture (February); fruit and vegetable production (February 20), concept of food safety and healthy nutrition (April 7), mechanisms for creating intensive gardens and small agrologistic centers (April 8), high-quality corn cultivation (July 27), food safety (August 10-11); farmers of Mirishkor district (February 26); laboratory assistants of the testing laboratory of the State Unitary Enterprise "Soil Quality Analysis" (April); operation of the AKIS agricultural knowledge and innovation system (June 15); smart greenhouses (September 13); operation of control and measuring machine (CMM) (September 18); farmers and clusters (December).

Events. The Ministry of Agriculture of Uzbekistan organized a number of events jointly with partners, including, among others: (1) seminar "Support for the inclusive transition of the agro-food sector to a "green economy" and the development of a climate-oriented system of agricultural knowledge and innovation" (UNDP, January 31); (2) seminar "Fruit gardening: Water resources management and business" (Ministry of Agriculture, Nature and Food Quality of the Netherlands, March 16); second international conference "AgroInsurance 2023" (Swiss Re and Europa Re companies, March 25); (3) seminar "Diversification of aquaculture aimed at small farmers and workers of agricultural extension services" (FAO, March 28-29); regional seminars on the implementation of country projects in Europe and Central Asia (May 2-3), the development of "green" methods of

growing certain types of agricultural products¹⁹⁹ (May 2-3), which resulted in the adoption of a decision on the establishment of the regional Central Asian working group of the Global Action Program "OSOPP"; five-day camp "Digital Valley" (July 22-26); international conference on food security (September 7-8); (4) UNDP, FAO and GIZ International Forum "Combating Land Degradation in Central Asia: Challenges and Solutions" (April 27); (5) FAO and ICARDA Scientific and practical conference "The importance and scientific foundations of innovative agrotechnologies in the development of rain-fed agriculture" (May 19); (6) GSP²⁰⁰, EASP²⁰¹ and FAO second meeting of the International Network on Saline Soils (INSAS) (May 22-26); (7) international conference "Sustainable Development Goals: Food security and water supply" (July 7).

International exhibitions in 2023 included: AGROPRO EXPO-2023 (February 21-23, Samarkand); "AGRO-WORLD UZBEKISTAN-2023" (March 15-17) and "UzFood 2023" (March 28-30).

Regional and international cooperation. The Uzbek delegation participated in the XV "World Forum on Agriculture and Food" and the Berlin Conference of Agricultural Ministers within the framework of the 84th exhibition "Green week -2023". On the sidelines of the exhibition, the delegation had meetings with agricultural ministers of Germany, France, Georgia, Turkey, Latvia, Canada, Mongolia, the Netherlands, Poland, Hungary, Kazakhstan, as well as with the heads of the World Bank, FAO and IFAD. Agreements have been reached on implementation of 12 projects worth \$575.6 million, trade contracts worth \$154.3 million (Berlin, January 19-21).

The Government of Uzbekistan has signed: (1) a Roadmap with the Kyrgyz Republic for the implementation of joint agro-industrial investment projects and the increase of turnover of agricultural products in 2023-2025 (Bishkek, January 26) and a memorandum on cooperation and implementation of joint horticultural projects (Tashkent, March 14); (2) 6 agreements (\$118 million) with Germany. These are aimed at developing of new technologies, education, and exchange in agriculture (May 2); (3) a co-operation agreement with China CAMC Engineering Co Ltd (May 17); (4) 16 cooperation agreements with Italy (June 6); (5) MoU with South Korea (June 16); (6) MoU with Israel on application of innovative technologies in agriculture (September 8).

The Samarkand Declaration on Global Food Security adopted during the International Conference on food security had several focus areas, including: (1) agricultural development in the most environmentally friendly way, supporting biodiversity, with opti-

¹⁹⁷ Environmental Systems Research Institute (ESRI) was founded in 1969 and is a leader in the global market of geoinformation systems, software for geolocation and cartography. The company has 49 offices, 11 research centers and more than 300 thousand users worldwide

¹⁹⁸ WB grant of \$4 million

¹⁹⁹ within the framework of the Global Action Program "One country – one priority product"/OSOPP

²⁰⁰ GSP-Global Soil Partnership

²⁰¹ EASP-Sub-Regional Eurasian Soil Partnership

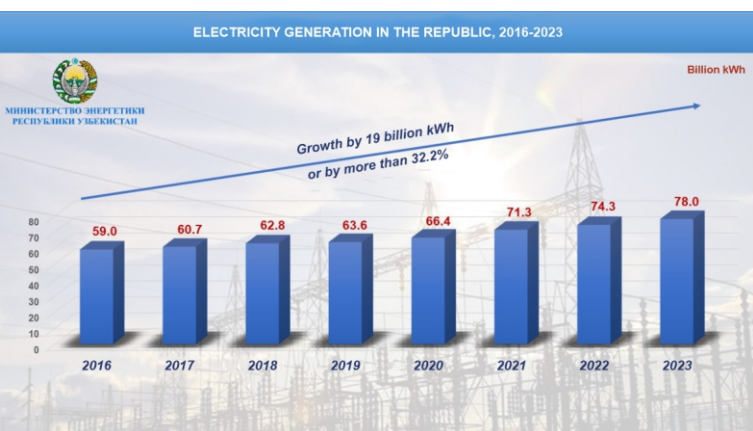
mal use of water resources; (2) promotion of healthy nutrition of the population, especially children and adolescents, comprehensive school nutrition programs; (3) empowerment of rural women to increase their contribution to the transformation of agro-food systems; (4) state support of small and family farms, expanding their access to inputs, natural and financial resources.

A number of meetings were held, including: (1) meetings on cooperation between the Ministry of Agriculture of Uzbekistan and FAO (January 10) and representatives of the American company Crown Iron Works (January 13); (2) 6th meeting of agricultural ministers of Central Asian countries (February 15); (3) meeting of the joint Uzbek-Hungarian working group on agriculture (March 2); (4) 2nd meeting of the Uzbek-Kazakh working group on monitoring the implementation of cooperative projects and import substitution for systematic supply of products (March 3); (5) 1st meeting of the Uzbek-Kyrgyz working group on agriculture (March 7); (6) 8th meeting of agricultural ministers of SCO member states (May 17); (7) 6th plenary meeting of the Sub-Regional Eurasian Soil Partnership (May 31); (8) 2nd Agribusiness Forum of the Turkic States (September 27).

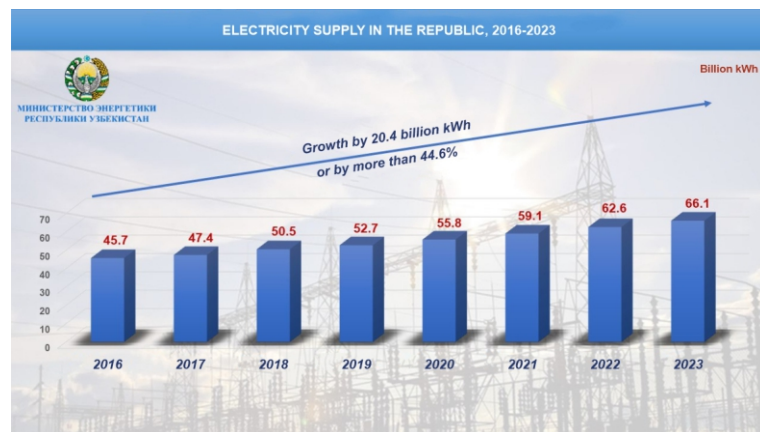
Energy

The current power generation capacity in Uzbekistan stands at 12,900 MW, primarily sourced from: thermal power plants (TPP): 11,000 MW (84.7%); hydro power plants (HPP): 1,850 MW (14.3%); other sources: 133 MW (1%).²⁰² By 2025, the total capacity is projected to reach 25,600 MW, with the following breakdown: TPP: 18,800 MW; HPP: 2,500 MW; Solar and Wind Power: 4,300 MW. Further, by 2030, the total capacity is expected to increase to 29,200 MW, with a significant portion (40.4%) coming from renewable energy sources, including hydro, solar, and wind power.

In 2023, Uzbekistan generated 77.9 billion kWh of electricity, a 4.8% increase from the previous year. This included 69.6 billion kWh generated by TPPs.



Source: <https://minenergy.uz/ru/news/view/3617>



Source: <https://minenergy.uz/ru/news/view/3619>

While the country exported 1.9 billion kWh of electricity in 2023, it also imported 4.9 billion kWh to meet domestic demand. A total of 71.2 billion kWh of electricity was transported through the main electric grid.

By the end of 2026, Uzbekistan is set to commission 25 new power plants, totaling 11,954 MW. These include 9 thermal power plants, 9 solar power plants, and 7 wind power plants. Looking ahead to 2030, the projected electricity consumption in Uzbekistan is estimated to reach 120.8 billion kWh.

Latest developments in legislation. Several decrees were adopted, including: on enhanced State Control mechanisms and implementation of the Digital Energy Control system in the fuel and energy industry" (UP-77 of 24.05.2023) and on the next stage of reforming the energy sector (UP-166 of 28.09.2023).

The decree "On measures to improve the effectiveness of State control in the use of fuel and energy resources" (PP-54 of 13.02.2023) instructs the Ministry of Energy to ensure implementation of SCADA system, as well as automated control and metering systems for electric energy (ASKUE) in all processes, starting from generation to delivery to end users.

Events. A number of events were organized, with the largest of them including: (1) conference "Energy Market of Uzbekistan" (March 30-31); (2) 2nd International Energy Forum of Uzbekistan (May 18-20); (3) 3rd international industrial exhibition "Innoprom. Central Asia" (April 24-26); (4) "International Forum of Women Power Engineers" (August 16-18); (5) 17th International exhibition "UzEnergyExpo-2023" (October 25-27).

Regional and international cooperation. The Minister of Energy of the Republic of Uzbekistan was elected²⁰³ Vice-President of the CIS Electric Power Council.

Memos and agreements signed in 2023 included, among others: (1) a memorandum between LONGi and KIUT University (Uzbekistan), which provides for

²⁰² "Concept of Electricity Provision in Uzbekistan for 2020-2030"

²⁰³ by the decision of the 63rd meeting of the CIS Electric Power Council

the support of students and grants for the university, student exchange programs, and the partial establishment of solar panel production in Uzbekistan; (2) a memorandum between JSC AzerEnergy and JSC National Electric Networks of Uzbekistan; (3) a contract for the supply of basic electrical equipment worth \$9.5 million as part of the investment project "Modernization and reconstruction of substations of main power grids with the participation of the World Bank"; (4) an agreement²⁰⁴ on the provision of financial and consulting services for an electricity distribution project in Tashkent in the amount of \$300 million between the Ministry of Investment, Industry and Trade and the International Finance Corporation.



Representatives of the energy sector took part in: (1) the 3rd meeting of the Energy Ministers of the SCO member states (March 14, online); (2) trilateral meetings of the Ministries of Energy of the Republic of Uzbekistan, Kazakhstan and the Kyrgyz Republic (Tashkent, March 15; Astana, August 25); (3) 39th (Dushanbe, May 3-5) and 40th (Samarkand, October 26) meetings of the Central Asian Coordinating Electric Power Council; (4) 41st (Dushanbe, May 3) and 42nd (Samarkand, October 25-26) meetings of the Coordination Commission; (5) 62nd (Bishkek, August 22) and 63rd (December 1, online) meetings of the CIS Electric Power Council.

Hydropower

In Uzbekistan, the hydropower sector has 58 HPPs with an installed capacity of 2,233 MW, particularly 17 large HPPs and 41 small and micro HPPs.

AO Uzbekgidroenergo is investing \$1.363 billion in 13 hydropower projects, adding 749 MW of capacity and generating 2.1 billion kWh annually. In 2023, \$148 million was invested, and seven projects worth \$1.4 billion are underway. This includes seven new hydroelectric power plants costing \$124 million,

generating 552 million kWh yearly and adding 200 MW of capacity.

Latest developments in legislation. Decree²⁰⁵ "On measures for further reformation of the hydropower sector" (PP-104 of 30.03.2023) sets the following: (1) bring the total capacity of hydropower to 4,999 MW by 2030; (2) construct Yukoripskem, Korongitugai, Toldiksoy HPPs, the cascade of Oygain HPPs and the Yukoripskem HPP with a total capacity of 876 MW in the Bostanlyk district, Tashkent province; the cascade of Naryn HPPs with a total capacity of 225 MW on the Naryn River in Namanagan province and the cascade of Yukoritupalang HPPs with a total capacity of 264 MW in the Saryasi district, Surkhandarya province; (3) implement a program of additional measures for further hydropower development in 2023-2030.

AO Uzbekgidroenergo's HPPs have started issuing green energy certificates since July 1, 2023, as per PPRUz 156. The first certificate was issued by I-REC.

Hydropower construction and modernization. In 2023, Uzbekistan commissioned eight hydro power plants, including three large and five micro-hydroelectric plants, in Tashkent, Andijan, Samarkand, and Surkhandarya provinces. These new plants have a combined annual capacity of 190 MW.

The following hydropower projects are planned for implementation: Tashkent province: Muloloik, Yukori Pskem, Korongi Tugai, Okbulok, Oigan HPP cascade, Huzhakent HPP (total capacity: 1734 MW); Namanagan province: Naryn HPP cascade (total capacity: 229 MW); Surkhandarya province: Mizot HPP cascade, Kuchluk (total capacity: 75 MW).

Four pumped storage projects, totaling 1,600 MW and costing \$2.1 billion, are planned as well.

Small hydropower. Recent water shortages in Uzbekistan have led the country to prioritize micro-hydropower plants. AO Uzbekgidroenergo has initiated 23 projects to construct micro-hydropower plants with a combined capacity of 27 MW. Two of these plants, Ispaisoy in Tashkent and Zavrok in Andijan, have already been commissioned, contributing 0.4 MW to the nation's power grid.

Capacity building. AO Uzbekgidroenergo held trainings on: PPP in the energy sector (July 24-27), modernization of the Tupalang HPP (August 17-19), safety of reservoir operation (September 13-14), innovative approaches in the field of renewable energy sources (November 15), transition to a green economy and ensuring green growth (November 28-29), network protection and automation and automatic process control (December 7).

Uzbekistan is pioneering a new approach to hydropower development with its first PPP-based hydroelectric power plant project. The project involves the

²⁰⁴ within the framework of the 32nd annual meeting of the EBRD Board of Governors

²⁰⁵ in fulfilment of Presidential Decree UP-101 of April 8, 2022

construction of five new hydroelectric power plants: Dukentsai, Kamchik, Kizildarya, Kuyi Koku, and Suvlisai, with a combined capacity of approximately 46.6 MW. Synergy Consulting has been appointed as the financial consultant, Dolsar Engineering as the technical consultant, and Unicas as the legal consultant.

Regional and international cooperation. The Ministries of Energy of Uzbekistan, Kyrgyzstan, and Kazakhstan have signed a roadmap to construct the 1,860 MW Kambarata HPP-1 (Bishkek, January 6).

AO Uzbekgidroenergo signed several agreements and MoU, including: (1) for the supply of floating hydroelectric units with a capacity of 50 MW with "MACLEC technical project laboratory pvt. LTD" (India) (February 8); (2) on the production of hydraulic units with a total capacity of 2-15 MW under the national brand "Made in Uzbekistan" with "Zhejiang Jinlun Electromechanical Co., Ltd." (February 21); (3) with "China Southern Power Grid International" JDA²⁰⁶ (November 18).

The delegation of AO Uzbekgidroenergo had meetings with representatives of: (1) MACLEC technical project laboratory pvt. LTD (January 23), Elsewedy Electric (Egypt) (February 13), CAMCE (China) (February 15); Zhejiang Jinlun Electromechanical Co. Ltd (China) (May 25); (2) Regional Center of Small Hydropower of the People's Republic of China (April 13); (5) China National Technical Import and Export Corporation (CNTIC) and China Machinery Engineering Corporation (CMEC) (May 17); (6) (7) Power Machines OJSC (September 8); (8) China Southern Power Grid International (October 17-18); (9) the World Bank within the framework of the CAWEP program (November 29).

Within the framework of the Uzbek-Chinese business forum²⁰⁷, AO Uzbekgidroenergo has signed agreements and MoU for production of 15 MW hydrounits, design and construction of hydropower projects and supplies of equipment for HPPs.

Thermal power

AO Thermal Power Plants is the primary electricity producer in Uzbekistan, generating over 70% of the country's power. The company operates five thermal power plants, three combined heat and power plants, three service companies, and the Tashkent heat center.

In 2023, AO Thermal Power Plants generated 54.2 billion kWh of electricity and 5.1 million Gcal of thermal energy. The company aims to increase its total capacity to 14.7 thousand MW by 2030²⁰⁸. In 2023, AO Thermal Power Plants disbursed \$622.63 million in va-

rious projects and localized the production of products through 35 projects, amounting to 48.1 billion UZS.

New appointments. Mr. B. Juraev was appointed as the Chairman of the Board of AO Thermal Power Plants.

Thermal power construction and modernization. AO Talimardjan TPP has launched the construction of a 1065 MW combined-cycle energy-efficient installation. AO Thermal Power Plants is implementing several projects to boost its power generation capacity: (1) Tashkent CHP: Constructing two new gas turbine units (32 MW) to generate 515.6 million kWh of electricity and 690.3 thousand tons of thermal energy annually (JICA); (2) Talimarjan TPP: Expanding with a new combined-cycle gas plant (900 MW) to generate 7.2 billion kWh per year (ADB/EBRD); (3) Navoi TPP: Constructing the third and fourth combined-cycle gas plants (650 MW each) to generate 4.9 billion kWh of electricity and 931.4 thousand tons of thermal energy annually per plant (JICA).

Several projects have been launched to connect a 1,500 MW combined-cycle gas power plant to the grid in Syrdarya province; construct a pilot production of "green hydrogen" in Tashkent province jointly with ACWA Power²⁰⁹. 9.6 MW of solar and wind energy capacity was added in 2023 to offset internal power consumption.

International cooperation. AO TPP and Siemens Energy signed contracts totaling €72 million for the installation of energy-efficient gas turbines in Bukhara and at the Mubarek Thermal Power Plant (May 2). Agreements have been also signed: (1) with TAQA energy company on the implementation of a 1,600 MW combined cycle gas turbine plant worth \$1.2 billion (May 17); (2) the Italian credit agency SACE for the implementation of 4 major projects totaling more than €2.26 billion (June 9).

Alternative energy sources

Latest developments in legislation. Several resolutions were approved on: (1) accelerated adoption of RES and energy-saving technologies in 2023 (PP-57 of 16.02.2023); (2) implementation of the Clean Energy for Buildings in Uzbekistan project, with the WB's participation (PP-106 of 30.03.2023); (3) implementation of the project "Application of innovative carbon resources for energy reforms", with the WB's participation (PP-271 of 08.08.2023); (4) production of alternative energy from landfills (PP-335 of 16.10.2023).

A number of documents were adopted in fulfilment of resolution "On measures to improve the effectiveness of reforms aimed at the transition of the Republic of Uzbekistan to a "green" economy by 2023" (PP-436

²⁰⁶ JDA-joint development agreement

²⁰⁷ the forum was held on May 17 in Xi'an, China

²⁰⁸ "Concept of Electricity Provision in Uzbekistan for 2020-2030"

²⁰⁹ Currently, ACWA Power builds 5 power plants totaling 4,100 MW in Uzbekistan, including 4 wind farms with a capacity of 2,600 MW and a 1,500 MW modern thermal power plant. The total volume of investments by ACWA Power currently amounts to \$7.5 billion

of 22.12.2022), including: (1) on adoption of green energy certification system (PP-156 of 12.05.2023); (2) on extended implementation of "Green Energy Certificates" and improvement of "Green Financing" mechanisms of (PKM 515 of 29.09.2023).

A new dispatch center, "Green Energy," has been established to manage alternative energy sources (November 3).

Carbon neutrality action plan for the energy sector of Uzbekistan. Uzbekistan aims to achieve carbon neutrality by 2050, focusing on decarbonizing its electricity sector. Strategic documents outline the roadmap for this transition, including mechanisms and targets for economic transformation and CO₂ emissions reduction.

The Government of the Republic of Uzbekistan and the World Bank [signed](#) an agreement to allocate \$46.25 million for financing the Innovative Carbon Resource Application for Energy Transition Project (iCRAFT).

Solar power. In 2023, solar power generation reached 253 MW. Uzbekistan aims to increase solar power's contribution to its electricity mix to 30% by 2030.

Two new solar power projects have been approved: a 250 MW plant in Bukhara and a 100 MW plant in Khorezm, both to be implemented as public-private partnerships.

The Ministry of Energy has signed agreements with several companies for solar power projects: 2,000 MW with CEEC ENERGY CHINA in Kashkadarya, Bukhara, and Samarkand; 2,000 MW with Huaneng Renewables and Poly Technologies in Jizzakh and Tashkent; 1,400 MW and 1,200 MW energy storage systems with ACWA Power in Tashkent, Samarkand, and Bukhara; 500 MW each in Kashkadarya and Bukhara with China Gezhouba Group; 400 MW with PowerChina International Group in Andijan.

MASDAR has signed contracts totaling \$396 million to build and operate SPPs in Surkhandarya, Samarkand, and Jizzakh provinces. Additionally, TrinaTracker will supply solar trackers for 510 MW of solar projects in Uzbekistan. Once operational, these projects will generate 1.1 TWh of renewable energy annually and reduce CO₂ emissions by 110,000 MT²¹⁰ per year.

Wind power. Resolutions were adopted in support of wind power project: a 500 MW wind power plant, a 100 MW storage system and overhead power lines in Kungrad district, Republic of Karakalpakstan (Kungrad Wind 1, 2 and 3) (PPs 325-327 of 05.10.2023).

A new 500 kV power transmission network will be constructed to connect three 500 MW wind farms in Bukhara to the national grid.

7 [projects](#) for the construction of wind farms with a total capacity of 3,100 MW are being implemented: (1) a 500 MW in the Tomdinsky district, Navoi province; (2) two 500 MW²¹¹ each in the Peshkun and Gijduvan districts, Bukhara province. As part of the projects²¹², 158 wind turbines with a total capacity of 1.0 GW will be installed with an annual output of 3.6 billion kWh; (3) a 100 MW in Karauzyak district; (4) three 500 MW each in the Kungirat district, Republic of Karakalpakstan. By the end of 2027, 10 wind farms with a total capacity of 4,400 MW will be launched.

MoU was signed with Chinese companies for a 1,000 MW wind farm in Jizzakh province. EBRD will provide loan of \$19 million for a 100 MW wind farm in Nukus. An agreement was signed with MASDAR on the joint development of 2,150 MW solar and 500 MW wind power projects totaling \$2.6 billion.

Environment and climate change

Latest developments in legislation. Laws, decrees and resolutions were adopted to: (1) amend certain legislative acts in the field of ecology (ZRU-854 of 11.07.2023); (2) transform the sphere of ecology and environmental protection and govern activities of the authorized state body (UP-81 of 31.05.2023) and ensure environmental sustainability by further increasing the level of afforestation in the Republic and the consistent implementation of the national project "Yashil Makon" (UP-199 of 23.11.2023); (3) fulfill obligations under international treaties and membership of the Republic of Uzbekistan in international organizations in the field of environmental protection" (PP-172 of 31.05.2023); (4) reclaim damaged land, preserve fertile soil layer and organize its rational use" (PKM-169 of 29.04.2023); reduce the negative impact of wastes on the environment and public health and effectively use alternative energy sources (PKM-300 of 20.07.2023).

Strategies and programs. The "Uzbekistan 2030 Strategy" (UP-158 of 11.09.2023) outlines key environmental reforms, including: (1) drastic improvement of the ecological situation and elimination of environmental problems affecting human life; (2) expansion of the national "Yashil Makon" project aimed to stabilize the ecological situation; (3) increase in forest areas; (4) stabilization of the ecological situation in the Aral Sea region and mitigation of the negative environmental impact from the drying up of the Aral Sea; (5) prevention of climate change impacts; (6) sustainable conservation of biodiversity; (7) improvement of waste management services; (8) prevention of air pollution and implementation of measures to preserve air quality.

In line with New Uzbekistan's Development Strategy (2022-2026), Resolution PKM No.362 of August 11, 2023 approved the National Climate Action Plan and

²¹⁰ metric ton

²¹¹ the project of the [largest](#) wind power plant in Central Asia, worth \$600 million, is being implemented with the participation of the UAE company Masdar

²¹² the projects are implemented in accordance with the PPs 5001 and 5003 of 23.02.2021

Disaster Risk Reduction Strategy for 2023-2030, including its implementation roadmap.

The Aral Sea region. During the UN Water Conference, a high-level plenary session featured S. Mirziyoyeva, who highlighted Uzbekistan's significant efforts to address the Aral Sea crisis and its role in galvanizing international cooperation on this issue (March 23).



Saida Mirziyoyeva speaks on the Aral Sea crisis and its consequences at the UN Water Conference, New York, March 23

A number of initiatives are ongoing in this area, including: (1) **Environmental Restoration of the Aral Sea II Activity (ERAS-II)** (USAID): two expeditions were organized for young government employees along the Syr Darya and Amu Darya rivers, a round table "Aral Sea region – zone of environmental innovations and technologies" (June 23) and a meeting of the Uzbek-Kazakh working group on the development of a bilateral "Roadmap" outlining the main strategic areas and potential actions on the topic "Combating drought and sandstorms on the coast islands" (October 19) were held; the program "Business incubator for "green" startups Climate Smart" is under-way; (2) **Ecologically oriented regional development in the Aral Sea Region (ECO ARAL)** (GIZ): a steering committee meeting (March 10) and a trilateral meeting of the Ministry of Ecology, Environmental Protection and Climate Change of the Republic of Uzbekistan, the Ministry of Ecology and Natural Resources of the Republic of Kazakhstan and the Ministry of Agriculture and Nature Conservation of Turkmenistan met to discuss cooperation on the Ustyurt Plateau (May 18); the GIS laboratory at the Karakalpak Institute of Agriculture and Agrotechnologies was opened (June 22); training in usage of Geographic Information System (GIS) and Geo Spatial and Remote Sensing Data Applications (June 26-27), seminars on growing sesame (June 11) and rosehip as income source (August 11), on hydroponics and growing feed for livestock using this method (November 20-21), and a workshop to exchange experience on cultivation of early maturing sort of mung bean "Durdona" in the Aral Sea region (December 5) were

held; the **Strategy** for the sustainable growth of tourism in the Republic of Karakalpakstan 2023-2026 was developed; and a memorandum of understanding in the field of tourism was signed between Karakalpakstan and Mangystau (September 28); (3) **My Garden in the Aral Sea**: Siberian Health LLC, ERIELL Oilfield Services Middle East DMCC, NESTLE, and the French Association of International Solidarity and Education/ASIE invested in planting 500 ornamental trees and 16,500 saxaul seedlings; (4) **Green Rehabilitation Investment Project for Karakalpakstan Republic to Address Impacts of the Aral Sea Crisis** (KOICA/GGGI): the Insight Brief "Capital Expenditure for Infrastructural Adaptation Measures for Agriculture, Republic of Karakalpakstan" has been issued; the first training course on the module "Greenhouses and drip irrigation adapted to climate change" (November), training "Crop quality and yield increase through resource efficiency, climate-friendly water management, and input-saving technologies in winter-wheat and fruit production" (November 28-December 1) and "Karatat training: Economic, environmental, and social benefits" (December 2) were completed in 2023; (5) Green Space Project/Yashil Makon: 217 million tree seedlings were planted, including 1.73 million ones planted around 189 industrial enterprises having a high environmental impact, and "green belts" comprising 135 thousand seedlings were arranged.

The UNDP/GEF Global Biodiversity Framework Early Action Support initiative was launched on April 12. On June 1, the Ministry of Ecology and KOICA signed a memorandum for the Smart Greening Project²¹³ in Tashkent province.

MPHSTF for the Aral Sea Region. In 2023, Germany contributed €700 thousand to the development of the Aral Sea region. The United Nations Office for Project Services (UNOPS) has joined the Trust Fund for the Aral Sea Region as the eighth participating UN Organization (UNO) of the Fund.

MPHSTF financed 2 projects worth \$4.4 million in such areas as youth employment, innovation, healthcare and "green" growth (March 2-3, Nukus).

For more information about the activities of the MPHSTF for the Aral Sea region, see [United Nations and its Specialized Agencies](#).

Capacity building. The Central Asian University for Environmental and Climate Change Studies (Green University) has been established in 2023. A national strategy and roadmap have been adopted to foster a culture of sustainable development and engage Uzbekistan's youth in climate action.

In the course of the year, training workshops/courses were delivered for employees of the environmental sector and sanitary engineering enterprises, managers and experts of atmospheric air protection branches, and environmental protection workers on envi-

²¹³ the total project cost is \$7.7 million

ronmental audit. The training topics included: law enforcement and management of natural resources (January 25-27) and role of rivers and lakes in ecosystem stability (February 2); enhanced regional cooperation on climate change and security in Central Asia (June 20-21) and development of the Green City Master Plan (November 6).

In 2023, Sudochie Lake has been included in the list of Ramsar wetlands of international importance²¹⁴.

Events. The following events were held: (1) *seminars and roundtables*: on development of the National Report on the Environment (February 1), Aarhus Convention (June 2), Aral Sea – Zone of Environmental Innovation and Technology (June 23); (2) *meetings and dialogues*: third meeting of the Regional Committee of the transnational UNESCO World Heritage Site “Western Tien Shan” (May 1); expert group of the Committee on the Development of the Aral Sea Region and Ecology (May 1); Regional Dialogue on Transboundary Nature Protection in Central Asia (November 28-30); regional dialogue “Expanding the practice of nature-oriented solutions to ensure the sustainability of landscapes in Central Asia” (June 15-16); (3) *international conferences*: Environmental protection and Ecological zoning: problems and solutions (June 8), Green Development: experience of New Uzbekistan and global trends” (July 6), on sustainable conservation and management of protected areas (OPT) (December 5); (4) *other events*: Environmental Remediation Account (ERA) Assembly for Central Asia (September 7); Central Asian Youth Environmental Camp and international dialogue “Strategy for Environmental Education of Central Asian Youth” (October 1-5); international eco-festival of landscape art “Green Art” (April 27-29).

In the course of the year, the delegation of the Ministry of Ecology participated in a number of important international events, including, among many others: (1) 7th high-level Conference “European Union-Central Asia” on environment and water resources (Rome, February 23-24); (2) 18th session of the UN Forum on Forests (New York, May 11); (3) OSCE High-level Conference on Climate Change in Europe (Vienna, July 7); (4) 61st session of the working group on the “Strategy on Transboundary Air Pollution” Program (Geneva, September 5); (5) 18th World Water Congress (Beijing, September 14-15); (6) Forum “Green and Low-carbon Development in the Asia-Pacific Region” (Changsha, China, October 20-23); (15) COP28 (Dubai, November 30-December 13).

For the first time, Uzbekistan took part in the international photo contest “Wiki loves Earth”.²¹⁵

Regional and International Cooperation. The following bilateral agreements were approved: (1) agreement²¹⁶ between the governments of Uzbekistan and Kazakhstan on environmental cooperation (PP-97 of 17.03.2023); (2) framework agreement²¹⁷ between Uzbekistan and South Korea on climate change cooperation (PP-339 of 19.10.2023).

The Ministry of Ecology signed memoranda and agreements with: (1) South Korea's Ministry of Environment (January 25); (2) Sejin G&E Co., Ltd. (South Korea) for a \$55 million agreement (April 28); (3) KEITI for a \$6.6 million grant project (May 24); (4) Executive Secretary of the UN Convention on Migratory Species (CMS) (June 20); (5) Industrial Innovation Group for the creation of a National Carbon Credit System (December 2); (6) Tadweer²¹⁸ for the implementation of modern, eco-friendly waste management technologies (December 4).

In the course of the year, the Ministry of Ecology held meetings with international organizations and national high-level officials, including: (1) UNECE, UNEP, FAO, UNECE, KfW, UN Economic and Social Council (ECOSOC), IUCN, EBRD, Environmental Remediation Account Assembly for Central Asia, International Center for Biosaline Agriculture (ICBA), GGGI; (2) Kazakhstan's Minister of Ecology and Natural Resources, Chairman of the Environment and Labor Committee, National Assembly of South Korea, Minister of Environment of South Korea.

Tashkent hosted: (1) 4th meeting of the heads of environmental ministries of SCO member states (April 18); (2) online meeting of “C5+1” (Central Asia + USA) on environmental and climate change issues (August 16).

SDG in Uzbekistan

The country continued implementing the UN Sustainable Development Cooperation Framework 2021-2025²¹⁹. The statistical collection “Sustainable Development Goals in the Republic of Uzbekistan-2023”²²⁰ was launched. Uzbekistan ranked 69th out of 166 countries in the [annual ranking of sustainable development](#).

In the annual [Open Data Inventory \(ODIN\)](#), Uzbekistan ranked 30th out of 195 countries in the world (40th in 2022) and 1st among Central Asian countries.

Uzbekistan launched its [second Voluntary National Review \(VNR\)](#) on SDG implementation, highlighting progress in market reforms, agriculture, infrastructure, education, health, green economy, social protection, poverty reduction, gender equality, and international cooperation.

²¹⁴ Sudochie became the 4th object of Uzbekistan included in the Ramsar Convention

²¹⁵ the competition is dedicated to natural heritage sites and has been held worldwide since 2013

²¹⁶ signed on 22.12.2022 in Tashkent

²¹⁷ signed on 01.06.2023 in Tashkent

²¹⁸ Abu Dhabi Waste Management Company

²¹⁹ Approved by the Government of the Republic of Uzbekistan and the UN agencies in Uzbekistan on 24.10.2020

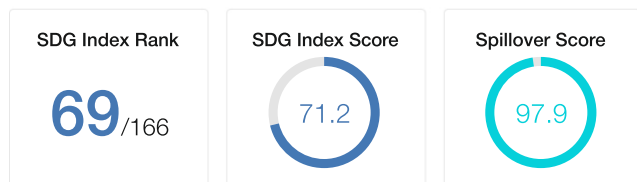
²²⁰ <https://online.pubhtml5.com/wscvz/lfhh/>

Uzbekistan

Eastern Europe and Central Asia



OVERVIEW INDICATORS



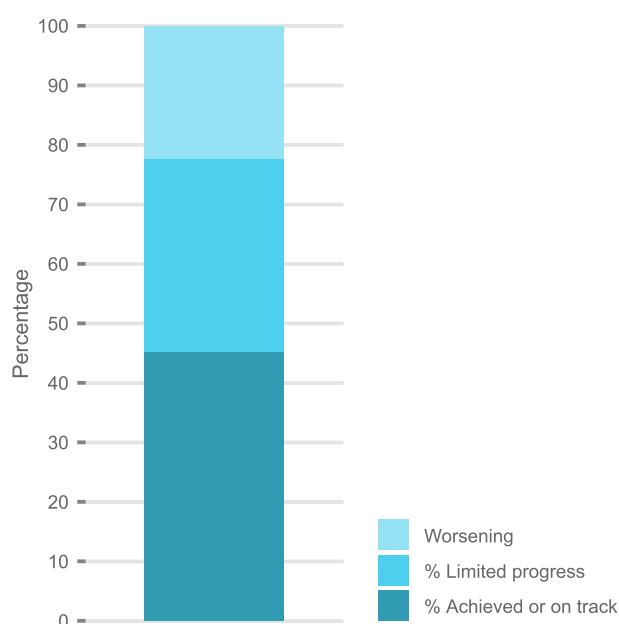
SDG Dashboards and Trends



Dashboards: ● SDG achieved ● Challenges remain ● Significant challenges remain ● Major challenges remain ● Information unavailable
Trends: ↑ On track or maintaining SDG achievement → Moderately improving → Stagnating ↓ Decreasing ● Trend information unavailable

Source: <https://dashboards.sdgindex.org/profiles/uzbekistan>

Status of SDG targets for Uzbekistan (% trend indicators)



Source: <https://dashboards.sdgindex.org/profiles/uzbekistan>

In the context of SDGs, the following events were held: (1) international conferences "Sustainable Development Goals and the Constitution: SCO countries experience" (April 5) and "Expanding the participation of civil society institutions and persons with disabilities in the achievement of the Sustainable Development Goals" (November 24); (2) international forums "Experience of Central Asian countries in achieving Sustainable Development Goals: the role and significance of referendums and national constitutions" and "Ensuring dignity and human rights – the highest goal of constitutional reforms" (April 25-26); (3) international round table "National Sustainable Development Goals of Uzbekistan: progress and challenges in achieving the SDGs" (September 26); (4) II Global forum on interparliamentary cooperation in achieving the SDGs (November 30); (5) over 20 events dedicated to each of the SDGs adopted in Uzbekistan, within the framework of the "Sustainable Development Goals Month."

Uzbek delegations participated in: (1) the 10th Asia-Pacific Forum on Sustainable Development (Bangkok, Thailand, March 27-30); (2) [UNEC Regional Forum on Sustainable Development 2023](#) (March 29-30, online); (3) UNGA High-level Meeting "The Role of zero waste as a transformative solution in achieving Sustainable Development Goals" (New York, March 30); (4) inter-

national conference "Innovative Financial Methods and Action Programs for Unlocking Human Potential", organized by SDSN²²¹ (July 13, online); (5) briefing on "Achieving the goals of sustainable development and strengthening regional security and stability: Uzbekistan's view" (New York, December 4).

Emergencies

In 2023, Uzbekistan faced 87 emergency incidents, a 34% decrease from 2022. Of these, 60 were man-made incidents (down from 76 in 2022) and 27 were natural disasters (down from 55 in 2022).

Latest developments in legislation. Resolutions were adopted to: (1) further improve the system for ensuring seismic safety of the population and territory of the Republic of Uzbekistan (PP-158 of 16.05.2023); (2) approve the Roadmap for the implementation in 2023 of the public safety system development strategy in Uzbekistan for 2022-2025 (PKM 121 of 23.03.2023); (3) organize performance of the State system for prevention and response in emergency situations in Uzbekistan" (PKM 171 of 29.04.2023); (4) develop an automated emergency warning system (PKM 361 of 11.08.2023).

Strategies and programs. The Strategy for the Development of Cooperation between Central Asian countries in disaster risk reduction (2022-2030) continued to be implemented.²²² Uzbekistan participated in a meeting of the Working Group (experts) of the Regional Forum – Meeting of the Heads of Emergency Authorities of Central Asian countries (Almaty, October 4). Subsequently, Uzbekistan and Kazakhstan signed a cooperation plan for emergency prevention and response (2024-2025).

Preventive measures. Improved emergency response: 211 tactical exercises were conducted to prevent mudflows, 105 km of ditches and channels were cleared, and 16 new fire and rescue units were commissioned (12 built, 4 repaired).

Events. Seminars/trainings were held on: prevention of mudslides in the water sector (February 10), emergency prevention in hydropower (February 22), the use of unmanned aircraft for emergency tasks (May 14-18); the procedure for training on the specialized platform "Online school of unmanned aviation" (May 26); the use of GIS technologies and emergency mapping (June 5-9).

The University of California San Diego (UCSD) and the Republican Center for Seismic Forecasting Monitoring

at the Ministry of Emergency Situations of Uzbekistan jointly installed a new modern seismic station²²³.

Regional cooperation. Uzbekistan and Kyrgyzstan signed a cooperation agreement²²⁴ on emergency prevention and response (PP-136, April 26, 2023), followed by a specific action plan for 2023-2024.

The Ministry of Emergency Situations of Uzbekistan took part in: (1) 2nd meeting of the Emergency Ministers of the Organization of Turkic States (Baku, September 6-8); (2) 14th meeting of the Council of the Center for Emergency Situations and Disaster Risk Reduction (November 9); (3) regional consultative seminar on international disaster response law (December 5).

Foreign Policy and International Cooperation

In 2023, the President of Uzbekistan made [official and working visits](#) to Singapore, the Kyrgyz Republic, Egypt, Azerbaijan, Turkey, Germany, the Russian Federation, China, Italy, Iran, Kingdom of Saudi Arabia, Turkmenistan, Hungary, Tajikistan, USA, Qatar, Kazakhstan, UAE.

In turn, the country was [visited](#) by presidents of foreign countries (Singapore, France, Qatar, the Kyrgyz Republic, Turkey, Iran, Tajikistan, Turkmenistan, Azerbaijan, Italy), country delegations (Iran, Azerbaijan, USA, China, UAE, Turkey, Russia, Czech Republic, France, Korea, Pakistan, Kingdom of Saudi Arabia, Qatar), and heads and delegations of international organizations (Economic Cooperation Organization, OTS, UN, World Bank, AIIB, EU, OSCE/ODIHR, IDB, CIS, EBRD, SCO, UNWTO, FAO).

Most significant events in the foreign policy of Uzbekistan. Uzbekistan pursues an independent foreign policy focused on national interests, aiming to strengthen sovereignty, enhance international standing, secure the region, and promote economic interests.

The Strategy "Uzbekistan-2030",²²⁵ approved in 2023, outlines the following foreign policy goals: implementing a people-centered foreign policy; elevating Central Asian cooperation to a new level; developing mutually beneficial ties, expanding international cooperation, and joining the WTO; supporting compatriots abroad and fostering dialogue.

For the statements made by the President of Uzbekistan during summits and meetings, see https://president.uz/en/lists/category/5?menu_id=12.

Development of alliances and strategic partnerships. Within the **CIS**, Uzbekistan participated in: (1) meetings of the: Council of the Heads of States (Bishkek, Octo-

²²¹ the Sustainable Development Solutions Network (SDSN) was launched in 2012 to mobilize global scientific and technical knowledge for the practical solution and implementation of the SDGs

²²² according to the "Strategy for achieving the goals of the Sendai Framework Program for Disaster Risk Reduction for 2015-2030 in the Republic of Uzbekistan (PKM 299 of 04/12/2019)

²²³ funded by the U.S. Government

²²⁴ signed on 27.01.2023 in Bishkek

²²⁵ approved by Decree UP-158 of 11.09.2023

ber 13), Council of Heads of Government (Bishkek, October 26; Sochi, June 8), Council of Foreign Ministers (Bishkek, October 12; Samarkand, April 14), Economic Council (December 8, September 22, June 23, March 17); (2) informal Summit of the CIS Heads of State (St. Petersburg, December 26).

Chairmanship in international organizations. In 2023, Uzbekistan chaired the ECO, within the framework of which the 16th ECO Summit was held under the motto "Together towards economic stability and development". The participants adopted the Tashkent Communique (Tashkent, November 8-9).



Promotion of the national interests and reinforcement of the country's image

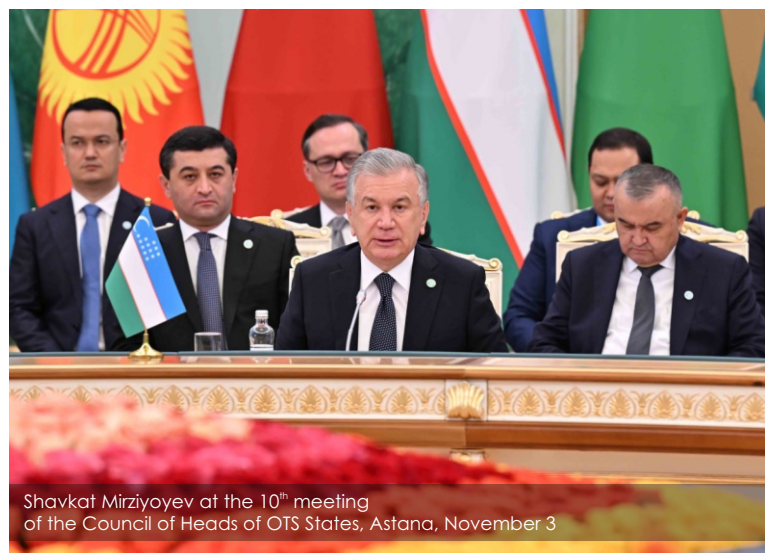
The UN. Speaking at the 78th session of the UN General Assembly, Sh.M.Mirziyoyev noted that the priority goal of Uzbekistan's foreign policy remains the transformation of Central Asia into a peaceful and prosperous region. He also raised the need to unite countries based on the fact that common interests are above existing contradictions and put forward a number of initiatives aimed at solving the most pressing issues on the global and regional agenda (New York, September 19).

The Uzbek delegation took part in the UN Water Conference, during which a joint statement of the Central Asian states was adopted (New York, March 22-24).

SCO. The President of Uzbekistan took part in a meeting of the Council of Heads of SCO Member States, during which the matters related to multilateral cooperation across the entire spectrum of SCO activities were discussed. Following the meeting, 14 joint documents were signed or approved, including the New Delhi Declaration, a Statement on Countering Radicalization Leading to Terrorism, Separatism and Extremism, a Statement on cooperation in the area of digital transformation (July 4, online).

OTS. The President of Uzbekistan took part in: 2nd extraordinary summit of the OTS, during which the prospects of multilateral cooperation in the field of emergency

management and humanitarian assistance, as well as coordination of efforts in preventing and overcoming the consequences of natural disasters were discussed (Ankara, March 16); 10th meeting of the Council of Heads of OTS States, during which an exchange of views took place on the state and prospects of multifaceted relations within the framework of OTS and a number of agreements and decisions were adopted on priority areas (November 3, Astana). ZRU-875 of 01.11.2023 ratified the agreement on the establishment of the Turkic Investment Fund (Ankara, March 16).



Shavkat Mirziyoyev at the 10th meeting of the Council of Heads of OTS States, Astana, November 3

For his outstanding contribution to strengthening the unity of the Turkic family, actively promoting the interests and views of the Turkic countries in the international arena Mirziyoyev was **awarded** the "Highest Order of the Turkic World".

The second meeting of the Security Council Secretaries of the OTS member countries was held in October in Tashkent.

Events. Uzbekistan hosted also several events in the area of tourism (International Travel Bazaar 2023 Tourism Forum, 25th session of the General Assembly of the United Nations World Tourism Organization), investment (2nd Tashkent International Investment Forum), innovations and ICT (InnoWeek.Uz-2023, ICT Week Uzbekistan-2023), as well as the 32nd annual meeting of the EBRD Board of Governors and the 21st session of the Committee for the Review of the Implementation of the UN Convention (CRIC 21).

Sources:

Official sites of the:

The President (<https://president.uz/ru>);

Legislative Chamber of the Oliy Majlis (<http://parliament.gov.uz/ru>);

Ministry of Foreign Affairs (<https://mfa.uz/ru>);

Ministries of Investment, Industry and Trade (<http://mift.uz/ru>);

Ministry of Water Management (<https://suvchi.gov.uz/ru>);

Ministry of Energy (<http://minenergy.uz/ru>);

Ministries of Ecology, Environmental Protection and Climate Change (<http://eco.gov.uz/ru>);

Ministry of Agriculture (<http://www.agro.uz/ru>);

Ministry of Construction and Housing and Communal Services (<https://kommunal.uz/ru>);

Ministries of Emergency Situations (<https://fvv.uz>);

The National Database of Legislation (<http://www.lex.uz>);

Institute of Strategic and Interregional Studies under the President of the Republic of Uzbekistan (<http://isrs.uz/ru>);

ICWC of Central Asia (<http://www.icwc-aral.uz>);

IFAS Executive Committee (<https://ecifas-tj.org>);

IFAS Agencies (<http://aral.uz/wp>)

News agencies:

<http://norma.uz>;

<https://dunyo.info/ru>;

<http://ru.sputniknews.ru>;

<http://kun.uz>;

<http://www.uzdaily.ru>



6

SECTION

United Nations
and its Specialized
Agencies

6.1. General Assembly



78th Session
United Nations
General Assembly

General Assembly (GA) occupies a central position as the chief deliberative organ of the United Nations. It is comprised of all Members of the United Nations, each having one vote. It is authorized to discuss full spectrum of issues covered by the Charter. The UNGA convenes on September each year.

The 78th Session of the UN General Assembly themed “Rebuilding trust and reigniting global solidarity: Accelerating action on the 2030 Agenda and its Sustainable Development Goals towards peace, prosperity, progress and sustainability for all” was opened under the chairmanship of [Dennis Francis](#), Trinidad and Tobago, in New-York on 19 September.

The UNGA [High-level week](#) comprised seven summits that adopted four political declarations on universal health, pandemic preparedness, fight against tuberculosis, and accelerating actions for achieving the SDGs.

The 2023 SDG Summit marked the beginning of a new phase of accelerated progress towards the Sustainable Development Goals ([September 18-19](#)).

Statements from Central Asia countries at the general debate of the UNGA 78th Session

Statement by the President of the Republic of Kazakhstan



“Diplomacy and dialogue should always prevail in seeking the resolution of international disputes. We must therefore together exert the greatest efforts to stabilize the only system of global institutions we have”

Security Council reform. H.E. Tokayev stressed the need to stabilize the system of global institutions, underlining that the world will not succeed in tackling these challenges without a comprehensive reform of the Security Council. He further emphasized that “the voices of middle Powers and all developing countries need to be amplified and clearly heard”. Since the Council appears unable to move beyond deadlock, it should become more representative so other countries, including Kazakhstan, can play a greater role in maintaining peace and security.

Climate change. “...Even if we successfully limit global temperature rise to 1.5 degrees by 2030 – which looks increasingly unlikely – we will experience between 2 and 2.5 degrees of temperature rise in Central Asia. Despite the long road of the Paris Climate Agreement, we must all remain committed to a carbon-free future. The climate agenda should not be used to introduce measures restricting trade and investment cooperation. Instead we must focus on positive change, such as Climate-Positive Actions identified by the United Nations including investing in green jobs, ending fossil fuel subsidies, and ensuring that all climate actions are fair, inclusive, and involve women at all levels.” The Head of Kazakhstan also noted that without proper funding, however, ambitious plans will remain unmet.

He proposed to launch Just Energy Transition Partnership in Kazakhstan. A gradual, sustainable, and socially responsible transition away from coal would be a big bonus for global climate change goals. Kazakhstan's initiative to open the Project Office for Central Asia on Climate Change and Green Energy in Almaty can lead on these issues. Kazakhstan looks forward to hosting a Regional Climate Summit in Kazakhstan in 2026 under UN auspices.

Water. The President underlined in his statement that **water scarcity** in CA has created serious economic and other challenges in transboundary river basins. This will be replicated across the world: by 2040 global demand for water may outstrip supply by as much as 40%. “...We must therefore combine political will and economic resources to address this critical global issue simultaneous with climate action. Next year, we will assume chairmanship of the International Fund for Saving the Aral Sea. We will continue efforts to

prevent further degradation of the environment and its impact on livelihoods around what was once the fourth largest lake on the planet. Today it is the world's largest lake – the Caspian Sea – that also faces ecological challenges including shallowing, water diversion, and the pollution of flora and fauna. Saving the Caspian Sea must be a matter of common priority that requires long-term international cooperation."

Food security and Trans-Caspian International Transport Route. The President also raised the issue of global food security. Particularly, Kazakhstan is ready to act as a regional food supply hub. "We have all the required resources, infrastructure and logistics in place

for these purposes. Kazakhstan is already a reliable link for nearly 80% of overland transit traffic between Asia and Europe." He also addressed the idea of Trans-Caspian International Transport Route, the so called "Middle Corridor", which can significantly strengthen East-West engagement and increase the pace of trade between critical markets.

Statement summary:

<https://gadebate.un.org/en/78/kazakhstan>

Full version: https://gadebate.un.org/sites/default/files/gastatements/78/kz_en.pdf

Video: <https://www.youtube.com/watch?v=3EomtiitqDfw>

Statement by the President of the Kyrgyz Republic

Cooperation among the Central Asian countries.

"Strengthening relations with the countries of the region is a natural top priority for our country", emphasized Kyrgyz President, noting that in recent years "regional cooperation in Central Asia has been developing consistently and in all directions." President Zhaparov envisions CA as a single geo-economic space, a "geopolitical intermediary" for the international community. On the path to full regional integration, it is necessary to resolve issues related to the legal delineation of state borders. The President highlighted that after almost 30 years of negotiations, Kyrgyzstan and Uzbekistan signed an Agreement on the legal delineation of the state border. "We want to live in peace, harmony, and friendship with all our neighbors", President Zhaparov underscored.

SDGs. President Zhaparov noted in his speech that the concluded SDG Summit once again reaffirmed the importance of unwavering commitment to sustainable development, identifying challenges in their implementation, and outlining specific commitments by states. "We are halfway to 2030, the deadline for reaching Sustainable Development Goals (SDGs). Kyrgyzstan, in its pursuit of achieving SDGs currently ranks 45th out of 166 UN Member States. We aim to be among the top 30 countries in reaching SDGs by 2030. The international community must breathe new life into these goals and strengthen solidarity in their attainment. It's important that we don't get lost in numbers, schedules, diagrams, and other 'economic intricacies,' because the essence and core of the 17 Goals are about people themselves."

Financing climate actions. As President Zhaparov said, the level of annual funding announced in 2015 under the Paris Agreement is no longer sufficient today and should be increased. "Another problem is that most climate finance is provided to low and middle-income countries in the form of loans", he noted and informed that he addressed partners with a request to exchange external debt for environmental projects but received no reaction from many of the developed countries. "Government of Germany was the only country that wrote off 15 million euros of debt", added Kyrgyzstan's leader.



"Kyrgyzstan supports the UN as the only universal, intergovernmental, international Organization mandated by all Member States to find solutions to the challenges that constantly arise"

Glaciers. "In light of global climate change, mountainous regions have been particularly vulnerable. In Kyrgyzstan, mountains occupy about 94% of the territory. Mountain glaciers are an integral part of the Earth's cryosphere, influencing not only the climate of our planet but also providing a habitat for flora and fauna and supplying water to people. Climate change in Central Asia has led to intensive melting of glaciers. If earlier it was predicted that by 2050 the area of glaciers in Kyrgyzstan would be reduced by half, and by 2100 they could disappear altogether, now there is reason to believe that this will happen much faster. This leads to aggravation of problems throughout the region: such as lack of water for drinking and agriculture, land degradation, and a threat to food security", President Zhaparov warned calling the international community to unite efforts to overcome these and other challenges.

"As you may know, in 2022, at the initiative of our country and the Italian Republic, the United Nations

General Assembly unanimously adopted the resolution on 'Sustainable Mountain Development' co-sponsored by 110 Member States. This document declared the years from 2023-2027 as Five Years of Action for the Development of Mountain Regions." "A national 'Roadmap' for the implementation of the 'Five-Year Period of Action for the Development of Mountain Regions for 2023-2027' has been developed, which will be adopted shortly. The 'Roadmap' includes measures at the global, regional, and national levels, including within the framework of existing and prospective projects and measures related to the Sustainable Development Goals. As the concluding stage of the "Five-Year Action", we

plan to host the Second Global Mountain Summit "Bishkek+25", in Kyrgyzstan in 2027, 25 years after the First Summit", announced Kyrgyz President and invited everyone "to actively participate and make concrete commitments to preserve mountain ecosystems."

Statement summary:

<https://gadebate.un.org/en/78/kyrgyzstan>

Full statement: <https://mfa.gov.kg/ru/osnovnoe-menyu/press-sluzhba/novosti/prezident-sadyr-zhaparov-vystupil-na-78-y-sessii-generalnoy-assamblei-onn>

Video: <https://www.youtube.com/watch?v=14SQY8VjXhg>

Statement by the President of the Republic of Tajikistan



Friends of Glaciers and beyond to implement the mandates of the Resolution. Tajikistan is convinced that this initiative will give a powerful impetus to a new global movement to take necessary collective action and to protect glaciers from intense melting. I would also like to highlight the successful outcomes of the United Nations Conference on the Midterm Comprehensive Review of the Implementation of the Objectives of the International Decade for Action, **"Water for Sustainable Development", 2018-2028**. He noted that Dushanbe will host the Third High-Level Conference on the Implementation of the Decade of Action "Water for Sustainable Development" in 2024 and the International Conference on Glaciers' Preservation in 2025. "We expect the international community to take an active part in these important international events. As a proactive and champion country in the global water and climate agenda, Tajikistan will continue to strive to promote cooperation between countries and organizations", stated Emomali Rahmon.

Climate-related disasters. Most of his speech, President Rahmon dedicated to climate change issues. Tajikistan actively supports UN mitigation programs and puts forward its own initiatives in this area.

With more than 13,000 glaciers, 60 per cent of water resources in Central Asia emanate from Tajikistan. Nevertheless, more than 1,000 glaciers have melted – this will have significant implications for the food security, water availability and ecosystems of the region and beyond, he warned. "The intense **melting of glaciers** as the primary source of freshwater requires the adoption of concrete measures, including research, data collection and processing, and enhanced international cooperation. I express my gratitude to all Member States for their cooperation in adopting the UNGA Resolution 77/158 from December 14, 2022 on **International Year of Glaciers' Preservation, 2025**. I invite all interested parties to join efforts to ensure the targeted implementation of this Resolution. We stand ready to work with the international community within the newly created Group of

Regional solidarity. The Tajik leader noted successful cooperation among the countries in the region that creates favorable conditions for addressing current challenges, promoting peace and responding effectively to emergencies. In this context, he also noted a difficult political and economic situation in Afghanistan that is affecting the region as a whole. Emomali Rahmon stated that Tajikistan created conditions to continue providing humanitarian assistance and its infrastructure to support the Afghan people and appealed to the international community to increase the volume of humanitarian aid to the suffering people of Afghanistan.

Statement summary:

<https://gadebate.un.org/en/78/tajikistan>

Full version:

https://gadebate.un.org/sites/default/files/gastatements/78/tj_en_0.pdf

Video: <https://www.youtube.com/watch?v=z6R0r8YtwPE>

Statement by the President of Turkmenistan

UN's role. The President of Turkmenistan proposed to start discussing the possibilities of preparing a Global Security Strategy based on the principles of the UN Charter and universally recognized norms of international law and reflecting the presence of recently emerged new risk factors.

Climate change. "Turkmenistan considers that the solution of urgent climate and environmental problems will be among the key areas of UN activity for the coming years, especially the issues related to global methane commitments. I must say that after joining the Paris Climate Agreement in 2017, a number of relevant national programs were adopted in our country to reduce and eliminate the negative impact of methane emissions. First and foremost, we are talking about a step-by-step transition to modern, climate-friendly, and resource-saving technologies, especially in the fields of energy, industry, and transport." "As an important step in adopting a strategic approach to environmental problems in Central Asia, Turkmenistan proposes to establish a specialized agency, the **Regional Center for Climate Change Technologies in Central Asia**, which will work on climate issues in a substantive and systematic way. We are ready to provide the organizational and technical conditions for the functioning of such a Center in Ashgabat, the capital of Turkmenistan."

Caspian ecology initiative. President Berdimuhamedov recalled the confirmation by all participants of the Sixth Caspian Summit in Turkmenistan last summer of their readiness for close cooperation on ecological issues. "I believe that this creates good opportunities for the start of a broadbased and systemic interaction of coastal countries with the UN", stated Serdar Berdimuhamedov, proposing to establish the Cas-



"...it is time for the UN to pay more attention to ecological problems in Central Asia. There is a need for proactive consideration of implementing concrete measures to create an all-inclusive environmental strategy for our region ..."

pian Ecology Initiative in close cooperation with the UN. It "could become an international platform for productive and professional interaction on a wide range of issues related to the protection of the Caspian Sea and its biological resources."

Statement summary:

<https://gadebate.un.org/en/78/turkmenistan>

Full version: https://gadebate.un.org/sites/default/files/gastatements/78/tm_en.pdf

Video: <https://www.youtube.com/watch?v=PwmCej4GJxA>

Statement by the President of the Republic of Uzbekistan

Unity of international community. On the background of numerous crises that the world currently faces, the Uzbek leader called on countries to unite their efforts bearing in mind that common interests should be placed above existing conflicts. He recalled the Samarkand Solidarity Initiative aimed at common security and development. "Our main goal is to comprehensively understand the responsibility for the present and future of our countries and peoples and to engage in a global dialogue of all parties that are ready for open and constructive cooperation."

Climate change. "Currently, the world is facing a critical environmental situation. The triple planetary crisis – crises of the climate change, the loss of biodiversity and the environmental contamination are worsening. In such challenging conditions, while Central Asia continues to grapple with the Aral Sea tragedy, the region is becoming one of the most vulnerable parts of the world in the face of climate change. Uzbekistan is doing its best to mitigate the consequences of the Aral Sea tragedy, which remains a global



"...transforming Central Asia into a peaceful and prosperous region will remain a priority goal of Uzbekistan's foreign policy"

problem. In recent years, 1.7 million hectares of green areas with drought tolerant plants had been created on the dried up bed of the Aral Sea. The support of the international community is essential for us to continue these efforts."

Over the next thirty years, the air temperature in the region has increased by one and a half degrees. If this tendency continues, the flow of the two major rivers in the region – Amu Darya and Syr Darya – may decrease by 15% in the next twenty years. It is expected that per capita water supply will decrease by 25% and agricultural yields – by 40%, warned President Mirziyoyev. "Given this context, we support the establishment of the position of the Special Representative of the UN Secretary General for Water Resources. We are in favor of attracting and introducing the

state-of-art technologies in the process of establishing a Water Saving Technologies Platform in Central Asia, using the UN-Water mechanism. We are building up a systematic cooperation as part of the Green Development Program adopted by the countries of the region. Such a partnership completely meets our interest and is aimed at preventing threats related to climate change. In this context, I believe that the introduction of the Central Asian Climate Dialogue would be expedient."

Statement summary:

<https://gadebate.un.org/en/78/uzbekistan>

Full version: https://gadebate.un.org/sites/default/files/gastatements/78/uz_en.pdf

Video: <https://www.youtube.com/watch?v=E2y9Ks3SIVM>

Selected Resolutions on Water, Environment and Development Adopted by the UNGA 78th Session:

Disaster risk reduction (A/78/152); Protection of global climate for present and future generations of human-kind (A/78/153); United Nations Decade on Combating Sand and Dust Storms, (2025-2034) (A/RES/78/314); Combating sand and dust storms (A/78/158); Sustainable, safe and universal water, sanitation, hygiene, waste and electricity services in health-care facilities (A/RES/78/130); Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction (A/78/272); The human rights to safe drinking water and sanitation (A/RES/78/206); Eradicating rural poverty to implement the 2030 Agenda for Sustainable Development (A/78/165); Science, technology and innovation for sustainable development (A/RES/78/160); Implementation of the United Nations Convention to Combat

Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (A/78/154); Agriculture development, food security and nutrition (A/RES/78/168); Implementation of the Convention on Biological Diversity and its contribution to sustainable development (A/RES/78/155); Central Asia facing environmental challenges: fostering regional solidarity for sustainable development and prosperity (A/RES/78/147); Agricultural technology for sustainable development (A/RES/78/144); Sustainable development: International cooperation and coordination for the human and ecological rehabilitation and economic development of the Semipalatinsk region of Kazakhstan (A/RES/78/142); Information and communications technologies for sustainable development (A/RES/78/132).

2023 Conference on the Midterm Comprehensive Review of the Implementation of the Objectives of the International Decade for Action, "Water for Sustainable Development", 2018-2028



UNGA by its resolution (A/RES/73/226) decided to convene, in New York, from 22 to 24 March 2023, coinciding with World Water Day, the United Nations Conference on the Midterm Comprehensive Review of the Implementation of the Objectives of the International Decade for Action, "Water for Sustainable Development", 2018-2028.

UN Water Conference 2023 is a second over almost 50 years²²⁶ water conference organized by the UN to catalyze joint and concerted actions to tackle global water challenges and accelerate progress on SDG6 (Ensure availability and sustainable management of water and sanitation for all).

The Conference, co-hosted by the Governments of Tajikistan and the Netherlands, featured plenary meetings, a number of high-level special events, interactive dialogues, and over 500 side events. The Conference brought together around 10,000 participants – heads of state and government, official UN member country delegations, representatives of 100 regional and international organizations, civil society, business

²²⁶ the first UN water conference took place in Mar del Plata, Argentina in 1977

leaders, youth, academia, and stakeholders from a number of sectors. Central Asia was represented by delegation from all five countries.

The conference concluded with generation of over 700 commitments by governments and stakeholders towards accelerating progress for the second half of the International Decade for Action and the 2030 Agenda for Sustainable Development, including the

appointment of a Special Envoy on Water and a new political momentum to achieve SDG6.

The CA countries have made a [joint statement](#), by which they committed to further strengthening regional cooperation to achieve sustainable development and made a number of obligations at regional and national levels.

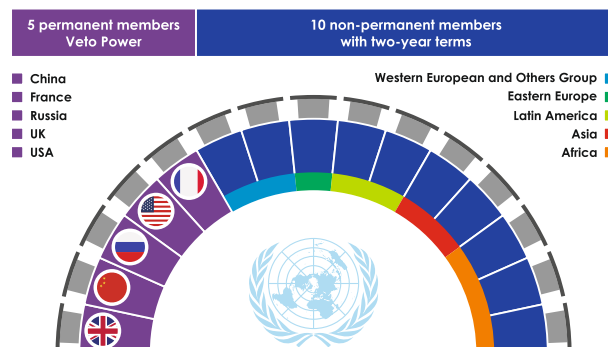
Conference web-site: sdgs.un.org/conferences/water2023

6.2. Security Council

The Security Council (SC) has primary responsibility for the maintenance of international peace and security; all UN members are obliged to follow its decisions. It has 15 members, including 5 permanent members with veto power (Great Britain, China, Russia, USA, France) and 10 non-permanent, elected by the UNGA for two-year terms of five countries each year.

UNSC activity in 2023 on energy, climate and natural resources

SC organized: (1) ministerial-level Arria-formula meeting on "Protection of civilians: Achieving a better protection of water-related essential services and infrastructure for the civilian population during armed conflicts". The meeting also explored how addressing the adverse effects of climate change can help to inform measures to protect water services and related infrastructure ([March 22](#)); (2) open debate on sea-level rise and its implications for international



peace and security ([February 13](#)) and on climate change, peace and security under the "Threats to international peace and security" agenda item ([June 13](#)).

Source: <https://www.securitycouncilreport.org/energy-climate-and-natural-resources/>

6.3. Secretariat

The Secretariat is one of the main organs of UN. At the head of the United Nations Secretariat is the Secretary-General, appointed by GA upon recommendation of UNSC for a 5-year term. Since January 2022, António Guterres (Portugal) has been serving as the Secretary-General.

Each year, the Secretary-General reports on the work of the Organization, including priority areas of the UN's activity and future plans. [2023 Report](#) highlights the work in the following key area: (1) **sustainable development** (United Nations country teams led by resident coordinators work in 162 countries and territories to help to implement the 2030 Agenda); (2) **peace and security** (deployed 53 peacekeeping operations, special political missions, and support offices to prevent conflict and support peace building); (3) **development in Africa** (helping 54 countries to leapfrog development challenges and catalyze a sustainable and equitable recovery from COVID-19 and the impact of cascading crises); (4) **human rights** (facilitated assistance for 47,000 victims of torture and 13,000+ victims of contemporary forms of slavery); (5) **humanitarian assistance** (helped to mobilize a record \$30B to assist 216M people across 69 countries and territories); (6) **justice and international law** (as of



“ The women and men of the United Nations are determined in our efforts to address today's cascading crises and set humanity on a new path to peace, stability and prosperity. ”

António Guterres, Secretary-General

2023, 643 multilateral treaties addressing matters of worldwide interest are deposited with the Secretary-General); (7) **disarmament** (channeled funds to 112 arms-control-related projects benefiting 147 Member States); (8) **drugs, crime and terrorism** (assisted 29

Member States in drafting or revising firearms legislation and supported 60 countries in countering and preventing cybercrime).

Source: UN

6.4. UN Development Program (UNDP)

The United Nations Development Program (UNDP) is the UN's global development network that promotes positive change and gives countries access to the knowledge, experience and resources that help improve people's lives.

It operates in 177 countries and territories.



UNDP activities in the Central Asian countries in 2023

UNDP in Kazakhstan

UNDP actively assists Kazakhstan in fulfilling its Paris Agreement commitments. This includes expanding green economy, introducing innovative farming techniques, strengthening disaster response systems and financing clean technologies.

Nature, land resources and ecosystem management.

Continued: (1) [Sustainable food systems and improved ecosystem services](#) (2021-2026) aimed to trigger wide-scale adoption of efficient land management technologies and promote green value chains to reduce degradation of productive agricultural land and associated high value ecosystems in Northern Kazakhstan Landscape; (2) [Reintroducing turan tiger](#) (2021-2025); (3) [Sustainable forest management](#), the goal of which is to preserve and sustainably manage the key globally important ecosystems for multiple benefits (2018-2024).

Energy and climate change. Continued: (1) [Low-carbon urban development in Kazakhstan](#) (2015-

2024); (2) [Financial support programs for entrepreneurs implementing energy efficiency and renewable energy projects](#); (3) [Attracting investors in the field of energy efficiency](#) (2021-2026) to advance energy efficiency of buildings, infrastructure, and other facilities in Kazakhstan.

Completed projects: (1) [Just Transition – green biofuel to benefit women in rural areas of Kazakhstan](#) (2022-2023), a pilot project on alternative fuel introduction; (2) [Leveraging Nationally Determined Contributions \(NDCs\)](#) to achieve net-zero emissions and climate-resilient development, in response to the climate emergency (2022-2023) aimed at introducing new climate smart technologies that can be scaled up on most of the farms, in the field of renewable energy, digitalization for water use, and proper drought control for small- and medium-size agriculture enterprises.

Source: open.undp.org/projects

UNDP in Kyrgyzstan

UNDP helps Kyrgyzstan achieve its national priorities, including in the area of green growth, access to green financing, management and fighting of climate change. In 2023, UNDP Kyrgyzstan implemented project portfolio for \$20.8 million.

Climate change, environment and energy. Ongoing projects: (1) [Partnership of Action for Green Economy](#) (2017-2024), aimed to assist Kyrgyzstan to transfer to green economy; (2) [Strengthening climate resilience of the Batken Province of the Kyrgyz Republic through introduction of climate smart irrigation and mudflow protection measures](#) (2019-2023); (3) [Climate change and resilience in Central Asia](#) (Fergana Valley, 2021-2024) – completed assessments of climate risks, vulnerabilities and mapped climate hotspots; developed early warning for four selected pilot communities in three provinces of the Fergana Valley con-

sidered as highly vulnerable to climate change; (4) [Advancing development of a National Adaptation Plan \(NAP\) process for medium and long-term adaptation planning and implementation in the Kyrgyz Republic](#) (GCF/UNDP, 2021-2024), which prepares sectoral adaptation plans in addition to the national plan and developed climate-related statistics, including 95 specific indicators.

The Project "[Conservation of globally important biodiversity and associated land and forest resources of Western Tian Shan mountain forest ecosystems to support sustainable livelihoods](#)" (since 2017) was completed in 2023. Three field studies were conducted to assess the region's biodiversity and ecological corridors and buffer zones were mapped, and snow leopard population was quantified. Based on this, an ecological corridor spanning over 64 thousand ha

and a buffer zone exceeding 25 thousand ha were established in Western Tien Shan.

SDG. Completed projects: (1) [National SDG Acceleration Support Platform](#) (2018-2023) – an anchor point for advancing SDG integrated approaches, to bring together work-streams for transformation impact; (2) [UN Joint SDG Fund, Reinforce the SDG Financing](#)

[Architecture](#) (2020-2023), aimed to create an Integrated National Financing Framework (INFF), with the ambition to improve the efficiency, effectiveness, and transparency in the use of public funds and governance of private finance to support the implementation of Kyrgyzstan's National Development.

Source: undp.org/kyrgyzstan; open.undp.org/projects

UNDP in Tajikistan

UNDP within the framework of its [Country Programme for Tajikistan](#), 2023-2026 renders assistance to achieve: (1) sustainable, inclusive, and green economic growth; (2) integrated management of climate and environmental risk and (3) people-centred governance and rule of law. In 2023, UNDP's project portfolio in Tajikistan totaled \$23.6 million.

Natural resource management. Continued: (1) [Improvement of Water Resources Management in Khatlon Region](#) (2022-2024) aimed to improve livelihoods, water supply and sanitation, irrigation and drainage systems of rural communities in Khatlon region; (2) [Technical support to Tajikistan Water Sector Reform](#) (2022-2024) to achieve an efficiently planned, developed and managed water sector; (3) [An integrated landscape approach to enhancing the climate resilience of small-scale farmers and pastoralists in Tajikistan](#) (2019-2025) aimed to introduce an integrated approach to landscape management to develop the climate resilience of rural communities in Tajikistan.

Climate change and energy. Continued: (1) [Green Energy SME Development Project](#) (2018-2024), the strategic objective is to facilitate the transformation of Tajikistan's energy sector, in particular the emergence of independent energy entrepreneurs. Draft "Concept for the development of the energy sector (RES)" was elaborated and coordinated with the Government of the Republic of Tajikistan, 543 solar, wind and BESS stations of generating capacity of 6,721 kW were installed; (2) [Enabling an Effective National Adaptation Plan \(NAP\) in Tajikistan](#) (2020-2023), the main goal of which is to establish the institutional arrangements and human/institutional capacities to develop and execute National Adaptation Plans to implement Tajikistan's National Climate Change Adaptation Strategy; (3) [Leveraging Nationally Determined Contributions to achieve net-zero emissions and climate-resilient development, in response to the climate emergency](#) (2022-2023) aimed at strengthening community resilience to climate-induced disasters through nature-based solutions.

Source: open.undp.org/projects

UNDP in Turkmenistan

The focus areas of UNDP's work in Turkmenistan include assistance to better governance and inclusive economic growth, greater country resilience and adaptation to adverse effects of climate change. In 2023, UNDP's project portfolio in Turkmenistan included 27 projects.

Climate change and environmental protection. Continued: (1) [Conservation and sustainable management of land resources and high nature value ecosystems in the Aral Sea Basin for multiple benefits](#) (2021-2026), during which awareness raising and knowledge building activities were conducted to address capacity gaps of key stakeholders, the needs of local population and farmers around the buffer zones were determined, the list of biodiversity indicator species and their population status was confirmed, recommendations on sustainable pasture management options were drafted, etc.; (2) [Developing a National Adaptation Planning process](#)

[in Turkmenistan](#) (2021-2024) – series of workshops on integration of adaptation to climate change in water use planning was held; (3) [Sustainable Cities in Turkmenistan: Integrated Green Urban Development in Ashgabat and Awaza](#) (2017-2024) – a work meeting was held with representatives of ministries and agencies in Turkmenistan to discuss key area of 'green' construction and sustainable urban development in the country.

SDG. The Project "[Partnering for SDG acceleration](#)"²²⁷ was launched in 2018. In 2024 it is planned to launch the third phase of the Project, which is to contribute to sustainable development by strengthening the capacity of the Ministry of Finance and Economy of Turkmenistan as the responsible body for coordinating activities for the implementation in Turkmenistan of the Sustainable Development Goals.

Source: www.tm.undp.org and open.undp.org/projects

²²⁷ a joint platform for coordinating the work of the relevant ministries and departments of Turkmenistan and UN agencies in the implementation of the SDGs

UNDP in Uzbekistan

The focus areas of UNDP activities in Uzbekistan are strongly aligned with the National Development Strategy of Uzbekistan (2022-2026) and include programmes to promote effective democratic governance, achieve inclusive and sustainable growth, sustain a clean environment, take action for the climate, and advocate for equality between men and women.

Land and ecosystem management and sustainable development. Continued: (1) [Sustainable Rural Development](#) (2022-2025) to create favorable living conditions for rural residents and ensure their access to basic infrastructure, socio-economic services including access to health and education; (2) [Climate resilient livelihoods of horticultural producers in Fergana Valley in Uzbekistan](#) (2022-2023); (3) [Conservation and sustainable management of lakes, wetlands, and riparian corridors as pillars of a resilient and land degradation neutral Aral basin landscape supporting sustainable livelihoods](#) (2022-2026); (4) [Facilitation and Support with Effective Implementation of the Integrated Roadmap for the Sustainable Development of the Aral Sea region](#) (2022-2024).

The Project "[Assisted afforestation for the vulnerable terrains](#)" (2022-2023) was completed. 100 ha in Termez city and three districts in Surkhandarya province were planted with erosion control forest-forming species.

Climate change. Continued: (1) [Promoting green urban development in Tashkent city through accele-](#)

[rating investments in low emission infrastructure](#) (2021-2027); (2) [Supporting an inclusive transition to a "green" economy in the Agri-food sector and development of a "climate-smart" Uzbek Agriculture Knowledge and Innovation System \(UAKIS\)](#) (2021-2025); (3) [Enhancing Multi-Hazard Early Warning System to increase resilience of Uzbekistan communities to climate change-induced hazards](#) (2021-2028).

The Project "[Supporting Self-Reliance through Climate Resilient Agriculture in the Aral Sea Region](#)" was launched in 2023. This project, which will last to 2025, aims at increasing self-reliance of people in the targeted communities by introducing climate resilient agricultural practices and social infrastructure.

SDG. The project "[Financing for sustainable development](#)" (2020-2023) has been completed. The Project was aimed to enhance dialogue, coordination, national capacities and policy measures aimed at facilitation of effective financing strategy for the achievement of national SDGs in Uzbekistan.

In 2023, UNDP supported²²⁸ the Government of Uzbekistan to mobilize private investment in its [green bond issuance](#) of \$350 million on the London Stock Exchange. Proceeds will be used to finance environmental, transportation and sanitation initiatives.

Source: www.uz.undp.org and open.undp.org/projects

The UN Multi-Partner Human Security Trust Fund (MPHSTF) for the Aral Sea region

On 27 November 2018, the UN Headquarters in New York hosted a High-Level Event on the launch of the UN Multi-Partner Human Security Trust Fund for the Aral Sea Region in Uzbekistan (MPHSTF). In 2023, the United Nations Office for Project Services (UNOPS) signed a Memorandum of Understanding between the UN participating organization and the UNDP Multi-Partner Trust Fund Office on [January 27](#).

As part of its International Climate Initiative (IKI), the Government of the Federal Republic of Germany contributed €700,000 to MPHSTF to specifically support reducing stress on local communities caused by the deteriorating environmental situation.

At COP28, MPHSTF jointly with partners organized a side event titled "[Showcasing the Aral Sea Restoration Activities for a Climate-Resilient Future](#)". The event underscored the urgency of collective action in confronting environmental catastrophes, emphasizing the role of such initiatives in fostering resilient development (Dubai, UAE, December 2).

Completed projects: (1) [Unleashing young people's and vulnerable citizens' creativity and innovation by strengthening their adaptive capacity to address the economic and food insecurities in the exposed communities of the Aral Sea region](#) (2021-2023); (2) [Towards universal health coverage and security in Karakalpakstan](#) (2021-2023).

Two additional joint programs were financed for a total amount of \$4.4 million. These are aimed to promote green and innovative community by empowering rural youth and women and to create climate resilient people-centered primary health care system: (1) [Empowering youth towards a brighter future through green and innovative development of the Aral Sea region](#); (2) [Laying the foundations for people-centered, climate resilient primary health care and water, sanitation and hygiene practices at healthcare facilities and schools in Karakalpakstan](#). Over 241,000 people and 5,000 school children are being benefited from access to climate resilient WASH services and healthy practices by the end of the project.

Source: www.aral.mptf.uz

²²⁸ UNDP supported the development of the SDG bond framework for the issuance and the identification of eligible green projects and strengthened capacities to support reporting on use of the proceeds

6.5. UN-Water

In 2003, the UN System Chief Executives Board for Coordination established the inter-agency coordination mechanism UN-Water. It coordinates the efforts of UN entities and international organizations working on water and sanitation issues. Over 30 UN organizations carry out water and sanitation programs.

Activities in 2023

The [UN-Water Integrated Monitoring Initiative for SDG 6](#) entered its third phase, with successful completion of the sufficient and credible [data compilation campaign 2023](#) and setting priorities for increased efforts and investments to ensure global coverage.

The consultation webinars for promoting gender contextualization of the SDG 6 global indicators were held ([November 14-16](#)).



The following publications have been launched: (1) [Blueprint for Acceleration: Sustainable Development Goal 6 Synthesis Report on Water and Sanitation 2023](#), which provides a “blueprint” to accelerate progress on water and sanitation (May 26); (2) [UN World Water Development Report²²⁹ 2023](#) “Partnerships and cooperation for water” describing how building partnerships and enhancing cooperation across all dimensions of sustainable development are essential to accelerating progress towards SDG 6 and realizing the human rights to water and sanitation.

Source: www.unwater.org

6.6. UN Economic Commission for Europe

The United Nations Economic Commission for Europe (UNECE) is one of five regional commissions of the United Nations set up in 1947. Its main scope of work includes environment, transport, statistics, sustainable energy, trade, wood products and forests, housing and land use, population and economic cooperation and integration.



UNECE Water Convention and its Protocol on Water and Health and the Convention on the Transboundary Effects of Industrial Accidents

UNECE is hosting the Secretariat of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention) and is providing the secretariat for the Protocol on Water and Health together with WHO/Europe (Protocol). In 2023, the Water Convention was working on implementation of its Program of Work for the period 2022-2024 and the Protocol was implementing decisions of its sixth session of the Meeting of the Parties (Geneva, 16-18 November 2022). In 2023 Kazakhstan was a Vice-Chair of the Bureau of the Water Convention. On December 26, 2023, Uzbekistan became the first Central Asian country to join the Protocol on Water and Health as a full Party.

UNECE is hosting the Secretariat of the Convention on the Transboundary Effects of Industrial Accidents as well. The Convention aims at protecting human beings and the environment against industrial accidents by preventing such accidents as far as possible, by reducing their frequency and severity and by mitigating their effects. On issues related to the prevention of accidental water pollution, the Water and Industrial Accidents Conventions work closely together,

including through their Joint Expert Group on Water and Industrial Accidents and in the implementation of capacity-building projects and activities, e.g. in the Syr Darya River Basin (see further information on the joint study below).

Events in 2023

Under the Water Convention and the Protocol on Water and Health, as well as the Convention on the Transboundary Effects of Industrial Accidents, UNECE organized: (1) Regional workshop on monitoring, assessment and information sharing in transboundary basins in Central Asia ([February 1-2](#)); (2) 7th meeting of the Global network of basins working on climate change adaptation ([May 25-26](#)); (3) 18th meeting of the Working Group on Integrated Water Resources Management (IWRM) ([June 19-21](#)); (4) Training workshop “From practitioner to practitioner: how to use the two global Water Conventions to promote cooperation on the ground” ([July 3-4](#)); (5) Global workshop on conjunctive management of surface water and groundwater: national to transboundary level ([October 16-17](#)); (6) 18th meeting of the Working Group

²²⁹ prepared by the UNESCO World Water Assessment Program on behalf of UN-Water

on monitoring and assessment (October 17-18); (7) Global workshop on the development of transboundary water cooperation agreements or other arrangements (November 7-8); (8) Strategic round-table on increasing resilience to climate change in the water and sanitation sector under UNECE-WHO/Europe Protocol on Water and Health (November 13-14); (9) 13th meeting of the Task Force on target-setting and reporting under the Protocol on Water and Health (November 14); (10) Global workshop on funding and financing transboundary water cooperation and basin development (December 5-6); (11) 8th meeting of the Task Force on the water-food-energy-ecosystems nexus (December 7-8); (12) 2nd Inter-institutional Working Group on mine tailings safety

and the prevention of accidental water pollution (IIWG) meeting (Astana, Kazakhstan, March 15); (13) 2nd IIWG meeting (Dushanbe, Tajikistan, April 4); (14) Inception meeting on the establishment of the Inter-Institutional Working Group on Tailings Safety and Prevention of Accidental Water Pollution (IIWG) in Uzbekistan (April 27); (15) Sub-regional workshop on strengthening mine tailings safety and the prevention of accidental water pollution in Central Asia (Dushanbe, Tajikistan, May 25-26);

Details: <https://unece.org/info/events/unece-meetings-and-events/environmental-policy/water-convention>; <https://unece.org/info/events/unece-meetings-and-events/industrial-accidents>

UNECE Activities in Central Asia in 2023

Transboundary cooperation. In 2023, UNECE continued to support the Chu-Talas Commission and was in close contact with UNDP regarding the process of SAP approval that resulted in signing of the joint statement on SAP by the Co-Chairs of the Chu-Talas Commission at its 32nd meeting on December 22.

Results of past projects are available on: <https://unece.org/environment-policy/water/areas-work-convention/transboundary-cooperation-chu-and-talas-river-basin> and in the brochure https://unece.org/DAM/env/water/Chu-Talas/RUS_ClimateProofingChuTalas_web_10Dec2018.pdf

National Policy Dialogues on Water (NPDs). Since 2019, the NPD process in Central Asian countries has been supported through a regional NPD project, implemented by UNECE in cooperation with OECD, as part of the WECOOP programme which supports the EU-Central Asia Working Group on Environment and Climate Change (WGECC).

NPD in Kyrgyzstan. The 18th Steering Committee Meeting of the National Policy Dialogue on IWRM in Kyrgyzstan was held in Bishkek and online on February 3. One of the key points for the discussion was on the developments of the National Water Strategy and Water Code, on the economic and financial instruments, donors coordination.

NPD in Tajikistan. The 16th Steering Committee meeting of the National Policy Dialogue was held in Dushanbe on February 15. The NPD provided a platform for a long-awaited presentation by the MEWR and discussion with the stakeholders on the progress in the implementation of the Programme of Reform of the Water Sector of the Republic of Tajikistan 2016-2025, on the National Water Supply and Sanitation Programme by 2030, a concept to support the higher education development for the water sector specialists training in Tajikistan by 2030. The meeting was also used for a dialogue between the donors and the authorities on then-planned commitments of the Republic of Tajikistan to the UN Conference on the Midterm Comprehensive Review of the Implementation of the Objectives of the International Decade for Action "Water for Sustainable Development" (2018-2028).

In the frame of the NPDs, the three investment concepts were developed and are further discussed with the authorities and IFIs: (1) water-saving irrigation technologies with elements of drip fertigation in the Chu-Talas basin (Kazakh side); (2) modernization of water distribution systems and water management infrastructure in the Chu-Talas basin (Kyrgyz side); (3) construction of riverbank protection and mudflow conducting structures in the Zarafshon River basin (Tajik side).

A study on the Syr Darya water quality and prevention of accidental water pollution. In the frame of the NPD, the following products were developed: (1) an in-depth report addressing the state of water resources, water quality issues and policies and institutions for water management, industrial safety and prevention pollution. The report contains concrete recommendations for riparian countries on transboundary contingency planning and reducing water pollution, including an executive summary with findings; (2) an inventory and map of 61 tailings management facilities (TMFs) – 9 in Kazakhstan, 30 in Kyrgyzstan, 12 in Uzbekistan, and 10 in Tajikistan – and 133 other hazardous industrial facilities, including 33 TMFs with potential transboundary effects in the Syr Darya basin; (3) the infographics visualizing key findings from the report.

Project reports and additional information are available at: <https://unece.org/pollution-syr-darya-river-emergency-situations>

3rd reporting exercise under the SDG indicator 6.5.2. UNECE and UNESCO are co-custodian agencies for the SDG indicator 6.5.2 on transboundary water cooperation. In 2023, all countries sharing transboundary rivers, lakes and aquifers were invited to submit national reports in the third reporting cycle. In Central Asia, Kazakhstan, Kyrgyzstan, Turkmenistan and Uzbekistan have submitted their reports. The national reports and the aggregated data will become publicly available in 2024.

2nd meeting of the Inter-institutional Working Group on tailings safety and the prevention of accidental water pollution in Kazakhstan. The meeting was dedicated

to discussing recent industrial safety developments and challenges at stake for Kazakhstan, in particular the recommendations deriving from the projects implemented under the auspices of the Convention on the Transboundary Effects of Industrial Accidents, such as alignment of Kazakhstan's national legislation with the provisions of the Convention. The WG: (1) reviewed the results of project on "Development of joint measures to prevent and respond to pollution of the Syr Darya river in emergency situations (Phase I)" and agreed to develop a Joint Contingency Plan between riparian countries; (2) considered the newly adopted "Road map for action to strengthen mine tailings safety within and beyond the United Nations Economic Commission for Europe region"; (3) agreed to work towards the development of its workplan for 2023, with concrete actions to strengthen mine tailings safety and reduce the risk of accidental water pollution in Kazakhstan by national authorities, in cooperation with operators, and representatives of NGOs and academia ([March 15](#)).

2nd meeting of the Inter-institutional Working Group on tailings safety and the prevention of accidental water pollution in Tajikistan. The meeting focused on the review of current issues and measures taken to reduce the risks of accidents at tailings management facilities and water pollution, the benefits of UNECE tools and regional projects, and the exchange of international good practices in the safe operation of tailings management facilities. Participants paid special attention to the benefits that Tajikistan would gain from acceding to the UNECE Convention on the Transboundary Effects of Industrial Accidents, the recommendations of the UNECE projects on industrial safety and prevention of accidental water pollution, notably on harmonization of the national legislation with the Convention's provisions and "Development of joint measures for prevention and response to pol-

lution of the Syr Darya River in emergency situations". As a result of the discussions, agreed proposals for further work of the Working Group were developed ([April 4](#)).

Subregional workshop on mine tailings safety and the prevention of accidental water pollution in Central Asia. The subregional workshop is organized by the UNECE Convention on the Transboundary Effects of Industrial Accidents, in cooperation with the Government of Tajikistan and with financial support from the Swiss Federal Office for the Environment, GIZ, OSCE and the United Nations Regular Programme of Technical Cooperation. It is implemented as part of the UNECE Projects on strengthening mine tailings safety [in Central Asia \(2020-2023\)](#) and [in Uzbekistan \(2021-2023\)](#), which are financed by the Swiss Federal Office for the Environment under the Convention's Assistance and Cooperation Programme ([May 25-26](#)).

SPECA program. The 26th Session of the Working Group on Water, Energy and Environment of the United Nations Special Programme for the Economies of Central Asia (SPECA) was hosted by the Kazakhstan-British Technical University. The focus of the session was to identify economic, investment, and policy opportunities in the water-food-energy-ecosystem nexus to support the achievement of SDGs 6 and 7. Additionally, the WG emphasized capacity building for sustainable natural resource management and exploring the feasibility of a water-energy consortium. Key discussions included presentations on the current status of the nexus in the region, highlighting challenges, ongoing initiatives, and recent developments, alongside country-specific case studies detailing national challenges, innovations, and success stories in implementing the nexus approach ([November 7](#)).

Source: UNECE

International Water Assessment Center

The International Water Assessment Center (IWAC) is the center for international cooperation on integrated water resource management, which has been established as a subsidiary body of the Water Convention in Astana in 2017. The main purpose of IWAC is to support the implementation of the Water Convention and its relevant work programs.

Activities in 2023

IWAC in cooperation with the UNECE organized: (1) the Regional Workshop on Monitoring, Assessment and Information Sharing in Transboundary Basins in Central Asia²³⁰ to assist countries in studying international experience in monitoring, assessment and sharing information in transboundary basins and discussing the possibilities of strengthening cooperation between the countries of Central Asia in the field of protection and use of water resources in transboundary basins (Astana, [February 1-2](#)); (2) the session "Promo-

ting innovations in transboundary cooperation through the tools of the Water Convention" during the World Water Week. The aim of the session was the application of innovative tools for solving transboundary basin problems in transboundary cooperation (Stockholm, [August 21](#)).

IWAC took part in: (1) the 2nd meeting of the Working Group on tailings safety and the prevention of accidental pollution of water bodies in Kazakhstan (Astana, [March 15](#)) and the Subregional workshop on mine tailings safety and the prevention of accidental water pollution in Central Asia (Dushanbe, [May 25-26](#)); (2) sub-regional workshop on supporting accession of Central Asian countries to the Protocol on Water and Health (Belgrade, [June 26-27](#)); (3) Eighteenth Meeting of the Working Group on Monitoring and Assessment under the Water Convention (Geneva, [October 17-18](#)); (4) Global Workshop on Conjunctive Ma-

²³⁰ with the financial support of the Green Central Asia Initiative implemented by Deutsche Gesellschaft für internationale Zusammenarbeit (GIZ) GmbH

management of Surface Water and Groundwater: National to Transboundary Level (Geneva, [October 16-17](#)); (5) Eighth meeting of the Task Force on the Water-Food-Energy-Ecosystems Nexus. The aim of the meeting was to take stock of 10 years of work on the water-food-energy-ecosystems nexus under the Water Convention, facilitate the exchange of expe-

riences and update information on progress made, lessons learned and best practices in applying the nexus approach, financing and implementing strategies and plans for energy transition to clean energy (Geneva, [December 7-8](#)).

Source: www.iwac.kz

6.7. Economic and Social Commission for Asia and the Pacific



Established in 1947, the Economic and Social Commission for Asia and the Pacific (ESCAP) is one of the five regional missions of the UN.

ESCAP works to overcome some of the region's greatest challenges by providing results-oriented projects, technical assistance and capacity building to member States in the following areas: macroeconomic policy and development; trade and investment; transport; social development; environment and sustainable development; information and communications technology and disaster risk reduction; statistics and sub-regional activities for development.

SPECA program

ESCAP in cooperation with UNECE manages SPECA, which celebrated its 25th anniversary in 2023. A joint statement made by ministers and high-level repre-

sentatives of countries participating in the United Nations Special Programme for the Economies of Central Asia (SPECA) endorsed the proposal to initiate a UN General Assembly resolution to highlight the 25th anniversary of SPECA and encourage the UN Member States, UN regional commissions and specialized agencies to continue extending support to efforts of the SPECA participating States ([April 18](#)).

The following events took place in Baku: (1) the 2023 SPECA Economic Forum on "Transforming the SPECA Region into a Connectivity Hub with Global Outreach", which focused on the increased significance of connectivity, in the face of new challenges, in the Trans-Caspian International Transport Corridor (Middle Corridor) between Europe and China ([November 21-22](#)); (2) first Summit of the Heads of State and Government of the SPECA participating States, the key topic of which was the regional transformation into a global logistics center connected to the rest of the world. The summit supported the creation of a Multilateral Trust Fund under the auspices of the UN. The [Baku Declaration](#) adopted at the summit underscores the high political commitment to sharing the region's enormous potential (November 24).

Source: www.unescap.org, www.unece.org

6.8. The United Nations Regional Centre for Preventive Diplomacy for Central Asia



The United Nations Regional Centre for Preventive Diplomacy for Central Asia (UNRCCA) is a special UN political mission established on the initiative of the five Governments of Central Asian in Ashgabat, Turkmenistan in 2007 to support national authorities in identifying and addressing existing and potential threats to regional peace and security. In implementing its initiatives, UNRCCA interacts with regional and international organizations. The Centre began operations in 2008 and is led by a Special Representative of the Secretary General.

Key priorities for 2021-2025

The current UNRCCA Programme of Action for 2021-2025 focuses on five key priority areas, which correspond to the Centre's mandate: (1) promoting preventive diplomacy among the Governments of Central Asia; (2) monitoring and early warning in support of conflict prevention; (3) building partnerships for prevention, including with regional and sub-regional organizations; (4) strengthening the United Nations preventive diplomacy in Central Asia; (5) encouraging cooperation and interaction between Central Asia and Afghanistan in close cooperation with the UN Assistance Mission in Afghanistan.

The "Strategy in support of cooperation between the states of Central Asia in the field of water, energy, environment and climate for 2022-2025" (hereinafter

referred to as the "Water Strategy") was adopted in 2021 with the active participation of all five CA states and focused on four main fields of activities, including: (1) preventive diplomacy and capacity building; (2) strengthening institutions and legal frameworks; (3) ensuring transparency, strengthening relationships and promoting partnerships; and (4) working on cross-cutting issues of the peace and security agenda.

Activities in 2023

As part of "Water Strategy", UNRCCA organized: (1) an online meeting of experts from the Central Asian States on the situation in the region with the shared water-related resources, where the participants exchanged on the state of cooperation in water and environment sectors in the Aral Sea basin, including in such areas as rational use of water resources, mitigating implications of the climate change, and taking into account different external factors (December 7); (2) a capacity-building event on climate risks in CA and a meeting of national experts. The participants (1) discussed such topics as international best practices and the experience of the Central Asian states on mitigation of and adaptation to the climate risks and the outcomes of the UN Water Conference; (2) exchanged on recent developments in international water law and policy, including the recent decisions of the International Court of Justice in this field; (3) reviewed the Early Warning Bulletins on the state of transboundary water resources in the Aral Sea Basin.

A separate session was devoted to exchanges on challenges and opportunities to cooperation between Central Asia and Afghanistan in the field of water resources (Almaty, April 18-19).

The UNRCCA Preventive Diplomacy Academy, in cooperation with the British Embassy in Turkmenistan, organized a training session for the participants and graduates from the countries of Central Asia and Afghanistan on the topic of "Climate Change". The purpose of the training session was to raise awareness among youth about climate change's impact on people's stability and security, as well as about the possible participation of young people in processes to overcome this challenge. Participants gained an understanding of the linkages between climate change and conflicts and became familiar with international regulatory mechanisms based on the UNFCCC and learned in more detail about the annual Youth Conference, which is a negotiating platform for young activists in climate change (Ashgabat, September 5).

UNRCCA has published a brochure entitled "United Nations Regional Centre for Preventive Diplomacy for Central Asia: 15 years of engagement in the region" on the occasion of its fifteenth anniversary. In cooperation with SIC ICWC, it published four Aral Sea Basin Transboundary Water Early Warning Bulletins.

Source: <https://unrcca.unmissions.org/ru>

6.9. World Meteorological Organization

The World Meteorological Organization (WMO) is a specialized agency of the United Nations. It was established in 1950.

It is the UN system's authoritative voice on the state and behavior of the Earth's atmosphere, its interaction with the oceans. WMO celebrated its 150th anniversary in 2023.

Activities in 2023

76th session of WMO Executive Council session was held in Geneva on February 27-March 3. The session discussed the community resilience to extreme weather, climate and water-related events and considered an initiative on the creation of an international greenhouse gas monitoring infrastructure.

WMO has approved new top strategic priorities to guide it through the next four years, including: (1) enhancing preparedness and reducing loss of life, critical infrastructure and livelihood from hydrometeorological extremes; (2) supporting climate-smart decision-making to build or enhance adaptive capacity or resilience to climate risk; (3) enhancing socioeconomic value of weather, climate, hydrological and related environmental services.



WORLD
METEOROLOGICAL
ORGANIZATION

WMO in partnership with the International Federation of Red Cross and Red Crescent Societies (IFRC), the Netherlands Red Cross, the United Nations Office for Disaster Risk Reduction (UNDRR), and the Systematic Observations Financing Facility (SOFF) has launched a new initiative "From satellites to sandbags: water at the heart of climate action" (September).

WMO publications. Report "2022 Year in Review: Climate-driven Global Renewable Energy Potential Resources and Energy Demand" (jointly with IRENA), WMO Airborne Dust Bulletin. For other publications, please, see <https://library.wmo.int/>.

Source: www.wmo.int

6.10. International Fund for Agricultural Development



The International Fund for Agricultural Development (IFAD) is a multilateral financial institution established in 1977. It mobilizes resources to eliminate malnutrition and improve agricultural productivity and incomes for rural poor in developing countries.

It provides direct financing in the form of loans and grants, attracts additional resources to implement projects and programs. Currently it has a number of ongoing projects in Central Asia.

Activities in 2023

Kyrgyzstan

Since 1993, IFAD has invested US\$ 129 million in rural development in Kyrgyzstan, including: assistance in reducing poverty and increasing economic growth in pastoralist communities.

In 2023, the IFAD country strategy and program [evaluation](#) was conducted. The main findings included: (1) IFAD's interventions in support of pasture management and veterinary services have been comprehensive, encompassing policy and legislative framework and field level; (2) interventions produced important results, including improved and more equal access to pastures (e.g. remote pastures), improved veterinary services and disease control; (3) interventions incorporated numerous innovations, mostly around pasture governance and private veterinary services (e.g. various practices and approaches relating to community-based pasture management, bringing in youth from disadvantaged households in areas lacking veterinarians on scholarship).

However, pasture improvement and sustainable management received less attention than expansion of accessible pastures, a poverty focus was generally weak, an insufficient attention was paid to gender aspects and private sector involvement. Finally, it was recommended to strengthen the identified weaknesses.

The [Access to Markets Project](#) (2016-2024, IFAD contribution – \$21.17 million) aimed to raise incomes and enhance economic growth in Kyrgyzstan's pastoralist communities continued in 2023.

IFAD allocated \$31.28 million for farming communities development under the Regional Resilient Pastoral

Communities Project (\$65.22 million, 2021-2026). About 557,000 household are expected to benefit directly from the project.

Tajikistan

The total amount of IFAD funding in Tajikistan is \$115.16 million. The organization's activities are based on the [program](#) titled "Strategic Opportunities of the Country for 2019-2024". The Program is aimed at reducing rural poverty and strengthening national food security in rural areas of Tajikistan. This is to be addressed under two strategic goals: (1) promoting inclusive agriculture-based economic growth in poor rural communities; and (2) increasing the resilience of smallholder producers to climate change.

The Community-based Agricultural Support Project 'plus' (2021-2030, IFAD contribution – \$37.85 million) continued in 2023. The project aims to increase resilience of ecosystems and adaptation of livelihoods in rural areas affected by climate change, for an estimated 100,000 rural households (650,000 individuals) in 21 of the most climate vulnerable districts of the country.

Uzbekistan

Uzbekistan joined to IFAD in 2011. The total IFAD funding in Uzbekistan amounts to \$166.5 million. IFAD in its activities in Uzbekistan is guided by the [Country strategic opportunities programme 2023-2027](#), aimed to sustainably increase rural prosperity and improve livelihoods of small-scale producers. Three strategic objectives underpin the programme: (1) increased resilience and productivity of small-scale producers; (2) improved access for small-scale producers to viable food systems and agricultural markets; (3) enhanced enabling environment for inclusive rural transformation.

The [Agriculture Diversification and Modernization Project](#) (2017-2025, IFAD contribution – \$93.5 million) is implemented in Andizhan, Fergana and Namangan provinces of Uzbekistan. Target groups include rural low-income households on Dekhan farms, small private horticulture and livestock farmers, and agribusinesses. Special attention is paid to ensure the participation of women-headed Dekhan and private farming households as well as rural youth.

Source: www.ifad.org

6.11. UN Educational, Scientific and Cultural Organization

UNESCO is the United Nations Educational, Scientific and Cultural Organization. It coordinates international cooperation in these areas. Established in 1945, it includes 193 member-states. UNESCO's programs contribute to the achievement of the SDGs defined in the Agenda 2030. Key areas of activity include the following five program sectors: education, natural sciences, social and human sciences, culture, and communication and information.

Activities in 2023

Events. At the UN 2023 Water Conference, UNESCO was a partner in [26 side events](#) taking place in parallel to the official conference programme. These side events were organized by member states with various United Nations agencies and other stakeholders and contributed directly to the conference's outcomes through the following streams: (1) raising the profile of science through the support of a [science-based global water assessment](#); (2) raising the profile of [groundwater and cooperation](#); (3) [filling the gap in capacity](#); (4) mainstreaming [gender equality in water management](#), etc.

During the COP28 in Dubai, United Arab Emirates UNESCO organized a series of events, in particular: (1) Cryosphere Changes Impacts and Adaptation in Central Asia: Case Studies from UNESCO Activities ([December 5](#)); (2) Towards the Implementation of the International Year of Glaciers' Preservation and Glacier Day, 2025 and beyond ([December 5](#)); (3) Scaling Up: Systems Approaches for Climate and Water Management, in partnership with ADB and WB ([December 8](#)).

Publications. (1) The 2023 United Nations [World Water Development Report](#) on Partnerships and Cooperation assesses the nature and role of partnerships and cooperation among stakeholders in water resources management and development and their role in accelerating progress towards water goals and targets. Report has been produced by UNESCO's World Water Assessment Programme on behalf of UN-Water, a grouping of more than 30 United Nations agencies; (2) The Water, Energy, and Food Security Nexus in Asia and Pacific: this three-volume, open-access book series introduces the complex links



between water, energy, and food security in the three sub-regions of Central and South Asia, East and Southeast Asia and the Pacific. By bringing together inputs from the world's leading thinkers, experts, practitioners and researchers, each volume explores some future scenarios and recommends approaches to best deal with future challenges; (3) [River Culture. Life as a dance to the rhythm of the waters](#) – a collection of interdisciplinary studies by more than 120 authors from river systems all over the world, exploring overarching issues on river management in the Anthropocene.

UNESCO Cluster Office in Almaty

Projects. A new regional [project](#) "Strengthening the resilience of Central Asian countries by enabling regional cooperation to assess high altitude glacio-nival systems to develop integrated methods for sustainable development and adaptation to climate change" was launched in July 2023. The project aims to strengthen the adaptation capacity of five Central Asian countries to climate change impacts on the cryosphere through assessment, promotion of regional cooperation, and stakeholder engagement.

As part of the "Reducing vulnerabilities of populations in Central Asia from glacier lake outburst floods in a changing climate" ([GLOFCA](#)) Project, a Glacial Lake Inventory (GLI) toolbox for mapping and monitoring of glacial lakes in Central Asia was developed. The GLI toolbox offers the possibility to monitor temporal lake changes in an automated way, and the detected lake outlines can be exported as shape files. The toolbox was presented to the countries during a face-to-face training in Almaty in November 2022, followed by a series of webinars in May 2023. The training series gave national partners the opportunity to use the toolbox in practice.

Source: www.unesco.org, www.en.unesco.kz

6.12. Food and Agriculture Organization

Food and Agriculture Organization of the United Nations (FAO) was established in 1945. FAO's work globally and in the Europe and Central Asia region is guided by the FAO Strategic Framework 2022-2031. FAO's Strategic Framework seeks to support the 2030 Agenda through the transformation to more efficient, inclusive, resilient and sustainable agri-food systems



**Food and Agriculture
Organization of the
United Nations**

for better production, better nutrition, a better environment, and a better life, leaving no one behind.

FAO Activities in CA States in 2023

The informal consultation for Europe and Central Asia provides a platform on which the FAO Regional Office for Europe and Central Asia and Members can interact, facilitating consultation on key issues in the region. The main purpose of the [informal consultation](#) in 2023 is defining the FAO priorities for the Europe and Central Asia Region for 2024-2025, which will be presented for endorsement at the 34th Regional Conference for Europe (ERC) in 2024.

The Consultation aims at facilitating an exchange of views among all Members of the Europe and Central Asia region considering also the challenges from the multiple crisis the region is facing.

Kazakhstan

Ongoing projects:

(1) Elaboration of the 2022-2026 State Program (including the Concept) of Agro-Industrial Development (\$370,000, 2020-2023);

(2) Contribution to development and further scaling up of healthy nutrition (\$465,000, 2023-2025);

(3) Strengthening the Statistical System on Accounting for the Production of Agri-Food Products (\$75,000, 2023-2024);

(4) Kazakhstan Resilient Agroforestry and Rangeland Project (\$1.9 million, 2023-2027);

(5) Promoting the development of land market and supporting the development of small family farms (\$275,000, 2022-2023);

(6) Supporting investments in smallholders inclusive agrifood value chain development in Kazakhstan (\$474,400, 2020-2023), during which a study tour was organized to Hungary to address the complex challenges faced by rural communities, smallholders, and family farmers in Eastern Europe and Central Asia; the tour included participation in the third Regional Workshop on Integrated Community Development ([June 6-8](#)).

FAO Kazakhstan held an international seminar on the development of an international agri-food hub in Kazakhstan where representatives of the Ministry of Trade and Integration, the Ministry of Agriculture, QazTrade JSC, and industry experts from the Netherlands, America and Tanzania have participated. During the meeting, overall outcomes of case studies on agri-food hubs activities in Africa, the Netherlands and the USA were presented, conclusions and recommendations for Kazakhstan on the development of a cross-border agri-food hub based on international experience were discussed ([December 26](#)).

Kyrgyzstan

Ongoing projects:

(1) Support for development of sustainable value chains for climate-smart agriculture (\$ 350,000, 2021-2023);

(2) Promoting accelerated green investment in agriculture through capacity building of national financial institutions (\$ 300,000, 2021-2023);

(3) Strengthening capacities of public and private sector for regulation, certification and marketing of organic products (\$ 300,000, 2022-2024);

(4) Support to revision of the Land Code and to development of agricultural land markets (\$ 50,000, 2022-2023);

(5) Carbon Sequestration through Climate Investment in Forests and Rangelands (\$30 million, 2022-2030);

(6) Introduction and promotion of innovative approaches for adopting best technologies for horticulture (\$175,000, 2023-2025).

Within the framework of the FAO project "Enhancing the Capacity for Food Safety Management in the Fruit and Vegetable Industry of the Kyrgyz Republic", trainings were conducted on food safety in the fruit and vegetable sector for entrepreneurs in the Osh, Batken, Jalal-Abad, Chu and Issyk-Kul province of Kyrgyzstan during three-months (Bishkek, [July-September](#)).

The training workshop was organized on food security issues, including food availability and quality, agricultural insurance, salt reduction, elimination of trans-fats, and other nutrition problems for Deputies and Employees of the Office of the Jogorku Kenesh of the Kyrgyz Republic (Bishkek, [December 1](#)).

Tajikistan

Ongoing projects:

(1) Support of warm-water fishery sector (\$95,000, 2021-2023);

(2) Introduce innovative approaches for adopting best technologies for apricot production in Sughd (\$92,000, 2021-2023);

(3) Provision of Technical Assistance on E-agriculture to the Ministry of Agriculture" (\$90,000, 2021-2023);

(4) Support to export increase of agri-food products through green development and enhanced market access (\$88,000, 2022-2024);

(5) Strengthening capacity on promotion of conservation agriculture among farms at Romit Reserve (\$33,000, 2022-2023);

(6) Support to agricultural sector reform and improvement of the investment climate (\$95,000, 2022-2023);

(7) Cooperative development and strengthening of rural institutions under the Agrarian Reform Programme (\$96,000, 2022-2023);

(8) Strengthening Resilience of the Agriculture Sector Project (\$2.4 million, 2022-2036);

(9) Facilitating agrobiodiversity (ABD) conservation and sustainable use to promote food and nutritional resilience in Tajikistan (\$1.7 million, 2022-2025);

(10) Strengthening the capacity of the Republic of Tajikistan to comply with the Enhanced Transparency Framework under the Paris Agreement (\$1.8 million, 2023-2026).

A National Stakeholder Validation Workshop on the Formulation of a Strategic Roadmap for Food Loss and Waste Reduction was organized in Dushanbe on [April 18](#). The workshop discussed and validated the strategic roadmap based on the participants' recommendations and the results of the FLW analysis.

FAO assisted in [launching](#) the national working group of the Globally Important Agricultural Heritage System (GIAHS) to prepare a proposal to nominate Tajikistan areas for the GIAHS initiative.

Turkmenistan

Ongoing projects:

(1) Development of aquafeed value chain and aquatic animal health management capacity (\$120,000, 2023-2025);

(2) Developing digital solutions for sustainable pasture management (\$100,000, 2023-2025);

(3) Enhancing Capacities for Climate-Resilient Water Management (\$150,000, 2023-2025);

(4) Support to the establishment of digital Land Cadastre (\$300,000, 2023-2024);

(5) Improving the capacity of Turkmenistan to access climate finance through capacity building and strategic frameworks (\$642,825, 2023-2025);

(6) Strengthening the capacity of Turkmenistan to comply with the ETF under the Paris Agreement (\$50,000, 2023-2024).

Experts from the FAO Geospatial Unit conducted three online training sessions on the use of remote sensing to aid in the identification and mapping of crops to enhance more accurate data collection and analysis, leading to improved decision-making and resource management. The sessions were attended by a mixed audience of specialists from the Land Resources Service, central and regional offices, representatives of the Turkmen Agricultural University of S.A. Nyýazow, researchers, and land surveyors from the State Design Institute "Türkmenyertaslama" (June 7-9, online).

An ongoing FAO-GEF project on integrated natural resources management in drought-prone and salt-affected agricultural production landscapes in Central Asia and Turkey established nurseries with drip irrigation systems in Dashoguz, developed a sustainable pasture management plan in Ahal and delivered equipment to combat drought and salinity in Nohur.

Uzbekistan

Ongoing projects:

(1) Preparing the grounds for digital transformation of agriculture (\$315,000, 2022-2023), within the framework of which, a National Digital Agriculture Program was developed;

(2) Support to country program development on sustainable agriculture (\$50,000, 2022-2023);

(3) Food Systems, Land Use and Restoration (FOLUR) Impact Program (\$6 million, 2022-2026,);

(4) Capacity-building to establish an integrated and enhanced transparency framework in Uzbekistan to track the national climate actions and support measures received (\$1.3 million, 2022-2025);

(5) Multi-faceted response to the food and energy emergency in Uzbekistan (\$80,000, 2022);

(6) Support for development of the Sustainable Agriculture Mechanization Strategy (\$140,000, 2023-2025);

(7) Technical Assistance for Sound Management of Hazardous Chemicals (\$4.3 million, 2023-2027);

(8) Sustainable forest and rangelands management in the dryland ecosystems of Uzbekistan (\$3.8 million, 2022-2026);

(9) Empowering youth towards a brighter future through green and innovative development of the Aral Sea region (\$231,000, 2022-2023).

A workshop was organized as part of implementation of the regional project "Enhancing agricultural land market development to address land abandonment and improve land consolidation procedures" funded from the FAO-Türkiye Partnership Programme on Food and Agriculture (FTPP II). The event presented the findings and recommendations from a prepared assessment report and policy recommendations related to land administration, land market development and land reform in Uzbekistan ([December 6](#)).

The "Digital Villages Camp", a skill development program designed for young talents of the Fergana Valley has been [launched](#) in Uzbekistan. This innovative initiative aims to introduce participants to the fundamentals of internet of things (IoT) for smart farming, offering a unique learning experience tailored to individuals between the ages of 16 and 30. Out of 90 applicants, 25 promising individuals were selected.

Over the course of five weeks of the camp, students will gain the necessary knowledge and hands-on experience required for programming IoT devices, leveraging open source solutions and devising smart

solutions – sensors for greenhouses and homestead plots.

Source: FAO in Europe and Central Asia 2023 Report, www.fao.org

6.13. International Law Commission

The International Law Commission (ILC) is a subsidiary body of UNGA, consisting of thirty-four members of recognized competence in international law, who sit in their individual capacity and not as representatives of their governments. The task of ILC is encouraging the progressive development of international law and its codification. It was established in 1947. The Commission has no representatives of the Central Asian states in its composition.

During the 74th session of ILC in 2023, reports were presented on the following topics: succession of States in respect of State responsibility, general principles of law, sea-level rise in relation to international law, settlement of disputes to which international organizations are parties, prevention and repression of piracy and armed robbery at sea, and other issues.

On the subject of sea-level rise in relation to international law, ILC underlined the fundamental importance of the principle that “the land dominates the sea”. It was noted that the UN Convention on the Law of the Sea allocated sovereign rights and maritime zones based on the size and form of their adjacent coastal territorial land. At the same time, some delegations considered that the application of the principle that “the land dominates the sea” in the context of sea-level rise was not absolute. It was noted that the right of peoples to self-determination

was closely linked with sovereignty over natural resources; the importance of further exploring the issue of territories submerged owing to sea-level rise and, in particular, their legal status was stressed. In this context, the Commission looks forward to the Study Group's work on the subtopics of statehood and protection of persons affected by sea-level rise, as well as to the consolidated results of work on the topic in a final substantive report.

On the subject of prevention and repression of piracy and armed robbery at sea, the first report of the Special Rapporteur (A/CN.4/758) and the memorandum prepared by the Secretariat concerning the topic (A/CN.4/757) were presented. It was acknowledged that piracy and armed robbery at sea continued to pose serious threats to international maritime security. The potential for the work of the Commission to contribute to enhanced international cooperation with respect to the prevention and repression of piracy and armed robbery at sea was highlighted. Several delegations expressed support for the approach the Commission had taken toward the topic. A number of delegations agreed with the Commission that its work should not duplicate existing frameworks and academic studies but should rather aim at identifying new issues of common concern.

Source: 2023 ILC Report

6.14. International Court of Justice

The International Court of Justice (ICJ) is one of the six principal organs of the United Nations. It was established in 1945. It delivers judicial and advisory functions. No judges from Central Asia sit in the International Court. Cases submitted to the Court involve a wide variety of subject matters: territorial and maritime disputes; consular rights; human rights; environmental damage and conservation of living resources; international responsibility and compensation for harm; the immunities of States, their representatives and assets; interpretation and application of international treaties and conventions.

In 2023, the Court's list of cases included two cases directly related to water disputes – the Gabčíkovo-Nagymaros project (Hungary/Slovakia) and dispute

over the status and use of the waters of the Silala (Chile v. Bolivia). For the nature of the case and proceedings on Gabčíkovo-Nagymaros project (Hungary/Slovakia), see the ICJ report.

Obligations of states in respect of climate change:

The General Assembly of the United Nations in its resolution 77/276²³¹ requested the Court to give an advisory opinion proceeding from the principle of prevention of significant harm to the environment and the duty to protect and preserve the marine environment on the following questions:

a) what are the obligations of States under international law to ensure the protection of the climate system and other parts of the environment from anthropo-

²³¹ 64th plenary meeting on March 29, 2023

genic emissions of greenhouse gases for States and for present and future generations;

b) what are the legal consequences under these obligations for States where they, by their acts and omissions, have caused significant harm to the climate system and other parts of the environment, with respect to: (i) States, including, in particular, small island developing States, which due to their geographical circumstances and level of development, are injured or specially affected by or are particularly vulnerable to the adverse effects of climate change? (ii) Peoples and individuals of the present and future generations affected by the adverse effects of climate change?

By an order dated 20 April 2023, the President of the Court decided that the United Nations and its Member States were likely to be able to furnish information on the questions submitted to the Court for an advisory opinion. The Court subsequently authorized the International Union for Conservation of Nature, the Commission of Small Island States on Climate Change and International Law, the European Union and the African Union to participate in the proceedings by presenting written statements on the questions submitted to the Court.

[Source: Report](#) of the International Court of Justice to the UNGA 78th Session, 2023, ICJ [Press releases](#)



7

SECTION

International Water Organizations and Initiatives

7.1. Asia Water Council



The Asia Water Council (AWC) is a global network focused in providing tangible solutions on Asian water challenges and facilitating multilateral discussions among stakeholders. It was established at the initiative of South Korea during the World Water Forum in March 2015. AWC is composed of 152 members from 24 countries.

The AWC action tools include the application of high-tech tools in all areas of water management and nature conservation through IWRM, the reduction of risks through better water security, especially as concerns prevention of floods and droughts. AWC is

the main organizer and sponsor of the Asia International Water Week (AIWW).

Activities in 2023

Asia International Water Week. The 3rd AIWW will be jointly hosted by AWC and the MWR of China and organized by the China Institute of Water Resources and Hydropower Research, and is set to take place from September 24 to 28, 2024 in Beijing, China. Under the theme “Enhancing our future water security,” the 3rd AIWW consists of three pillars: Asian to World Statement, Asian Water Issues, and Water Project Business Forum. Focusing on the major challenges related to water in Asia, six sub-themes were also proposed for the 3rd AIWW: (1) Water Disasters and Climate Change; (2) Water for Shared Prosperity; (3) Water for Food Security; (4) Water and Watershed Ecosystems; (5) Sustainable Hydropower Development; (6) AI for Water Management. All the sub-themes are interconnected, together forming the water cycles in both the nature and human society. The 3rd AIWW [Kick-off Meeting](#) was successfully held in Hwaseong, Korea (July 7). During the Kick-off Meeting, IWHR introduced the overall progress of the preparations for the 3rd AIWW,

organized group discussions on Asian water issues and reported on the drafting of Asia to World Statement.

Events. The following [events](#) took place in the course of 2023: AWC 17th Board of Council meeting. The meeting reported on the new members, financial operations, member activities, 2023 water projects, and preparations for the 3rd AIWW, 2023-2026 BoC election, and other related matters (hybrid format, July 5); 4th AWC General Assembly, with more than 200 representatives from Asian nations, including government officials and academics, as well as international organizations such as OECD, GCF and GWP. The election committee was established during the general meeting, and a new Board (2023-2026) with 29 members was elected after on-site voting (Hwaseong, Korea, July 6); 18th Board of Council meeting, on which, Yun Seog-dae, CEO of K-Water was elected as the President of AWC (hybrid format, July 7); 19th Board of Council meeting, where preparation for the 3rd AIWW was updated, the venue for the 4th AIWW was selected, and the participation plan for 10th WWF was discussed (Manila, Philippines, November 6).

Source: <http://www.asiawatercouncil.org>

7.2. Geneva Water Hub



The Geneva Water Hub is a Centre of the University of Geneva, co-financed by joint project of the Swiss Confederation (Swiss Agency for Development and Cooperation, SDC, Global Program Water Division) and the University of Geneva. The Geneva Water Hub was established in 2014 to help prevent water conflicts at an early stage and to promote water as an instrument of peace and cooperation. The Platform for International Water Law (PIWL) was established by some members of the Department of Public International Law and International Organization of the Faculty of Law of the

University of Geneva in 2009. Later, it became a part of the Geneva Water Hub. The Geneva Water Hub serves as the Secretariat of the Global High-Level Panel on Water and Peace.

Activities in 2023

Water for peace. In 2023, the Geneva Water Hub has continued to develop and leverage strategic partnerships to promote water for peace at various fora, including the First Africa 2050 Forum and the SIWI World Water Week. The GWH hosted two side events

and contributed to 15 side events at the UN Water Conference, and to five events during the New York Water Week. The GWH systematically included the voice of young experts in its events. The inputs of the GWH to the UN Water Conference were appreciated and as a result the Hub was invited by the Netherlands to take part to the high-level panel on the follow-up of the conference during the Stockholm water week.

The GWH manages the secretariat of the Group of Friends on Water and Peace. Its [18th meeting](#) focused on “Women, Peace, Water: The Role of Women in

Water Diplomacy". The discussion was extremely active, with a good mix of political and expert inputs. About 40 missions participated in the events (Geneva, October 16).

Water and armed conflict. The GWH pursued its work on the protection of freshwater and water infrastructure, positioning itself as a leader in this domain, both for content and for reputation. The GWH published a [report](#) on the "National legal frameworks related to the protection of water during armed conflicts", a follow-up to the Geneva Principles on the Protection of Water Infrastructure. It also contributed to the ILC PERAC Principles for the Protection of the Environment in Armed Conflict, a document of strategic importance for the advocacy of the protection of water resources. The GWH also contributed to several high-level discussions and events (New York and [European Humanitarian forum](#), Brussels, March 20-21) to further promote the legal instruments for the protection of water as well as highlighting the consequences of reverberating effects for the civilian populations.

Preparation of big events. In the second half of the year, the GWH was mainly involved in the preparation the upcoming big events in 2024, such as the 10th World Water Forum, the Stockholm World Water Week and the Summit for the Future, as 2024 will be the year of Water and Peace. The GWH participated actively in the UN-Water Task force meetings in preparation of 2024's year of Water and Peace and was closely

involved in the organization of the different events planned for the World Water Day. GWH also provided written comments to the UN World Water Development Report 2024 "[Water for prosperity and peace](#)" and to the [UN System-wide Strategy for Water and Sanitation](#).

Finally, in 2023, the GWH was accepted by UN Water as "partner". The GWH co-organized two events during the [Geneva Peace Week](#) (October 30- November 3) on key aspects of water and peace. One event focused on the presentation of the report on Water and Peace from the Special Rapporteur on Water and Sanitation ("Water as an argument for peace, twinning and cooperation", to which the GWH contributed substantially). The second focused on the political aspects of water when dealing with climate change.

Transboundary cooperation. The GWH adhered to the Transboundary water cooperation coalition and is involved in the institutionalisation process of the coalition. The GWH increased its presence in the security fora: it was present at the [Bled Strategic Forum](#) (August 28-29), at the [Prague Forum](#) on the Economic and Environmental Dimension of the OSCE (September 14-15), at the [Munich Security Conference](#) (February 17-19) and is pursuing discussions with the Sanremo Institute of International Law.

Source: Geneva Water Hub

7.3. Global Water Partnership

The Global Water Partnership (GWP) is a global network of action including over 3,000 partners in 180 countries. The network has 77 accredited Country Water Partnerships (CWPs) and 13 Regional Water Partnerships (RWPs), with the mission to advance governance and management of water resources for sustainable and equitable development.

Activities in 2023

2023 was the first year of the 2023-2025 Work Programme, which provided renewed pointers to guide the implementation of the second half of the GWP 2020-2025 Strategy.

Transboundary water cooperation. GWP's transboundary water cooperation anchor area aims to improve cooperation over transboundary waters globally, contributing to water security and peace.

The programme is loosely structured around four key components: (1) Transboundary water management knowledge and learning; (2) Regional dialogues on transboundary waters; (3) Cooperation for the management of transboundary water bodies; and (4) Transboundary aspects of SDG target 6.5 on IWRM. Progress achieved in 2023 across each of these four components is described below.



Transboundary water management knowledge and learning. GWP has a well-established capacity building programme in Africa, Latin America and Asia developed in collaboration with a wide range of global, regional and national level partners and targeted at practitioners and legislators involved in transboundary water management. At global level, GWP continues to run the GEF IW:LEARN Governance for Transboundary Freshwater Security [MOOC](#) to which over 3800 learners from 167 countries are registered. In addition, the [Transboundary Water Knowledge Exchange Hub](#) is providing a platform for peer-to-peer exchange on the IWRM Action Hub. GWP also co-organized the Global International Water Law training convened by UNECE and hosted by Hungary, which trained 90 practitioners from various transboundary basins around the world.

Regional dialogues on transboundary waters. Regional dialogues constitute a series of events focusing on

policy and technical instruments to address transboundary water management. By focusing on solutions, these dialogues can assist in identifying entry points for cooperation at the level of specific basins. Examples of GWP's work on this component in 2023 include: (1) validation by the Minister Council of the Central American Commission of Environment and Development (CCAD) of the Regional Guidelines on the Principles of Cooperation for Transboundary Water Management in the Central American Integration System (SICA) Region; (2) launch of the new publication [Multistakeholder Regional Dialogues: Pathways for Advancing Transboundary Water Cooperation](#), which provides reflections on key factors that enable multi-stakeholder dialogues to positively influence transboundary cooperation by diving into three concrete examples in South East Europe, South Asia and Southern Africa. An interactive online learning event was organized inviting key actors engaged in fostering successful dialogues.

Cooperation for the management of transboundary water bodies. GWP supported the establishment of the Buzi, Pungwe, and Save Watercourse Commission (BUPUSACOM) in Mozambique and Zimbabwe. A new project was approved by the GEF Council focused on transboundary cooperation in the Drin Basin. With a duration of 5 years and a budget of \$7.1 million, the project will support the implementation of the Drin Strategic Action Programme and enable countries coordinating action at the Drin Basin level. An International Agreement for the management of the Drin Basin is one of the processes that will be facilitated in the context of the project.

GWP supported the process of Togo's adherence²³² to the 1992 UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes and collaborated with the Commission of the West African Economic and Monetary Union (UEMOA) and UNECE to promote countries' access-

sion to the Conventions on shared surface and groundwater in the UEMOA region.

SDG 6.5 targets on transboundary waters. In 2023, 5 countries requested GWP's support to complete the monitoring of SDG 6.5.2 (Armenia, Cameroon, Central African Republic, Malaysia and Panama), which focuses on the proportion of transboundary basin area with an operational arrangement for water cooperation.

Central Asia and the Caucasus. In 2023, GWP supported organization of stakeholder consultation meetings on monitoring and reporting of SDG Indicator 6.5.1, the degree of implementation of Integrated Water Resources Management, in the countries of Caucasus (Armenia, Azerbaijan, and Georgia). Capacities for drought policy preparation were strengthened in Armenia as part of the GWP-implemented project "Knowledge transfer on drought issues due to climate change for Armenia".

As to Central Asia, workshops to discuss the progress and reporting on the implementation of IWRM were organized in [Kazakhstan](#) and in [Uzbekistan](#). In Turkmenistan, the first round of [stakeholder consultations](#) on the progress of implementing SDG 6.5.1 was co-organized by the Regional Water Partnership for Central Asia and Caucasus (GWP CACENA), which also supported a [workshop](#) titled "Gender and Water Resources in the Process of Adaptation to Climate Change" (December 7).

The process of accreditation re-check was initiated by GWP Kazakhstan and Tajikistan. The purpose of this exercise is to verify that CWPs continue to fulfill the GWP Conditions of Accreditation, identify areas that require strengthening and related actions that contribute to energizing the platform of partners.

Source: GWP, [GWP Annual Progress Review for 2023](#), www.gwp.org

7.4. International Commission on Irrigation and Drainage



The International Commission on Irrigation and Drainage (ICID) was established in 1950 as a scientific and technical organization with a view to develop scientific technologies in engineering, agriculture, irrigation and drainage, economy, ecology, and social sciences to increase food production, protect environment, improve water quality, improve land productivity, and manage floods and disasters. Kazakhstan, Tajikistan, and Uzbekistan are the members of ICID.

Activities in 2023

In 2023, the major event was the **25th International Congress on Irrigation and Drainage and the 74th Interna-**

tional Executive Council²³³ meeting organized by the Indian National Committee of ICID (INCID) on the theme 'Tackling Water Scarcity in Agriculture' (Vishakhapatnam (Vizag), Andhra Pradesh, India, November 1-8).

²³² Benin and Niger are in the process of acceding to the UNECE Convention

²³³ the International Executive Council (IEC) is the highest decision-making body of ICID. It is vested with the management of the affairs of the International Commission on Irrigation and Drainage

The prestigious ICID Congress brought together a global congregation of around 1300 experts, researchers, and professionals from 41 countries.

The three-day Congress was comprised of two plenary sessions, 18 thematic sessions and a number of side events to answer the two key questions: (Question 64): What alternative water resources could be tapped for irrigated agriculture? and (Question 65): Which on-farm techniques can increase water productivity?

The Opening Plenary presented ICID annual awards and recognitions. Total nineteen structures from seven countries have been recognized by ICID as World Heritage Irrigation Structures. Iranian National Committee on Irrigation and Drainage (IRNCID) has won the 7th Best Performing National Committee (BPNC) Award²³⁴. The Best Paper Award 2023 was presented to Japanese researchers for their outstanding paper entitled "The development of a hybrid model to forecast paddy water temperature as an alert system for high-temperature damage."

During the 74th ICID International Executive Council meeting the new ICID President and three ICID Vice-Presidents were elected for the period 2024-2026: ICID President – Dr. Marco Arcieri (Italy), who replaced the retired Prof. Dr. Ragab Ragab (Great Britain); ICID Vice Presidents – Dr. Fuqiang Tian (China); Dr. Vadim Sokolov (Uzbekistan); Dr. Watchara Suiadee (Thailand).

Other events. The 10th International Micro Irrigation Conference was organized on 25-27 January on the theme 'Micro-irrigation in the Era of Technology Innovation and Digital Transformation' (Morocco).

The three-day conference which aimed to share experiences of using new technologies and best management practices in drip, micro-sprinkler and other localized irrigation systems was witnessed by a large group of eminent international and national experts from 16 countries and local farmers, in the field of the latest development in micro irrigation technology, to enhance the crop production and water management for optimal use in agriculture, technical and sociological interventions for sustainable water, food and agriculture.

In the course of the year, ICID together with partners organized a series of webinars, in particular on: (1) INSPIRE: Performance Assessment Tools in Irrigation and Drainage (February 16); (2) Tsunami / Tidal Wave Protection in Japanese Case (April 19); (3) Empowerment and Capacity Development of Women in Water Resources Management (May 3); (4) 74th ICID and INCID Foundation Day Celebrations on the Theme: Role of Modern Irrigation in Global Food Security (June 26); (5) Towards the Utilization of Agricultural Drainage Benefits for Facing the Future Challenges and Achieving Sustainability (September 29); (6) Adapting Agriculture to Climate Change: Strategies for Resilience and Sustainability (November 22); (7) Role of Women in Water Governance and Management (December 28).

Publications. Irrigation and Drainage Journal (Volume 72); Special publication "Historical Water Sustainability".

Source: IFAS Agency for Implementation of the Aral Sea Basin Projects in Uzbekistan, <https://icid-ciid.org/home>

7.5. International Network of Basin Organizations

The International Network of Basin Organizations (INBO) was established in 1994 in Aix-les-Bains (France) to promote integrated water resources management at the level of national and transboundary basins of rivers, lakes and groundwater aquifers to link economic growth, social equity, water and environmental protection, and civil society participation.

Basin organizations, governmental administrations in charge of water, and bi- and multilateral cooperation organizations are the members of INBO from 90 countries.

INBO member organizations belonging to the same geographic region created 8 regional networks of INBO.



INBO
International Network
of Basin Organizations

Activities in 2023

Events. Main international events: (1) 1st kick-off meeting of 10 WWF, where INBO brought its ideas and initiatives, in particular IWRM at the level of basins, as a solution for better water management and supported by the Dakar Action Plan and by the Water & Nature Declaration (Jakarta, Indonesia, February

²³⁴ BPNC is presented triennially at every ICID Congress, with the main objective to recognize the contributions made by a National Committee to fulfill ICID's mission and objectives

15-16); (2) [UN 2023 Water Conference](#), where INBO organized and intervened in 13 sessions to promote IWRM to accelerate the implementation of the Sustainable Development Goals (New York, March 22-24); (3) [3rd International Conference on Water and Climate](#), co-organized with the Kingdom of Morocco and WWC, was focused on basin management as a key to adaptation and achieving the SDGs (Fez, Morocco, July 6-7); (4) XVIIIth IWRA World Water Congress, with 3 special sessions organized by INBO on water information systems, basin water management, and nature-based solutions (Beijing, China, September 11-15); (5) [21st International Conference Europe-INBO](#) for the Implementation of the European Water Directives (Valencia, Spain, October 16-19); (6) United Nation Climate Change conference ([COP28](#)), with INBO organizing seven events on water and adaptation to climate change (Dubai, UAE, November 30- December 12).

Webinars: (1) Improving national river continuity restoration policies for European ecosystem-based river management (June 27); (2) webinar on Policy Gaps (December 14) in partnership with its regional network, Europe-INBO, and the project Water4All.

In the course of 2023, preparations were underway to the [INBO World General Assembly](#), associated with the INBO's 30th anniversary, to be held in 2024 in Bordeaux, France. The General Assembly will include

9 thematic sessions under the general theme "Water resources and climate change: How can basin management be more resilient?"

Projects. INBO and its Permanent Technical Secretariat have been working since 2016 on the incubation of water and climate projects for Africa, enhancing in particular the interest of IWRM at the level of basins. In 2023, this initiative has evolved into a **Water and Climate Project Incubator** whose aim is: (1) the detection of new climate change adaptation projects, (2) the incubation of selected projects among the detected ones, through the promotion of the incubator through physical and digital events and communication campaigns.

Publications. INBO Report on UN 2023 Water Conference (published in March); Redaction, in view of their publications at the 10th World Water Forum in Bali, of:

- a new methodological guide on the transfer of waste and plastics into aquatic environments to be produced in the collection of "INBO Manuals";
- a special edition of the Water International Journal.

Source: INBO, www.inbo-news.org/en

The Eastern Europe, Caucasus, and Central Asia Network of Water Management Organizations (EECCA NWO)



EECCA NWO is one of eight regional networks of INBO. It was established in 2010 to exchange views, experiences, and information on various aspects of water management activity.

The Network is administered by SIC ICWC, and Network's activities are coordinated with those of INBO.

In 2023, a roundtable in memory of Prof. V.A. Dukhovnyi on the theme "Improvement of regional water and energy cooperation in Central Asia" was held under umbrella of EECCA NWO ([August 16](#), online).

Among big events organized by members of the Network were the following: International Scientific-Practical Conference "Current issues of efficient and integrated use of water resources" (Minsk, March 22-24); 5th Central Asian Conference on Climate Change (CACC-2023) (Dushanbe, May 16-17); Bishkek Water Forum (31 May); Conference dedicated to 30th anniversary of IFAS "Central Asia: towards sustainable future through strong regional institution" (Dushanbe, June 5-7); International Scientific-Practical Conference "Land reclamation for addressing geo-ecological problems in Eurasia" (Moscow, December 13-15).

The information on the activities of the Network and its members is disseminated via the special website (<http://www.eecca-water.net/index.php?lang=english>), as well as the social media (<https://www.facebook.com/eecca.nwo> and <https://www.linkedin.com/groups/9023073/>).

In 2023, the Network members contributed to the [2022 Water Yearbook: Central Asia and around the Globe](#) and the [discussion paper](#) "Rethinking Institutional and Financial Mechanisms on Water and Energy Cooperation in Central Asia".

Source: EECCA NWO Secretariat

7.6. International Water Management Institute

International Water Management Institute (IWMI) is a research-for-development (R4D) organization, with headquarters in Colombo, Sri-Lanka, offices in 13 countries and a global network of scientists operating in more than 30 countries.

IWMI is a Research Center of CGIAR, the global research partnership for a food-secure future. IWMI's Vision reflected in its Strategy 2019-2023 is "a water-secure world".

IWMI leads the CGIAR Research Program on Water, Land and Ecosystems.

Activities in 2023

IWMI continued to implement its [strategy 2019-2023](#), which responds directly to the demand for innovative, scientifically tested water management solutions for sustainable development.

Three high-priority water challenges were addressed: food, climate, and growth. The implementation of the strategy was supported by the IWMI's [Gender and Inclusion Strategy 2020-2023](#).

New projects: (1) [Addressing Climate Vulnerability in Nepal through Resilient Inclusive WASH systems \(RES-WASH\)](#) (2023-2024, Department of Foreign Affairs and Trade (DFAT)); (2) [Groundwater for Deep Resilience in Africa – Design Phase](#) (2023, South Africa/GEF).

Research projects involving Central Asian countries:

(1) [Water Efficient Allocation in a Central Asian Transboundary River Basin](#) (2023-2026, Kyrgyz Republic, Uzbekistan/EC); H2020: Hydropower For You (2021-2026, Central Asia/EU); (2) [From Fragility to Resilience in Central and West Asia and North Africa](#) (2022-2025, Egypt, Sri Lanka, Uzbekistan/CGIAR Trust Fund); (3)



[NEXUS Gains: Realizing Multiple Benefits Across Water, Energy, Food and Ecosystems](#) (Forests, Biodiversity) (2022-2024, Ethiopia, India, Nepal, Pakistan, Uzbekistan, South Africa/CGIAR); (4) [Improving and Strengthening Water Security and Watershed Management in Central Asia](#) (2022-2023, Central Asia/United States Forest Services); Implementation and conducting of Trainings on water efficiency technologies for cotton production in Uzbekistan (extended to 2023, BMZ); (5) [Increasing water use efficiency in the Aral Sea region](#) (extended to 2023, Kazakhstan, Uzbekistan/GIZ).

Awards. IWMI won [Award for Digital Transformation](#) from Project Management Institute (PMI) in Sri Lanka in 2023. The award recognized the Earth Observation for Agricultural Risk Management (EO4ARM) application for its contribution to accelerating Sri Lanka's agricultural digital transformation.

The EO4ARM platform helps to build agricultural resilience among smallholder farmers in Sri Lanka by providing a comprehensive range of solutions – including weather forecasts, flood and drought monitoring, crop health status and farm-level updates – to assess climate risks and crop health, and enable timely compensation and mitigation measures.

Publications: (1) [IWMI Research Reports 184-188](#), (2) [IWMI Working Papers 205-206, 210, 212](#), (3) [7 Briefing notes](#), (4) [Water quality in agriculture: risks and risk mitigation](#).

Source: <https://www.iwmi.cgiar.org/>

7.7. Stockholm International Water Institute and World Water Week



The Stockholm International Water Institute (SIWI) is a Swedish not-for-profit Foundation. The SIWI's vision is a Water Wise World – a world that recognizes the value of water and ensures that it is inclusively shared and used sustainably, equitably, and efficiently for all.

At SIWI, they believe that the best way to tackle water crises and help bring about lasting change – is to strengthen water governance among public and private actors alike.

SIWI focuses on priority areas including transboundary water cooperation, international policy, WASH, and water governance and streamlines three cross cutting issues – gender equality, youth empowerment, and human rights-based approaches –

throughout all programming. SIWI hosts the world's premier annual water meeting and water dialogue platform, the World Water Week and awards the prestigious Stockholm Water Prize and the Stockholm Junior Water Prize. As a trusted convener, SIWI is the

host and driver of important initiatives such as the UNESCO Category II's International Centre for Water Cooperation and the Shared Waters Partnership (SWP), hosted by SIWI's Transboundary Water Cooperation Department.

World Water Week

World Water Week is the leading annual conference on water, a meeting place for our ever growing and inclusive community of changemakers, working together to accelerate the change needed to develop water-related solutions that can simultaneously tackle the water, climate, food, biodiversity and energy crises.

World Water Week 2023, held onsite and virtually from 20-24 August, was a truly global event that brought the international community together to work towards a more water-wise world.

Many of the world's greatest challenges are inextricably linked to water, its use and management. Water-related solutions are thus key to delivering the sustainable development goals by 2030.

Thanks to the generosity of session organizers, almost all the 300 sessions and other content are available online for free.

In 2023, the conference attracted 15,000 participants (online and onsite) from 193 countries and territories, demonstrating not only the great concern for the world's water, but also a determination to change things for the better. More than 50 percent of participants were female, and the event welcomed a large proportion of young participants: 41 percent were under age 35. Read the detailed report on outcomes and important actions [here](#).

Activities in Central Asia and Afghanistan in 2023

Programs. SIWI's Shared Water Partnership program engaged in several key activities in Central Asia and Afghanistan supporting targeted capacity develop-

ment and experience exchanges, and networking opportunities to elevate regional water cooperation.

SIWI, in cooperation with the Office of the Coordinator of OSCE Economic and Environmental Activities (OCEEA) and the CAREC, continued the "[Women in Water Management Central Asia and Afghanistan](#)" network. Through the Network, women water experts from Afghanistan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan engage in joint capacity development, experience and knowledge exchange, and skills building activities. Through their work, participants of the Network highlight the value of inclusivity and the need for women water experts to achieve sustainable regional water cooperation.

Events. The following events were held: (1) Closed webinars on "Academic Writing and Women's Participation in Peace Mediation" (February); "DigitAll: Innovation and Technology for Gender Equality" (June) and "Achieving water security through inclusive delivery on Water, Sanitation and Hygiene (WASH)" (December) for the Women in Water Management Central Asia and Afghanistan Network (WWMN); (2) Members of the WWMN participated in the "Water Diplomacy Symposium" which elevated the voices of communities that are often excluded from high level water diplomacy dialogues such as women, youth, and Indigenous Peoples and allowed for experience sharing between them and knowledge exchange. The WWMN also participated in the UN Water Conference official side event in the UN Headquarters "Elevating Critical Voices in Water Diplomacy" (March); (3) the WWMN participated in Global Women in Water Diplomacy Network online events for International Women's Day (March) and "Women in Water Diplomacy Network 2023 Year-in-Review Online Event" (December); (4) On the second annual International Day for Women in Diplomacy, SIWI, together with ELI, the Women in Water Diplomacy Network, and the U.S. Institute of Peace, co-convened the event, "[Elevating Women's Leadership for Effective Transboundary Water Cooperation](#)" (June). The event brought together experts to discuss how we can work to force inclusion in water diplomacy.

Source: SIWI, <https://www.siw.org>

7.8. World Water Council

The World Water Council (WWC) is an international multi-stakeholder platform. It was established in 1996 on the initiative of renowned water specialists and international organizations, in response to an increasing concern about world water issues from the global community.

The World Water Council catalyzes collective action during and in between each World Water Forum – the world's largest event on water. Organized every three years with a host country, the Forum provides a unique



platform where the water community and key decision makers can collaborate and make long-term progress on global water challenges.

Activities in 2023

10th World Water Forum “Water for Shared Prosperity”.

In 2023, preparatory phase and processes for the 10th World Water Forum in Bali, scheduled for May 18 to 24, 2024, gained momentum as stakeholders convened twice: the [kick-off meeting](#), which marked the beginning of preparations for the upcoming forum (Jakarta, Indonesia, February 15-16); the [2nd Stakeholder Consultation Meeting](#) gathering 1,094 stakeholders from 73 countries (Bali, Indonesia, October 12-13).

Three key preparatory processes – thematic, regional, and political – were established to address various aspects of water management.

Events. In 2023, the WWC achieved a significant milestone with its support to the organization of the [2023 UN Water Conference](#) (New York, March 22-24). The WWC actively engaged in over 15 events, advocating for key issues like local governance, basin management, and disaster response, and emphasized the political nature of water challenges, highlighting the upcoming 10th World Water Forum in Bali.

The World Water Council, Moroccan Ministry of Equipment and Water, and International Network for Basin Organizations organized the [3rd International Conference on Water and Climate](#) with over 500 global participants (Fez, Morocco, July). It addressed water management challenges amidst climate change, while discussions emphasized the need for innovation and knowledge-sharing.

Four major events were co-organized by the WWC, including the 3rd high level seminar on water security, special sessions, and the launch of the report “Opening-Up Integrated Water Resource Management: to Include Energy, Food, Health and Education” during the [XVIII World Water Congress](#) (Beijing, China, September 11-15).

A WWC delegation actively participated in the Euro-RIOB 2023 and kick-off of the 5th Mediterranean Water Forum (Valencia, Spain, October), 6th Cairo Water Week (Cairo, Egypt, November), 9th World Water Cities Forum (Daegu, Korea, December).

New strategy. The World Water Council adopted in 2023 a comprehensive strategy aimed at aligning the Task Forces with the World Water Forum's Thematic framework.

Through this synergy, the World Water Council and the World Water Forum are better equipped to drive insightful dialogue and present concrete solutions that will contribute to building meaningful and sustainable change in the water sector.

In 2023, the Board of Governors convened four times, holding two virtual sessions and two in-person meetings.

Publications. [Opening-Up Integrated Water Resource Management: to include Energy, Food, Health and Education](#) (WWC Report, June); [Triennial Strategic Framework-2023-2025](#).

Source: Activity Report 2023, <https://www.worldwatercouncil.org/en>



8

SECTION

Activities
of International
Partners
in Central Asia

8.1. Asian Development Bank



ASIAN DEVELOPMENT BANK

The Asian Development Bank (ADB) has provided technical assistance support and made investments in the water sector in the Central Asia region since its first lending (to Kazakhstan) in 1998.

Investments to date, totaling US\$4.4 billion, have included support for flood management, irrigation and drainage, clean water supply, sanitation, hydro-power, institutional reforms, and knowledge and capacity building.

Projects in Central Asia and other CAREC countries in 2023

ADB has assisted the [Central Asia Regional Economic \(CAREC\) Program](#) for regional cooperation and integration. This partnership of 11 countries²³⁵ supported by six multilateral institutions promotes development through cooperation, leading to accelerated growth and poverty reduction.

In 2017, CAREC introduced agriculture and water as a key pillar of the CAREC 2030 strategy. In 2020, ADB approved technical assistance (TA) to support the development of the CAREC water pillar, emphasizing economic aspects and sustainable financing of water resources management.

The framework for CAREC water pillar was developed and endorsed in 2021 by the Ministerial conference. Following a series of consultations with CAREC countries, a dedicated working group for the Water Pillar was established in 2023 with representatives from Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan.

The Working Group of the Water Pillar is an advisory and consultative body who provides guidance on the implementation and future direction of the Water Pillar and development of regional projects and technical assistance, including coordination with other regional initiatives.

The Water Pillar is envisaged to expand over time to include other CAREC countries and will be assessing potential projects for financing in the coming years including water-energy nexus modeling.

Investment approvals in 2023 included an additional financing of \$5 million grant for the [Emergency Flood](#)

[Assistance Project in Pakistan](#). Approved in February 2023, the project supports urgent provision of climate-resilient seeds for staple crop cultivation and women-led livelihoods to meet basic household needs. This additional financing from the Japan Fund for Prosperous and Resilient Asia and the Pacific is managed by ADB to expand the original scope of the Emergency Flood Assistance Project in 2022. In that year, ADB approved a \$475 million loan and \$3,050,000 grant for Pakistan's post-flood recovery and reconstruction response to contribute to the economic recovery of flood-ravaged provinces of Balochistan, Khyber Pakhtunkhwa and Sindh, while building longer term resilience.

In October 2023, ADB approved a €48 million loan and €500,000 grant for enhancing the policy and institutional framework for sustainable water resources management and an efficient state-owned enterprise for delivering irrigation services in [Georgia](#). This [project](#) will increase resilience to future climate change impacts by (i) revising irrigation fees to ensure improved efficiency of water use and financial sustainability of irrigation systems under climate change, and (ii) modernizing existing infrastructure from open canal to more efficient, combined closed pipe and open canal networks. It will also support water-efficient irrigation technologies and promote innovative and climate-smart agricultural production.

In [Uzbekistan](#), ADB expanded its technical assistance support to the preparation of the Resilience in the Amu Darya River Basin Investment Project with a total grant of \$1,825,000 approved in November 2023. The technical assistance will help design the Ayakchi and Obizarang Reservoir projects listed in the pipeline for 2024 approval. The technical assistance also covers a study tour to Japan to learn from Japanese experience and knowledge in integrated and comprehensive climate adaptation measures such as dam development and operation, and innovative water saving and digitalization technologies required for the projects.

In December 2023, a technical assistance in the amount of \$528,000 was approved by ADB for preparing the [Naulong Integrated Water Resources Development Project in Pakistan](#) that harnesses flood flows generated by intense but highly episodic rainfall. The proposed project will increase the reliability of water resources by developing a storage reservoir for multipurpose use of agriculture, power generation and drinking water.

Source: Asian Development Bank, <https://www.adb.org/>

²³⁵ Afghanistan, Azerbaijan, Georgia, Kazakhstan, People's Republic of China, Mongolia, Pakistan, Tajikistan, Turkmenistan, Uzbekistan

8.2. Asian Infrastructure Investment Bank

The Asian Infrastructure Investment Bank (AIIB) is a multilateral development bank with a mission to improve social and economic outcomes in Asia. Headquartered in Beijing, AIIB began operations in January 2016 with 57 founding Members and have since grown to 109 approved members worldwide.

The 2023 AIIB eighth Annual Meeting themed “Sustainable Growth in a Challenging World” marked AIIB's first in-person Annual Meeting since 2019, and the first one in Africa (Sharm El Sheikh, Egypt, September 25-26). The meeting highlighted AIIB's continued commitment to supporting the key infrastructure demands of its Members, and alluded to the climate-centered global agenda, and the compounding challenges faced by its Members. During the meeting, the Bank announced that it would host its next Annual Meeting in Central Asia. The ninth annual meeting of the Bank will be held in Samarkand, Uzbekistan, in September 2024.

Projects in Central Asia in 2023

AIIB has signed a loan agreement (\$36 million) for the development, construction and operation of a 100-MW [wind power plant](#) in the Zhambyl region of **Southern Kazakhstan**. The project will be co-financed by EBRD, Green Climate Fund, and Green Technology Fund. When fully operational, the plant is expected to help reduce the country's emissions by over



200,000 tons of carbon dioxide-equivalent per year on average.

In **Tajikistan**, a [Rogun Hydropower Development Project – Phase 1](#) was proposed for financing in 2023 for the construction of a hydropower plant, currently in progress, with a designed generation capacity of 3,780 MW. In Phase 1, AIIB is considering investing USD 200 million in certain components of the Project. Further phases of development will be reviewed at a later stage by reflecting on the progress to date.

In **Uzbekistan**, AIIB approved the [UzPSB Energy and Water Efficiency, and Renewables Bond Investment](#) (\$25 million), which will finance a portfolio of renewable energy, and energy and water efficiency sub-projects in Uzbekistan. \$145 million were approved as co-financing for the construction, operation, and maintenance of three solar photovoltaic independent power plants (See Section 8.3. [European Bank for Reconstruction and Development](#)).

Source: <https://www.aiib.org/en/index.html>

8.3. European Bank for Reconstruction and Development

The European Bank for Reconstruction and Development (EBRD) was established in 1991. It invests in projects facilitating the transition to open market, as well as the development of business activity.

The EBRD work in Central Asian countries on water issues is very broad, including water supply, wastewater treatment, RES, and increased climate resilience.

Projects in Central Asia in 2023

EBRD invested more than €1.2 billion in Central Asian economies in 2023. More than 100 projects supported renewable energy, water efficiency, private entrepreneurship and sustainable infrastructure. Sixty per cent of investments were green.

Highlights of the EBRD's work in **Kazakhstan** include the launch of the [GEFF Kazakhstan II](#) and an investment in a local currency bond issued by the country's transmission system operator, [KEGOC](#). The funds will help make the country's electrical grid more sustainable and reliable.

In the **Kyrgyz Republic**, the EBRD pledged new funds under its [Kyrgyz Water Resilience Framework](#) to sup-



port the modernization of water supply services in the Batken and Jalal-Abad oblasts. The Bank signed a number of sovereign projects aimed at modernizing key transport and energy infrastructure to improve the country's connectivity and climate resilience, including: (1) upgrade of a 30 km section of the [Issyk-Kul Lake ring road](#); (2) increase of the reliability of the national electricity transmission and distribution grid; and, (3) rehabilitation and modernization of the [Lebedinovskaya hydropower plant](#) – the largest investment in the country's hydropower sector in 20 years.

The completion of three infrastructure projects in **Tajikistan** allowed more than 400,000 people in 13 municipalities across the country to enjoy better access to clean and safe drinking water. Last year the EBRD launched the [GEFF Tajikistan II](#) and extended new GEFF loans to Bank [Arvand](#) and microlenders [Humo](#) and [Imon International](#). With a joint base of more than 540,000 clients and operational even in remote

mountainous parts of the country, these three institutions will help bring green finance to even the smallest borrowers in Tajikistan. The EBRD offered support to local retailers and agribusiness companies under a risk-sharing scheme with the country's largest private lender, Bank Eskhata.

Uzbekistan remained the leading recipient of EBRD funding in the region for the fourth year running, by attracting more than €700 million. The Bank: (1) financed the construction of three greenfield solar power plants with total installed capacity of nearly

900 MW in **Jizzakh**, **Samarkand**, and **Sherabad**; (2) provided funds for the construction of a 100 MW wind power plant in the autonomous republic of **Karakalpakstan**; (3) provided a sovereign loan to modernise 118 pumping stations and improve the sustainability of water supply for irrigation in the Fergana Valley. Samarkand became the first city in the country to join the **EBRD Green Cities programme**, and is planning to deploy ecologically friendly electric buses as part of this engagement.

Source: <https://www.ebrd.com>

8.4. European Union



The European Union's engagement with the region has significantly expanded since the early 1990s. In 2019, the Council adopted a new EU Strategy on Central Asia. The new-generation bilateral Enhanced Partnership and Cooperation Agreements (EPCAs) form a cornerstone of EU engagement. At the beginning of 2023, the EU and Tajikistan have started negotiations on an Enhanced Partnership and Cooperation Agreement (EPCA).

More than 100 delegates gathered for the **7th European Union – Central Asia High-Level Conference on Environment and Water Cooperation** (Rome, February 23-24).²³⁶

The EU reiterated its support to the five countries of the region accelerating a green transformation of their economies to ensure sustainable development.

The **19th EU-Central Asia Ministerial Meeting** took place in Luxembourg (October 23). The participants endorsed the **Joint Roadmap for Deepening Ties between the EU and Central Asia** and stressed the need to strengthen regional cooperation in Central Asia as an effective and desirable way of tackling climate, water-energy and environmental challenges and recognized the importance of further action in stepping up and promoting such cooperation including through sharing knowledge and experience in sustainable water management and fostering political dialogues within the region and between the EU and Central Asia.

EU Regional Environment Programs in Central Asia

EU is currently supporting two regional cooperation programs in Central Asia on environment-related issues: (1) Central Asian Water and Energy Program (**CAWEP**) implemented jointly by EU, WB, Switzerland and UK to promote water and energy security at the regional and national levels (see **World Bank**); (2) Regional coordination and support to improve the EUCA Platform for Environment and Water Cooperation (see further).

"European Union – Central Asia Water, Environment and Climate Change Cooperation (WECOOP)" in 2023

After three and a half years of dedicated work to enhance national environment, climate change and water policies and to promote green investments in Central Asia, the WECOOP project closed (April 14). Key results: (1) The Project supported policy dialogue between CA and the EU with participation of over 700 policy makers and experts; (2) WECOOP worked on enhancement of national policies and capacities in CA and promotion of green investments. 520 national experts improved knowledge and skills in environmental governance, of them 56% are women. 19 environmental national policy documents have been adopted by relevant institutions with project's assistance. More than 100 representatives of municipalities and NGOs attended 3 WECOOP workshops on investment project preparation. 115 students and young entrepreneurs received training on green business development and 30 university teachers on environmental economics; (3) 3 regional media contests with participation of over 130 journalists were organized to raise awareness on climate, biodiversity and renewable energy. The project organized study tours for national experts, journalists and young entrepreneurs to Czechia, Kyrgyzstan, Latvia, the Netherlands; (4) Project experts developed analytical review of biodiversity and significant ecosystems conservation priorities in CA. Published 16 news bulletins on developments in EU policies legislation, new relevant reports and studies.

Source: <https://ec.europa.eu>, <https://wecoop.eu>

²³⁶ organized under the auspices of the EU–Central Asia Platform for Environment and Water Cooperation

8.5. German Society for International Cooperation

As a globally active federal enterprise for international development cooperation, the German Society for International Cooperation/Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH/ supports the German Federal Government in implementation of its development policy goals.



Since the beginning of the 1990s, GIZ has been implementing programs and projects in Central Asia.

Regional Programs and Projects on Water, Environment, and Development

The German government, in collaboration with its Central Asian partners, launched the **Green Central Asia Initiative**²³⁷ (with a budget exceeding €450 million) in 2020 to engage in a political dialogue process on climate, environment, and security. Its primary goals include promoting the environmentally friendly use of natural resources, safeguarding ecosystems and biodiversity, and reducing greenhouse gas emissions.

This initiative aligns with Germany's foreign policy focus on 'climate and security' within the United Nations framework and supports the implementation of Sustainable Development Goals (SDGs) 6 (clean water and sanitation), 13 (climate action), and 15 (life on land). GIZ collaborates with partners in Central Asia across various areas such as Water Management, Green Economy, Climate Adaptation and Risk Management, Land Management & Biodiversity, and Renewable Energy and Energy Efficiency.

One notable project under this initiative is the '**Green Central Asia: Transboundary dialogue on climate, environment, and security in Central Asia and Afghanistan**' (2020-2024). Commissioned by the Federal Foreign Office, it facilitated the drafting of the **Regional Climate Change Adaptation Strategy for Central Asia**, which was introduced at COP28 in Dubai and adopted in 2023. Moreover, a Memorandum of Understanding was signed among four countries' glacier research institutions and Meteorological Institutes (March) to develop a common regional methodology for monitoring glaciers, enhancing regional coordination.

Scientific institutions like the Potsdam Institute for Climate Impact Research (PIK), the Helmholtz Centre Potsdam - German Research Centre for Geosciences (GFZ), the Martin Luther University Halle Wittenberg (MLU), and the German-Kazakhstan University (DKU) have provided vital support and capacity building measures. For instance, they developed a statistical weather-driven crop model for wheat yield forecasting in Kazakhstan, conducted hydrological mode-

ling, drought monitoring (<https://droughtmap.geo.uni-halle.de/droughtmap>) and monitored reservoirs, lakes, GLOFs (Glacial Lake Outburst Floods), and other natural hazards.

The **second phase of the Green Central Asia Initiative**, starting in April 2024, will further support the Regional Climate Adaptation Strategy with a focus on enhancing regional adaptation and mitigation. This phase is co-financed by the EU Turkmenistan Facility and will deepen the policy dialogue between the EU and Turkmenistan on renewable energies, methane reduction, and environmental protection.

Additionally, projects like '**Climate sensitive Water Resources Management in Central Asia**' (2023-2028), commissioned by the Federal Ministry of Economic Cooperation and Development (BMZ) and co-financed by the Swiss Development Cooperation (SDC), aim to implement Integrated Water Resources Management (IWRM) principles in the Aral Sea Basin by supporting basin dialogues along the Amu Darya and the Syr Darya, building capacities and working in particular on improving water quality and groundwater monitoring and introducing digitalization measures at selected pilot sites of transboundary irrigation canals. Similarly, the BMZ-commissioned **projects on climate risk management and integrative land use in Central Asia** work on **water-related risks** at the pilot basins Isfajram-Saj, Zerafshan, Shakhimardan, Murgab, Chu, Talas and **sustainable land use practices** in the five Central Asian countries.

In the realm of **Green Economy**, GIZ collaborates with partners to promote socially just and environmentally friendly economic development. Noteworthy projects include initiatives in the **Aral Sea region**, Tajikistan, and **Kyrgyzstan**, which focus on integrating green technologies, improving water access and efficiency, and developing product-specific marketing strategies for international markets.

Moreover, in the **renewable energy and energy efficiency** sector, GIZ supports efforts to achieve climate-neutral energy coverage by 2050, emphasizing energy efficiency, renewable energy sources, and hydrogen promotion.

Source: GIZ Green Central Asia Program, <https://www.giz.de>, www.greencentralasia.org

²³⁷ this initiative is a significant contribution to the Team Europe Initiative on Water, Energy, and Climate Change in Central Asia

8.6. Organization for Economic Co-operation and Development



The Organization for Economic Co-operation and Development (OECD) is a multidisciplinary, inter-governmental organization comprising 38 member countries and provides a unique forum and the analytical capacity to assist governments to compare and exchange policy experiences, and to identify and promote good practices through policy decisions and recommendations.

The OECD is working to help developed and developing countries meet the water challenge. The OECD contributes analyses to improve the information base, identifies good practices, and provides a forum for exchanging country experiences.

OECD work on water focusses on the economic and financial dimensions of water management and improving governance.

In addition to analytical work, the OECD works with selected regions and countries to facilitate the reform of water policies.

The OECD has enhanced its convening power and capacity to structure discussion among stakeholders on water issues, by setting up international initiatives including the [Roundtable on Financing Water](#), the [Water Governance Initiative](#), and the [Network of Economic Regulators](#).

The OECD facilitates the [Global Commission on the Economics of Water \(GCEW\)](#) which was convened by the Government of the Netherlands and launched in May 2022 with the aim of redefining the way water is valued and governed for the common good.

The [OECD Council Recommendation on Water](#) captures policy guidance developed by the OECD and can inspire water policy reforms in countries around the globe. Non-member countries are welcome to adhere to the Recommendation with a view to create a momentum for water policy reforms that contribute to water security and sustainable growth.

The Recommendation on Water includes high-level policy guidance on topics relevant for water resources management and the delivery of water services including managing water quantity, improving water quality, managing water risks and disasters, ensuring good water governance and ensuring sustainable finance, investment and pricing for the water and water services.

Activities in Eastern Europe, the Caucasus and Central Asia in 2023

In Central Asia, the OECD works with partner countries through its [GREEN Action Task Force](#). The GREEN Action Task Force annual meeting in 2023 was held on [May 11-12](#) in Istanbul, Turkey at the OECD Istanbul Centre, with an agenda that reviewed progress with implementation of the program of work for 2023-2024 and a substantive focus on the biodiversity policies in EECCA, greening public finance in EECCA countries, mobilizing and catalyzing private-sector investment in green economy transition in EECCA and a special session on the effects of the Russian invasion of Ukraine on climate and energy policies in the European Union's Eastern Partnership and Central Asian countries. The meeting also provided an update on work on strengthening water management and on the energy-water-land use nexus in Central Asia.

The OECD assists the countries in Eastern Europe, the Caucasus and Central Asia (EECCA) in adopting a more integrated approach to water management, applying robust economic and financial analyses and improving multistakeholder participation. It also helps in identifying and removing some of the key obstacles to effective and efficient water management, while reflecting countries' level of socio-economic development. This work is part of the programme of the European Union Water Initiative (EUWI), for which the OECD is a strategic partner, together with the United Nations Economic Commission for Europe (UNECE) and is aimed at improving river basin management and water governance frameworks. National Policy Dialogues are jointly facilitated by the OECD and UNECE and fed by robust analytical work, often lead to practical implementation of policy advice.

The OECD focuses on the economic aspects of water resources management (policy coherence, managing water for growth and making the best use of economic instruments for water management), and on the financial sustainability of water supply and sanitation services (strategic and mid-term financial planning and financial support mechanisms to the sector).

Work in Eastern Europe and the Caucasus is carried out within the frame of the [EU4Environment Water Resources and Environmental Data Program](#) which the OECD implements in partnership with the Environment Agency Austria (UBA), Austrian Development Agency (ADA), International Office for Water (OI Eau) (France) and United Nations Economic Commission for Europe (UNECE)

In Central Asia, recent work has focused on the analysis of [energy, water and food security as part of a new program of work on "nexus"](#). In 2023, this work

led to the publication of a series of case studies titled [Climate-Resilient Agribusiness in Central Asia: The water, energy, land-use nexus approach](#). As part of strengthening its relationships with the International Fund for saving the Aral Sea (IFAS), the OECD in collaboration with its nexus implementing partners²³⁸ SIC ICWC and UNECE and the European Union organized a side event at the IFAS conference: "Central Asia: Towards sustainable future through strong regional institutions". The side event ["Innovative Solutions for strengthening regional cooperation on water and energy in Central Asia"](#) saw high-level welcoming remarks from H.E. Mr. Daler Juma, Minister of

Energy and Water Resources of the Republic of Tajikistan and H.E. Ms. Terhi Hakala, the Special Representative for Central Asia, the European Commission. The OECD with its implementing partner SIC ICWC also contributed to the [UN SPECA 26th Session of the Working Group on Water, Energy and Environment](#) where a panel session on the nexus was organized and presented. This work was launched in 2023 and the OECD partners with SIC ICWC, EBRD, FAO and UNECE on this five-year regional program (Kazakhstan, Almaty, hybrid, November 7).

Source: OECD

8.7. Organization for Security and Co-operation in Europe

The Organization for Security and Co-operation in Europe (OSCE) has a long history in supporting its Central Asian participating States in the area of regional water management, focusing on water governance and support for transboundary water management, training and capacity development, research and development of standards and legislation.

Activities in 2023

The Intergovernmental Chu-Talas Water Commission's activities were supported by the **OSCE Programme Office in Astana and the OSCE Program Office in Bishkek**. The support aims to promote transboundary water dialogue and co-operation on Chu and Talas river basins. With the support of national experts, a technical examination of the reservoir was conducted; necessary maintenance and repair work for Orto-Tokoy water reservoir in the Kyrgyz Republic were determined. OSCE also supported the organization of the [11th Meeting of the Working Group on Environmental Protection \(WGEP\)](#) under the Secretariat of the Intergovernmental Chu-Talas Water Commission (Almaty, November 21). The participants from the Republic of Kazakhstan and the Kyrgyz Republic discussed the results of laboratory water quality assessments and also reviewed a joint annual report on water quality and the hydrometeorological situation in the Chu and Talas river basins.

As part of OSCE's efforts to enhance national legislation in line with good practices in the efficient and sustainable management of water resources, expert assistance in revision of a new edition of the national Water Code of Kazakhstan was provided.

The OSCE Programme Office in Dushanbe supported organization of two capacity-building workshops for representatives of Syr Darya River Basin's Steering Committee with a strong focus on gender mainstreaming and increasing women's participation in water



resource management, as well as a workshop for young professionals to increase capacity in project proposal writing with a focus on sustainable water management.

In the area of legislative support, OSCE assisted passing three by-laws to the Water Code (2019) focusing on irrigation and drainage in Tajikistan. OSCE also supported the Land Reclamation and Irrigation Agency of Tajikistan developing the 2024-2028 Land Reclamation and Irrigation Programme. To promote regional cooperation, OSCE supported 10th meeting of the National Commission on Irrigation and Drainage with a focus on experience exchange between Tajikistan and Uzbekistan. This event also aimed at enhancing regional dialogue on climate change in Central Asia and bringing in young professionals to stimulate their interest in the land reclamation and irrigation sector.

OSCE worked with the Ministry of Health and Social Protection of Population to develop sanitation regulations and rules on waste water treatment in Tajikistan and facilitated the production of awareness raising videos on sanitation norms applicable to drinking water. OSCE also facilitated a desk review on sanitary wastewater management and implemented a survey on wastewater disposal facilities and their impact on open water sources. The capacity building trainings for the Sanitation and Epidemiological Centers employees on the topic of sanitation regulations on drinking and ground water were conducted in Tajikistan's four regions and involved 735 employees (317 female; 418 male).

Support for the assessment of the **pollution in the Syr Darya river basin was provided by the OSCE Project**

²³⁸ in 2023, OECD in partnership with SIC ICWC, EBRD, FAO and UNECE launched the five-year project "Regional mechanisms for the low-carbon, climate-resilient transformation of the energy-water-land Nexus in Central Asia"

Co-ordinator in Uzbekistan via the Ministry of Ecology, Environment Protection and Climate Change of Uzbekistan. Within this framework, monitoring missions to settlements on the basin were organized to conduct seasonal analysis of the water surface and sediments on the point of their contamination by various pollutants. This support contributes to Uzbekistan's efforts on implementation of efficient disaster risk reduction mechanisms and safety precaution measures.

Support in the implementation of Central Asian countries' commitments in the area of water management as well as strengthened dialogue and co-operation was provided by the **Office of the Co-ordinator of OSCE Economic and Environmental Activities** at the OSCE Secretariat in Vienna, with notable activities listed below.

In 2023, OSCE launched the next phase of the project "[Women, Water Management and Conflict Prevention – Phase III](#)". The project contributes to more inclusive and participatory water governance and capacity building of women water professionals, including in mediation and peacebuilding processes.

In partnership with the Regional Environmental Centre for Central Asia (CAREC) and Stockholm International Water Institute (SIWI), OSCE continued the organization of monthly capacity-building sessions for the [Women in Water Management Network in Central Asia and Afghanistan](#).

The Network works to support a community of practice for women water experts engaged in different aspects of transboundary water cooperation processes in Central Asia. Women water experts from the region engage in joint capacity building, experience sharing, and knowledge exchange, supporting development of women water experts in the region and enhanced regional water cooperation.

Preparations have been underway to organize the *Global Network Forum for Women in Water Diplomacy* on 4-8 March 2024 in Vienna for the Central Asian Network together with partner networks from Africa, North America and other regions. More than 80 women water professionals, partners and stakeholders are expected to meet and exchange experiences, plan the next steps in advancing the network strategy, development and cooperation.

In August 2023, OSCE and the International Union for Conservation of Nature (IUCN), contributed with a session on "**Facilitating Transboundary Water Cooperation through Data and Information Exchange**" at the **Stockholm World Water Week**. The event gathered more than 50 participants from the international water sector – many of them young professionals – and was an occasion to discuss the importance of data and information exchange focusing on transboundary water management. A highlight of the event was the introduction of a "Data and Information Exchange Toolkit – Facilitating transboundary water management and governance through co-operation", developed by OSCE in partnership with the IUCN Environmental Law Centre in Bonn within the framework of the OSCE project on Water Diplomacy and Conflict Prevention.

In September 2023, OSCE contributed to the *Water Day at the 13th Central Asia Leadership Program (CALP)* held in Almaty, Kazakhstan. Participants attended lectures by international experts in water diplomacy, gender equality, and sustainable development. The sessions focused on state management in the water sector where participants were introduced to the approaches of Integrated Water Resources Management (IWRM), progress in implementing IWRM practices in Central Asia, and discussed the main constraints to sustainable cooperation among regional countries in transboundary river basins.

Source: OSCE

8.8. Swiss Confederation (SDC and SECO)



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

State Secretariat for Economic Affairs SECO

Switzerland initiated its ongoing **Cooperation Program for Central Asia (2022-2025)**, maintaining a strong focus on water, infrastructure and climate change. The Program is set up in a way to encompass regional efforts to address water and climate change, along with national portfolios in Kyrgyzstan, Tajikistan and Uzbekistan. The overall goal of the regional water portfolio is to see Central Asian states collaborate, use evidence and take concrete steps

to manage their water resources with a basin approach in a climate-resilient, sustainable and inclusive way. Through the bilateral portfolios, Switzerland aims to see People live and work – reasonably protected from natural hazards – in resilient settings and use quality public infrastructure services, and water resources are managed with a basin approach in a climate-resilient, sustainable and inclusive way.

In the **Kyrgyz Republic**, Switzerland supported the Kyrgyz government agencies in implementing the National Water Resources Management Program (NWRMP), which has significantly contributed to the effectiveness and efficiency of selected basin management institutions and water utilities. The Swiss funding facilitated the completion of essential tasks

such as the preparation of Asset Management Plans (AMP) and the creation of digital maps for numerous Water User Associations (WUAs). As a result, a large proportion of WUAs have developed comprehensive irrigation and drainage management plans, leading to a notable increase in satisfaction among community members regarding the services provided. However, there is a need for improved gender representation within WUAs, advocating for better and more balanced inclusion of women in management roles. Despite these challenges, the Swiss-supported NWRMP has positively impacted over a quarter of a million people in the country. Additionally, efforts to enhance the resilience of rural communities against climate change impacts have been notable, with various measures such as infrastructure development, training, and support for climate-smart agricultural practices contributing to increased resilience among community members, particularly women.

In **Tajikistan**, Switzerland continued its support for various initiatives aimed at enhancing the country's infrastructure and resilience to climate change impacts. In close coordination with other development partners Switzerland continued its support in the implementation of the Water Sector Reform and assisted in the development of new Water Code adopted by the GoT in 2020, the State Program for drinking water supply and sanitation for the period up to 2032 (approval expected in 2024), the "National Water Strategy 2040" (approval expected in 2024) and the "National Program on Melioration and Irrigation 2030". Another notable achievement was the improvement in interagency disaster risk reduction (DRR) coordination, facilitated through the National DRR platform established with the Swiss support. Efforts to improve access to quality public services, including water, sanitation, and electricity, have seen significant advancements, with thousands of additional people gaining access to essential services. DRR and CC concerns were integrated into the river basin planning within NWRMP project. Moreover, climate change adaptation measures have been implemented in cities like Khorog and rural areas of Gorno-Badakhshan Autonomous Oblast (GBAO) as well as in Rasht valley benefiting thousands of residents, but projects in certain regions have faced obstacles due to security concerns and restrictions imposed by local authorities. Swiss initiative on biodiversity conservation and climate resilience launched in the Southern Khatlon region and ground water management in Sugd. Overall, Switzerland's support in Tajikistan encompasses a wide range of initiatives aimed at promoting sustainable development and resilience in the face of environmental challenges.

In **Uzbekistan**, Switzerland sustained its support for initiatives aimed at enhancing integrated water resources management (IWRM) and improving public services, particularly in the water supply and sanitation (WSS) sector. Through partnerships with international organizations like the Asian Develop-

ment Bank (ADB), World Bank (WB), and United Nations Development Programme (UNDP), Switzerland assisted in the development of a comprehensive legal framework for IWRM, including the submission of crucial documents such as the draft Water Code and the Water Strategy 2024-2026 to the Cabinet of Ministers. This support reinforced Uzbekistan's commitment to water conservation and environmental protection, aligning with its strategic priorities for 2030. Furthermore, Switzerland's efforts included promoting women's empowerment in the water sector and implementing various WSS projects to benefit over half a million people. These endeavors reflect Switzerland's dedication to fostering sustainable development and resilience in Uzbekistan, addressing key challenges such as climate change adaptation and efficient natural resource management.

In continuation of its efforts in the three focus countries, Switzerland remains actively engaged in advocating for **regional cooperation and coordination around Water, Infrastructure and Climate Change issues in Central Asia**. The Swiss flagship initiative, **Blue Peace Central Asia** will continue, underlying the Swiss commitment to hydro-diplomacy and promoting of water as vector towards peace, stability and sustainable development. Switzerland continues to engaging with and strengthens regional organizations and dialogue platforms, foster an evidence-based dialogue and identify strategic demonstration projects to set best practices in water cooperation in the region.

Based on a successful demonstration project of Blue Peace Central Asia, the new **"Smart and Precise Prognostic Hydrology for Innovative Risk Management and Resource Use Efficiency in Central Asia" (SAPPHIRE)** project was launched. The project modernizes operational hydrology workflows in Central Asia Hydromet organizations, streamlines data management and processing steps, improves quality of forecasts of river discharge and builds capacity and interagency regional cooperation. By integrating information on snow for hydrological forecasting, SAPPHIRE is directly linked to the Swiss **Cryospheric Observation and Modeling for improved Adaptation in Central Asia (CROMO-ADAPT)** project, which strengthens the glacier, snow and permafrost monitoring systems in Central Asia. CROMO ADAPT builds on Swiss expertise in monitoring and adaptation in alpine water and disaster risk management to develop user-oriented climate information services, and supports the planning of adaptation measures to increase resilience to climate change.

Switzerland also continues its contribution to the **Central Asia Water and Energy Program (CAWEP)**, a multi-donor trust fund managed by the World Bank (see [World Bank](#)).

Finally, Switzerland continues to build on the **Governance of Groundwater Resources in Transboundary**

Aquifers (GGRETA) project, a global project with the Pre-Tashkent aquifer as one of three pilot areas.²³⁹

Beyond its direct involvement in projects within the region, Switzerland recognizes the importance of fostering dialogue and knowledge exchange among regional donors.

Switzerland's commitment to promoting water security and climate resilience is further demonstrated through its participation in key thematic meetings and conferences, including the Dushanbe Water Process and UN Water Conference. By emphasizing a systemic approach, Switzerland underscores the interconnection of climate change, food security, and water management.

Publications. (1) [Online course book](#) on Hydrological Modeling developed by Hydrosolutions as part of the Blue Peace Youth Pillar Program; (2) the [Water Footprint Assessment for Central Asia](#) contributes to a better understanding of the costs of water consumption for various uses across sectors as well as along specific agricultural value chains; (3) the [SnowMapper Central Asia](#) is gaining increasing significance for snow cover analysis and monitoring in Central Asia. This tool, a result of the fruitful collaboration between SAPPHIRE Central Asia (hydrosolutions GmbH) and CROMO-ADAPT (SLF) projects, leverages climate reanalysis data for high-resolution snow cover dynamics analysis.

Source: Regional Water and Climate Change Advisor for Central Asia, Embassy of Switzerland in Uzbekistan

8.9. United States Agency for International Development



The United States Agency for International Development (USAID) works across the whole Central Asia region to transform water-sharing problems into cooperation that would lead to better and equitable water management.

Activities in 2023

The USAID Regional Water and Vulnerable Environment (WAVE) activity, with a total budget of \$21.5 million, aimed at strengthening regional capacity to manage shared water resources and mitigate environmental risks in the Syr Darya and Amu Darya River basins, [continued](#) in 2023.

In 2023, the WAVE activity [sponsored](#) seven representatives in the CA delegation attending the UN Water Conference 2023. Under the theme of "Every drop counts," the delegates participated in a variety of sessions on a range of topics from reviving the ecosystem of the Aral Sea to preserving glaciers and the cryosphere, and using the Water-Energy-Food-Ecosystem Nexus approach to improve water management. It completed its summer school on academic writing for 12 winners in its Young Researchers Competition. The 10-day school was designed to strengthen the researchers' skills in preparing their studies for submission to peer-reviewed journals (May).

USAID Central Asia's Environmental Restoration of the Aral Sea Activity I (ERAS-I) [organized a three-day expedition](#) for a delegation of representatives from Germany, Japan, Kazakhstan, Uzbekistan, and the United States to visit several afforestation projects in the dried bed of the Aral Sea, including the USAID Oasis, where 200,000 black saxaul seedlings have been planted to test optimal growing conditions for restoring this vital ecosystem (May 21-26). Following the Expedition, USAID convened the first Aral Sea Donor Coordination Conference, which included more than 130 representatives from various national governments and international organizations (e.g., WHO) to discuss strategy and opportunities for improved coordination among initiatives dedicated to restoring this vital ecosystem (Kyzylorda, May 25-26).

A series of [workshops were concluded](#) in Khiva, Uzbekistan, where more than 40 water, agriculture, environmental, energy and economic specialists from Amu Darya River Basin countries gathered to learn about the initial results of long-term water and energy models developed for the basin by a group of national and international experts.

With the support of USAID, Foundation for Tolerance International (Kyrgyz Republic), Istiqbolli Avlod (Uzbekistan), and Youth Group for Protecting the Environment (Tajikistan) have [engaged students](#) in the Fergana Valley to form "Green Patrols," local youth groups who lead small environmental projects in their communities and raise public awareness about the need for water conservation.

Source: www.usaid.gov

²³⁹ implemented by UNESCO through a planned new phase

8.10. World Bank

For more than 30 years, the Bank has supported the efforts of Central Asian countries in improving the living standards of their people and promoting economic growth. Now, the Bank is increasingly adopting a regional approach to tackle the development challenges of Central Asian countries, through cross-border cooperation, fostering dialogue, and knowledge sharing across key sectors such as energy and water, transportation, and healthcare.

Central Asian Water and Energy Program. Since 2009, the Central Asia Water and Energy Program (CAWEP)²⁴⁰ has been supporting regional cooperation and integration for strengthening water and energy security. CAWEP consists of three pillars that support data and diagnostic analyses, institutions, capacity, and dialogue, and related investments: (1) Water Security; (2) Energy Security; and (3) Water-Energy Linkages.

Since the start of the program, it has facilitated 23 water, energy, and environmental investments of \$3.78 billion. **The third phase** of the program, ended in November 2023, catalyzed almost \$1.6 billion in new Bank-funded water and energy investments, convening many technical knowledge exchanges, and providing technical assistance to build sector capacity for more than 25 national institutions. It contributed significantly to the development of an integrated regional hydrological and meteorological data processing and forecasting platform – Central Asia Flood and Early Warning System (CAFEWS), which will improve regional monitoring and forecasting of extreme weather and other risks, assist in disaster preparedness, and support the management of water resources and the optimization of agricultural and energy production.

The ambitious **fourth phase** of the program (CAWEP-4) will promote regional cooperation for more resilient and better-integrated water and energy management under a changing climate.

Activities in 2023

Projects at national and regional levels. Several projects under the water and water-energy linkages pillar were completed in 2023: (1) "Support for Preparation of the North Aral Sea Development and Revitalization Project" and "North Aral Sea Engagement" (Kazakhstan); (2) "Strengthening Irrigation



Management across Central Asia", as part of which an online earth observation platform for mapping irrigation performance was developed, and Web applications were created for each of the five Central Asian countries, as well as an application for the entire region; (3) "Regional Water Resources Management in Central Asia"; (4) "Integrated Landscape/Catchment Management for Sustainable Hydropower" (Tajikistan); (5) "Strategic Environmental and Social Assessment of the Power Sector Expansion" (Tajikistan); (6) "Energy Efficient Water Services" (CA), which organized in 2023 a workshop on financial sustainability (Astana, March 28-29) and a study tour to the Danube River Basin (Austria, May 2-6).

Events. CAWEP organized two flagship events: (1) the Central Asia Energy Trade and Investment Forum where the interlinked opportunities of energy security, decarbonization, and economic growth were discussed (London, [March 2-3](#)); and, (2) the fifth Central Asia Climate Change Conference²⁴¹, where the need for better water, energy, and land (agriculture) management and to pay closer attention to climate change was emphasized. During the conference, two youth sessions – Youth for Climate and Youth for Connecting Policy, Activism and Science – provided a platform for youth to engage in climate change discussions. (Dushanbe, [May 16-17](#)).

Regional dialogue. CAWEP continued its support to the regional dialogue and structured reform process for the IFAS institutions by facilitating Regional Working Group (RWG) meetings. RWG members visited the Mekong River Commission (MRC) and participated in the international conference that MRC organized for the fourth MRC summit in Vientiane. Participants discussed lessons learned from institutional reform processes with the MRC Secretariat, as well as insights into the MRC's budget, data and information exchange, basin planning and monitoring mechanisms, and coordination between basin- and national level entities of the MRC (April).

Source: www.worldbank.org, CAWEP Annual Report 2022 and 2023

²⁴⁰ launched in 2009, the program entails three phases. Phase 1 ran until June 2013, phase 2 – until December 2017, and phase 3 was extended until November 2023. The joint program is supported by the European Union, Switzerland, the United Kingdom, and USAID and managed by the World Bank

²⁴¹ in cooperation with CAREC



9

SECTION

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 (2023) the [Kazakh Research Institute of Agriculture and Plant](#), the [Water, Land and Forest Resources](#) and [Agrobiological](#) faculties, the Center for Sustainable Agriculture (CSA), the [International Institute for Green and Sustainable Development](#). KazNARU is a member of UNAI²⁴² since 2016. The [Green campus](#)²⁴³ program is under implementation. The [Dissertation Council](#) on 8D086 "Water resources and water use" functions at the University.

On the KazNARU policy and goals for the academic year 2022-2023, please, see <https://www.kaznaru.edu.kz/university/about>.

Major Events and Activities in 2023

Research. The following projects are under implementation: (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 a technology for the rehabilitation of anthropogenically degraded moving sands 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 Aral Sea shrinkage: socioeconomic-environmental systems (SES) dynamics within the Syr Darya River Basin"²⁴⁴ (2021-2023, PEER, USAID); agro-meteorological stations were installed in Zhanakorgan, Syrdarya and Karmakshy districts of the Kyzylorda region for long-term autonomous monitoring of weather parameters, as well as for having a comprehensive database on climate, river flow, agricultural land, and temporal land cover series along the Syrdarya River (July 10-15), a practical seminar on "Open Remote Sensing and Applications in Agriculture" was held (November 21-23); (5) "Interdependent dynamics of food, energy and water in Kazakhstan and Mongolia" (2020-2023)²⁴⁵.

Capacity building. On the basis of (1) the [Professional development office](#), the educational program "Water, land and forest resources" functions: "Integrated

water resources management, irrigation land reclamation and reliability of hydraulic structures in Kazakhstan", "Operation and repair of external networks and facilities of water supply and sanitation", "Formation and functioning of water management systems in river basins", "Water resources management, irrigation land reclamation and reliability of hydraulic structures in Kazakhstan"; (2) KazNARU the Kazakh-German Institute for the Protection of Ecosystems and Biodiversity (KaGEB) was established and the Memorandum of Cooperation was signed (April 19).

An agreement was reached for establishing a branch of TIAME at KazNARU which will prepare bachelors and masters on "Water Resources and Water Use"; it is planned to open the "China-Kazakhstan Research Center on Water Sciences and Technologies", establish the "China-Kazakhstan Training Center for the Water Sector" (June 15) and the "Knowledge Hub" or a branch of the University in Taldykorgan, Zhetysay region (June 27).

The International Summer School was held in 2023 in 10 study fields, including "Problems of water resources assessment and management in Kazakhstan", "Innovative technologies and technical means in agriculture in the context of digitalization" (June 10-20, online).

Researchers from the University improved their skills through the training²⁴⁶ on "Introduction to Geospatial Technologies for Achieving Sustainable Development Goals (SDGs) – Enhancing Resilience" (July 23-28, Budapest).

Events. KazNARU hosted: (1) the international conference on the theme: "Biodiversity and ecosystem services as an integral component of sustainable development" (April 18); (2) 36th meeting of Balkhash-Alakol Basin Council (May 12); (3) roundtables "Kazakhstan's water resources: problems and ways of their solution", as a result of which a resolution was adopted on the current challenges in the water sector and ways to overcome them and a decision was made to establish a working group for identifying the systemic issues in the water sector and informing accordingly the higher-level authorities (June 26), and "Ways to improve the management system of water and energy resources of the Syr Darya River in present-day conditions" (September 12).

²⁴² United Nations "Academic Impact" program

²⁴³ a roadmap for KazNARU on contribution to the Sustainable Development Goals (SDGs), promotion of the ideas of green economy and the global climate action program

²⁴⁴ jointly with the University of Michigan and the University of South Dakota

²⁴⁵ jointly with the University of Michigan, the Humanities University of Mongolia and the Mongolian Academy of Sciences

²⁴⁶ in 2022, the leading German accreditation, certification and quality assurance institute ACQUIN in Bayreuth awarded the program a quality certificate

Cooperation. KazNARU signed (1) a memorandum of cooperation with the Xinjiang Institute of Ecology and Geography of the PRC (March 7); (2) an agreement on dual degree education with the American University of Emirates (November 15-17).

Achievements and awards. KazNARU entered the following rankings: 481st place in the “QS World University Rankings 2023”; 5th place in “QS Asia University Rankings 2023: Central Asia”; improved its results in the “QS World University Ranking by Subject 2023”, taking 301-350 positions; 5th place in “QS Sustainability Rankings 2024” among the higher education institutions of Kazakhstan.

For the results of the IQAA-Ranking of educational programs see <https://www.kaznaru.edu.kz/news/8608>.

KazNARU received the International Scopus Awards Kazakhstan 2023, and also “4 stars” in the QS Stars Rating System for its success in education.

Publications. Scientific journal “Research, results”, Almaty 2023, on <https://journal.kaznaru.edu.kz/index.php/research/issue/archive>.

Source: <https://www.kaznaru.edu.kz/>

German-Kazakh University

The German-Kazakh University (GKU) was founded in 1999 with the aim of training students in line with the German standards and is the only German university in Kazakhstan and Central Asia. The World Politics Faculty of the GKU has developed and carries out the master's program “Integrated Water Resources Management”²⁴⁷; the Economics and Business Faculty holds the “Strategic Management of Renewable Energy and Energy Efficiency”²⁴⁸ Program. The Center for Natural Resources and Sustainability (CRS) was established on the base of the GKU and received the status of the UNESCO Chair for Water Resources Management in Central Asia. The Central Asian Journal of Water Resources”/CAJWR²⁴⁹ and the “Central Asian Journal of Sustainability and Climate Research”/CAJSCR have been published by GKU.

Since 2022 the Kazakhstan Climate Accelerator²⁵⁰ is implemented in partnership with EIT Climate-KIC.

Major Events and Activities in 2023

Research. The following projects are under implementation by CRS: (1) “Climate Change and Resilience in Central Asia” (UNDP) aimed to create and operationalize the regional knowledge sharing practices through a series of regular thematic webinars on

the risks of instability caused by climate change. The CRS conducted the online regular technical webinar series: 1st – on the assessment of national and regional platforms for the exchange of information and knowledge on climate risks and resilience in Kyrgyzstan, Tajikistan and Uzbekistan (July 18); 2nd – on “Emergencies related to climate change in Central Asia” (August 15); and, 3rd – on “Water resources. Review of scientific achievements and knowledge platforms in Central Asia” (December 21); (2) “Development of the Almaty City Green Space Management Plan and the Almaty Agglomeration Regional Green Corridor Action Plan” (WB, August 1, 2022-September 30, 2023), the aim of which is to contribute to the achievement by Kazakhstan of the global objectives on carbon sequestration and forest landscape enhancement and in the development of two products; (3) “Strengthening Higher Education in the Water Sector for Climate Resilience and Security in Central Asia (HWCA) Erasmus+” (European Education and Culture Executive Agency (EACEA), May 2023-April 2026), the aim of which is to support the relevance, quality and modernization of MA/MSc curricula on water governance and water diplomacy offered by universities of Central Asian countries; (4) “Green Education and Science for Central Asia in frame of “Green Central Asia” – Regional Initiative on climate and security in Central Asia and Afghanistan” (German Foreign Ministry, April 2020-March 2024); (5) “Empowering Central Asian women in the energy sector” (OSCE, 2021-2024); (6) “Involvement of youth in solving environmental problems in Almaty” (“Eurasia” Foundation, February 22, 2022-February 23, 2023) and others.



The following projects were completed: (1) “Ecothon” aimed at supporting development of ecological and social entrepreneurial skills among students; (2) “International School of Green Business ‘Eco-Talk’”, the aim of which is to provide opportunities for young people in Central Asia to translate their eco-business ideas into sustainable business projects with an emphasis on the priorities of water, renewable energy and circular economy.

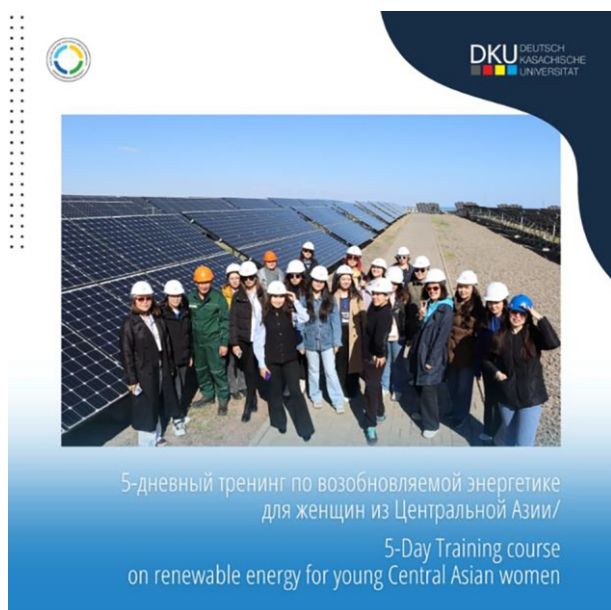
²⁴⁷ in 2022, the leading German accreditation, certification and quality assurance institute ACQUIN in Bayreuth awarded the program a quality certificate

²⁴⁸ in 2023, the programme was granted International Programme Accreditation by the ACQUIN Institute for Accreditation, Certification and Quality Assurance for a period of 6 years until 30 September 2029

²⁴⁹ indexed in DOAJ, EBSCO, IndexCopernicus, Russian Science Citation Index, 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 dated 29.07.2021)

²⁵⁰ a mentorship program for young Central Asia entrepreneurs willing to grow their eco-friendly start-ups into scalable sustainable businesses

Capacity building. (1) Trainings for government officials on the topic: "NEXUS assessment: water-energy-food-ecosystem interlinkages" (February 8-9, Ashgabat), course: "Clean Energy Transition"²⁵¹ (February 27-March 3), for Central Asian women on renewable energy sources²⁵² (April 17-21); (2) 2023 Student Olympiad "Sustainable Development Goals in Central Asia", as part of which the tests were organized in such fields as "Integrated Water and Land Resource Management", "Climate Change and Clean Energy" (March 27); (3) Summer School on the Aral Sea (August 21-31).



CRS jointly with the partners developed the following online courses: "Networking on Water and Climate Data in Central Asia" (NWCD_CA); "Clean Energy Transition Course"; "Kazakhstan Climate Accelerator"; "Weather and Climate Services for the Energy Sector of Central Asia: training course for practitioners"; "Training for Government Officials from Central Asia on promoting the Water-Energy-Food-Ecosystem Nexus assessment".

Events. The following events were held: (1) the international seminar "Decarbonization in Kazakhstan and energy cooperation in Central Asia" (February 16); (2) the online international conference 2022-2023 "The Silk Road of Knowledge: science meets green policy" with 6 thematic sessions organized, in particular on the topic "Innovations in adaptation and mitigation methods of climate change in the water sector of Central Asia" (February 22-24); (3) XV international student conference "Modern Global Trends: Challenges and Risks for Central Asia" with 6 sessions, in particular on the topic "Energy Systems and Renewable Energy Technologies" (April 7); (4) the roundtable "Energy Saving and Energy Efficiency

Improvement – the Most Important Directions of Modernization and Innovative Development of the Economy" (May 5).

Cooperation. GKU in collaboration with the Caspian State University of Technologies and Engineering named after Sh. Yessenov established the German-Kazakh Institute of Sustainable Engineering Sciences in Aktau (June 21). In 2023, the Institute launched, among others, an educational program "Energy and Environmental Engineering" aimed at training in production of green hydrogen in Mangystau.

The following documents were signed: (1) a framework agreement between the German-Kazakh University and D. Serikbayev East Kazakhstan Technical University on cooperation in establishing the Kazakh-German Institute of Science and Technology in Ust-Kamenogorsk; (2) a consortium agreement between the German-Kazakh University, Technical University of Berlin, Darmstadt Technical University, Hamburg University of Applied Sciences (HAW Hamburg), and Yessenov University.

Publications. For CAJWR publications, please, visit <https://water-ca.org/issues/>; for CAJSCR publications, see <https://cajscr.com/>; and, for CRS publications, see <https://ks.dku.kz/ru/>.

Collections of articles and selected publications are available on <https://dku.kz/ru/content/view/?slug=nauchnyye-publikatsii-dku&tab=2>.

The "Belt and Road" Initiative – The Great Silk Road of Modernity. Proceedings of scientific conferences (Almaty, May 12, 2023; ICBC "Khorgos", August 29, 2023). Almaty: Research Institute of International and Regional Cooperation of the Kazakh-German University (RIIRC of the DKU), 2023. 240 pages, on <https://disk.yandex.ru/d/RzU6VfJrR7TDFg>.

Source: <https://dku.kz/>, 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 NU is to create a wide range of engineering and applied science programs in land, water, energy and ecology.

NU has been implementing a "Green Campus" initiative aimed at promoting an environmental sustainability in the campus, including the efficient use of resources and reduction of negative environmental impact, and the Sustainability Living Lab Program, which supports the sustainable development research and innovation projects of the university community and actively contributes to the development

²⁵¹ with the support of the U.S. Mission in Kazakhstan, within the framework of the project "Clean Energy Transition course" implemented by DKU and CRS

²⁵² as part of the project "Empowering Central Asian women in the energy sector"

of SDSN Kazakhstan²⁵³ through the integration of research and educational resources into the network.

In 2023, 1,450 graduates received their diplomas from the NU; a new campus was opened in Almaty (June 5).

Major Events and Activities in 2023

Research. The NU Office of Sustainable Development in cooperation with the "National Conservation Initiative" Corporate Fund and with the support of Chevron company continues implementing the Sustainability Living Lab Program (SLL)²⁵⁴ to support students' green research and innovation projects in water conservation, energy, etc. The NU hosted the conference of the SLL program, where the program participants demonstrated their "green projects" for energy efficiency, plastic recycling, greening the campus, searching for alternative energy sources, introducing green standards, etc. (March 28-29).



March 28-29, the conference of the SLL program

Capacity building. The following events were organized: (1) a panel discussion on the topic "Development of green entrepreneurship. Which start-ups will be in demand in the near future?" (August 9); (2) a webinar "Assessing Economic and Social Effects of Climate Change and Energy Transition in Central Asia" (August 29); (3) a training course "Numerical Groundwater Modelling using the INOWAS Platform" (October 24).

Events. NU hosted: (1) the 1st SDSN Kazakhstan conference on SDGs in Central Asia, comprising 6 panel sessions. The conference session themes were designed to align with the 3 research priority areas of SDSN Kazakhstan: Land, Water and Communities (SDG 1, 2, 6, 11, 14, 15); Energy and Climate (SDG 7, 13); Education and Partnerships (SDG 4, 10, 17) (May 30); (2) the First Kazakh-French²⁵⁵ Decarbonization Day²⁵⁶, aimed to explore cooperation opportunities between companies in the realm of low-carbon

solutions (June 7); (3) the youth conference dedicated to the problems of climate change, with the participation of rural teachers and school students (July 10-13); (4) the Local Youth Conference on Climate Change in Kazakhstan/LCOY Kazakhstan 2023, within which the following events were organized: panel discussions on various topics, including "Climate Change in Kazakhstan", "Assessing the Impact of Climate Change on the Water Sector", "Local Solutions for Climate Change Adaptation", and "The Importance and Future Prospects of Mass Adoption and Utilization of Green and Sustainable Energy in Kazakhstan"; an exhibition of green projects initiated by students, an art exhibition, and the "Climate Fresco" game, designed to enhance participants' knowledge on climate change and its consequences. Based on the conference results, the joint statement was prepared by Kazakhstan's youth, and then presented at the COP 28 (September 28).



Achievements and awards. NU enters the top 30% of international research universities in the Times Higher Education (THE) World University Rankings 2024.

Source: <https://nu.edu.kz/ru/>

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 research²⁵⁷ institution of higher education in the country. The multilevel system of education includes higher basic education, master's and doctoral studies program. University branches have been opened in Bishkek and Istanbul. The University has 17 faculties, the Institute for Advanced Studies and Additional Education. The Earth Remote Sensing Center was opened at Al-Farabi KazNU in association with the Academy of Sciences of China. Al-Farabi KazNU continues to lead the Global Hub of the United Nations "Academic Impact" Program (UNAI) for Sustainable Development.

²⁵³ <https://www.sdsn.kz.nu.edu.kz/>

²⁵⁴ launched at NU in 2019 and currently implemented at 10 universities in Kazakhstan

²⁵⁵ both nations have set ambitious targets of achieving carbon neutrality by 2050 and 2060, respectively

²⁵⁶ organized by the France-Kazakhstan Chamber of Commerce in collaboration with JSC "NC "KAZAKH INVEST"

²⁵⁷ Decree of the Government of the Republic of Kazakhstan No.516 of 25.07. 2022

Training in water is offered by the Faculty of Geography and Environmental Sciences²⁵⁸, Meteorology and Hydrology Department. The UNESCO Chair in Sustainable Development functions at the faculty.

Major Events and Activities in 2023

Research. In 2023, University scientists were implementing 354 research projects. The projects on water, agriculture, environmental protection and sustainable development included: (1) AP09058406 "Modeling of flood, breakthrough waves and mud-stone impurities during normal and emergency dam breaks in a complex system of rivers and canals"; (2) AP09260687 "Technology for the extraction and disposal of toxic compounds of industrial wastewater"; (3) BR18574227 "Scientific and applied justification for managing the NAS²⁵⁹ to prevent desertification processes in the southern regions of Kazakhstan, to ensure the sustainable development of rural areas"; (4) BR18574168 "The role of Kazakhstan in deepening the regional integration of CA countries and its sustainable development goals in the context of modern global trends" (0123PK01034); (5) IRN AP14869740 "Biotesting of water and bottom sediments of the Ile River and the Kapshagay reservoir, forecasting the environmental risk for the biodiversity of the studied ecosystems"; (6) AP14871838 "Study of the wave climate of the water bodies of Kazakhstan using the satellite altimetry data"; (7) IRN AP14872548 "Modern ecological law and order: Kazakhstan case study"; (8) AP14870596 "Problems of legal regulation of rational use and protection of pasture ecosystems"; (9) AP19680487 "Monitoring and management of pasture lands of the Moyinkum sandy massif under the climate change using the remote sensing data"; (10) BR21882122 "Sustainable development of natural-industrial and socio-economic systems of the West Kazakhstan region in the context of green growth: a comprehensive analysis, concept, forecast estimates and scenarios", linked to the SDGs and aimed at solving strategically important tasks related to sustainable ecological, social and economic development of the territory. The results of the first year of implementation were presented at the working meeting (December 5); (11) AP09058590 "Monitoring of land degradation and desertification processes in Talas district of Zhambyl region using GIS and remote sensing data for sustainable land use"²⁶⁰; a scientific seminar was held on the topic "Desertification processes in the context of climate change" (October 24); (12) BR18574227 "Scientific and applied justification for managing the NAS²⁶¹ to prevent desertification processes in the southern regions of Kazakhstan to ensure sustainable development of rural areas": field work was undertaken to study the state of agricultural land and pastures (June 22-July 24 and August 6-15, Zhambyl, Turkestan, Almaty, Zhetysay and Kyzylorda regions); (13) AP14871372 "Geospatial

approach to assessing the risks of climate disasters (drought and erosion) and their impact on agriculture in the Western region of Kazakhstan": field studies were conducted for the physical and geographical description of the research area, soil pits with sampling, etc. (August 16-31, Aktobe, West Kazakhstan, Atyrau and Mangystau regions).

As part of a startup project aimed at maximizing energy generation and accelerating national and global transition to clean and green energy, the University students have developed the software called VOLT for tracking solar energy.

Capacity building. The Faculty of Geography and Environmental Management together with the Faculty of International Relations have developed a new educational program "7M05220 – Water Diplomacy".

KazNU organized: (1) the international webinar "Strengthening the universities' role in the implementation of SDGs" (February 3); (2) the roundtable "Green Economy: Challenges and Prospects" (April 1); (3) XV Republican Student Thematic Olympiad in the discipline "6B05202-Ecology" (April 20-21); (4) II advanced training course "Environmental journalism in the context of the Sustainable Development Goals" (June 7-9).

Representatives of the University took part in the following events: (1) roundtable "Transboundary Environmental Problems between the Central Asian States" (March 23, PRC); (2) XV Republican Subject Olympiad on "Life Safety", where the University team took the 1st place (April 18-22, Toraihyrov University, Pavlodar); (3) training of trainers on the "Rational use of water resources"²⁶² (September 20-22), etc.

Events. The Al-Farabi KazNU hosted: (1) international conferences "Ecological Genetics and Public Health: Achievements and Prospects" (January 19), "A new way of decarbonization of the economy (KZGT-2023)", within the framework of which 7 sessions were organized, in particular on the topic "Environmental Sustainability, Social Economy" (November 8-9), and "GIS Day Kazakhstan" (November 18); (2) the roundtable "SDG 6. Environmental regulation and control in the field of water supply and sanitation" (March 21); (3) the international scientific and practical conference "Geographical foundations of sustainable development" (November 23, Almaty).

The University representatives took part in: (1) the international scientific and practical conference "Mudflow security – 50 years of Kazselezaschita activity: status and prospects" (April 22-24, Almaty); (2) the international forum on sustainable environmental development in the economic belt of the Silk

²⁵⁸ the faculty celebrated its 75th anniversary in 2023

²⁵⁹ natural and agricultural systems

²⁶⁰ on the way to SDG 15 "Conservation of terrestrial ecosystems"

²⁶¹ natural and agricultural systems

²⁶² organized by the USAID Regional Water and Environment Project



Road (September 17-19, Urumqi, China); (3) the international symposium "Science for Sustainable Development: Challenges for Central Asia" (November 3-5, Tashkent); (4) the 13th UNESCO Youth Forum (November 14-15, Paris).

Achievements and awards. The Al-Farabi KazNU is the leader of national ratings, both institutional and educational program ratings. The university's entry into the world rankings of QS WUR and THE WUR contributed to its dynamic promotion at the international level. For more details, refer to https://farabi.university/university/rating?&active_tab_order=undefined.

The senior lecturer of the Department of Meteorology and Hydrology Zhanabaeva Zhanara Anuarbekkyzy was awarded the "Eren enbegi ushin" medal. Lecturers of the "UNESCO Chair for Sustainable Development" T.L. Tazhibayeva, G.M. Minzhanova and G.B. Tanabekova became winners of the prestigious International Pedagogical Competition "Pedagogical vocation".

Publications. The Al Farabi Kazakh National University publishes 24 scientific journals, including 6 international scientific journals in English, 17 series of KazNU bulletins and the Journal of Open Systems Evolution Problem. The following publications were prepared and issued: textbooks "Biorisk management in life sciences", "Geographic information systems in Hydrology", "The concept of climate policy in the context of Sustainable Development Goals", "UNESCO Chair for Sustainable Development" released 4 bulletins, <https://www.kaznu.kz/ru/22319/page/>, <https://pps.kaznu.kz/en/Main/ChairPublications/131/0/>.

Source: <https://www.kaznu.kz/ru/>, <https://farabi.university/>, <https://www.kaznu.kz/ru/26424/page/>

Taraz Regional University named after M.Kh. Dulati

The Taraz Regional University named after M.Kh. Dulati (M.Kh.Dulati TarRU)²⁶³ was established by the Resolution of the Kazakh President No.752 dated October 11, 2019 and on the basis of the Order of the Ministry of Finance of the Republic of Kazakhstan No.346 dated June 3, 2020. The University has, in its composition, 1 college, an institute, 6 faculties and 47 departments, academic library, 2 museums, 2 research institutes, 10 research centers, educational-research and production center "Phytochemistry", Research engineering laboratory "Nanoengineering research methods named after A.S. Akhmetov" and a specialized hydrologic and technical safety (HTS) laboratory.

The workforce capacity is 2,190 people, including 910 persons of teaching staff. The number of students is 13,651, including 470 graduate students and 34 postgraduate students. The educational activity is performed under 182 educational programs, including 103 bachelor's, 69 master's and 10 doctoral programs.

Water education is offered at the Institute of Water Management and Environmental Engineering²⁶⁴.

The University was assigned to be a **basic organization** of higher and (or) postgraduate education for water professions (Order of the Minister of Science and Higher Education of the Republic of Kazakhstan No.64 dated September 22, 2022 as amended on May 16, 2023). A memorandum on the establishment of a Consortium, which comprises 13 organizations of the country, was concluded by the universities and research organizations in 2023 with the purpose of further training of personnel and research activities for the water sector of Kazakhstan.

Major Events and Activities in 2023

Research. The University is underway of successful implementation of the Erasmus+ international educational project "Human capacity development for the water sector of Central Asia to strengthen resilience to climate change and support sustainable development, peace and security"/HWCA (2023-2025).

Capacity building. The teaching staff (1) built capacity at: the training of trainers on the "Rational use of water resources" (September 20-22, Almaty); the training on water diplomacy and international water law (November 20-24, Almaty); advanced training course "Municipal wastewater sludge management" (March 1-3, online); training workshop covering such topics as the operational hydrometry for water management systems, water accounting, operation of collector-drainage network and vertical

²⁶³ Zhabul Hydromelioration and Construction Institute celebrated its 60th anniversary in 2022

²⁶⁴ The Institute of Water Management and Environmental Engineering was established as a result of merging the Institute of Water Management, Ecology and the Faculty of Oil and Gas Engineering and Mechanics since the 2021-2022 academic year

Training workshop, March 13-17



drainage wells (March 13-17); (2) conducted career guidance events for secondary school students (April 19, Sarysu district; April 20-21, Karatau; May 3-4, Jualy, Talas, Zhambul districts); (3) organized a roundtable "Young professionals in the water sector" (March 15, Taraz).

Events. The teaching staff of the Institute of Water Management and Environmental Engineering took part in 22 conferences conducted both at the international and Republican levels.

Cooperation. The University developed and implemented the 2022-2024 Roadmap for preparation of highly-skilled water professionals.

A memorandum of cooperation was signed between the Dulati TarRU and "TIAME" NRU. The Agreement on the first-stage training of bachelors in the format "2+2" (4 years of study) and of masters – "1+1" (2 years of study) and the Agreement on organization of educational process as part of the joint educational two-diploma program are implemented.

Leading water researchers were invited to the University to enhance academic mobility: Nobel Laureate Rae Kwon Chung, advisor on climate change to the UN Secretary-General, South Korea; Professor Ng Cheng Ye, Petronas University of Technology, Malaysia; Professor Daniel Snow, University of Nebraska, USA.

Achievements and awards. Dulati TarRU entered the global rating "QS World University Rankings" and took the 1200-1401st place in this rating; entered the QS Asia University Rankings 2024 taking 601-650 positions; took the 30th place in the QS Asia University Rankings 2024: Central Asia; was included in the general rating "Times Higher Education World University Rankings 2024" with the status "reporter"; ranked the 8th among 95 higher educational institutions of Kazakhstan and was placed in A+ category in the international rating of the European Scientific-Industrial Chamber ARES-

2020, improving its rating by 25 positions over the past five years. This rating assessed the quality of education, research activities and demand for graduates by employers.

Publications. The teaching staff of the Institute of Water Management and Environmental Engineering issued 5 monographs, 2 manuals, 3 textbooks, 8 teaching aids; published 7 articles in journals with the high impact-factor in Scopus, 15 articles in journals recommended by the Committee for Control in the Sphere of Education and Science at the Ministry of Science and Higher Education; got 14 patents and provisional patents for inventions and models.

Source: M.Kh.Dulati TarRU, <https://dulaty.kz/ru/>

South Kazakhstan State University named after M. Auezov

The South Kazakhstan State University named after M. Auezov (M. Auezov SKSU) is a state multidisciplinary higher education institution, which celebrated its 80th anniversary in 2023. The SKSU named after M. Auezov was awarded the status of a research university by the Decree of the Government of Kazakhstan. The University is comprised of 9 faculties, the Distance Learning Institute, five higher schools and a college.

The Department of Water Resources, Land Use and Agricultural Engineering of the Faculty of Agriculture teaches specialists in such disciplines as "Water resources and water use" and "Water supply, sewage and water protection". The agrochemical laboratory of the TOO "Republican Soil Center" has been opened.

The "New Climate Economy Center named after Rae Kwon Chung"²⁶⁵ functions at the University as well. It focuses on the implementation of a new model of economic development based on the principles of sustainable growth, green technologies and climate change mitigation.

For the University's 2021-2025 Strategic Development Plan, see <https://auezov.edu.kz/media/attachments/2023/05/23/strategic-development-plan-2021-202523.05.2023.pdf>.

Research activities. The following projects were implemented in the course of the year: (1) "Study of water and soil quality within settlements in the suburbs of Shymkent"; (2) "Development and adoption of groundwater treatment technology and provision of drinking water to the population and animals" in line with the sanitary-epidemiological standards; (3) "Development of effective technologies for the sound use of degraded rural pastures in the desert zone of Turkistan region"; (4) "Environmental monitoring of groundwater sources in the south of Kazakhstan and recommendations for the optimal water treatment technology".

Capacity building events. (1) 2023 International Summer School "Smart and innovative agriculture –

²⁶⁵ professor Rae Kwon Chung – Nobel Prize laureate, Advisor to the UN Secretary General on Climate Change

effective technologies and practices" (June 12-23, online); (2) an open regional debate tournament AGRO CUP V "Green Country – the Future of a New Country" (November 25); (3) a training seminar for deans, heads of departments and structural divisions on the topic "Implementation of the Sustainable Development Goals in Kazakhstan: challenges and opportunities" (December 20).



Events. (1) the 27th scientific and practical conference for students and young scientists on the "Current challenges in the development of the agro-industrial complex: past, present, future", which included presentations on the discipline "Water Resources, Land Use and Agricultural Engineering" as well (December 5-6); (2) the International Scientific and Practical Conference "Innovative development of the agro-industrial complex: experience, problems and solutions" (December 22).

Representatives of the University took part in: (1) the seminar "Improving water security and water resources management in Central Asia: focus on Kazakhstan (Syr Darya River basin, south of Kazakhstan)" (July 31); (2) the international scientific and practical conferences "Environmental improvement through afforestation and agricultural development

challenges" (August 4, Turkistan) and "Scientific and practical foundations for the effective use of innovative resource-saving technologies in agriculture" held at the Andizhan Institute of Agriculture and Agro-technologies (October 27-28).

Achievements and awards. Based on the results of international rankings, the M. Auezov SKSU (1) took the 253rd place among 1183 universities of the world and the 2nd place among 18 higher education institutions of Kazakhstan in the UI GreenMetric World University Rankings; (2) entered the 981-1000 position among 1403 universities of the world in the QS Sustainability 2024 of the Quacquarelli Symonds (QS) company. In Kazakhstan, the University is on the 4th place among 12 higher education institutions. In the Asia regional ranking, the University took the 293rd place among 487 higher education institutions of the region.



Source: <http://www.sdo.ukgu.kz/?q=ru>

Publications. Scholars of the Department of Water Resources, Land Use and Agricultural Engineering issued a textbook "Water supply and sanitation system".

Source: <https://green.auezov.edu.kz/ru/component/sppagebuilder/?view=page&id=443>, <https://auezov.edu.kz/kaz/>, <http://www.sdo.ukgu.kz/?q=ru>

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. Its curriculum includes 15 undergraduate degree programs, in particular "Environmental Sustainability and Climate Science", and 10 graduate degree programs. The "New Generation Academy" at the American University of Central Asia offers a one-year

intensive preparatory program. AUCA also includes the Technical School of Innovation, which offers six 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 2023

Research. The University is implementing the following projects: (1) "Promoting Energy and Resource Efficiency in the Tourism Industry of Kyrgyzstan"²⁶⁶, within

²⁶⁶ implemented by the AUCA with the financial support from the European Union's SWITCH-Asia programme and in consortium with partner organizations: UNISON Group (Kyrgyzstan), Technopolis Group (Belgium), Collaborating Centre on Sustainable Consumption and Production – CSCP (Germany)

which, in partnership with the "IDEA Central Asia" youth organization, the extensive Ecology 3.0 ecological campaign, Ecological Hackathon (December 4-7, Bishkek) was held; (2) OSUN's GeoHub project in partnership with the Central European University and Bard College²⁶⁷. The summer school "Geospatial Technologies for Building Resilience" (July 24-28, Hungary, Budapest) and GIS lectures (June 7) were offered; (3) CEPF²⁶⁸ on the sustainable rangeland management in Chychkan and Suusamy, as part of which an environmental camp for students "Sustainable Natural Resource Management and GIS in Chychkan" (June 25-29, Chychkan gorge, Kyrgyzstan) and a meeting with school students (September, Zhany-Zhol village, Jalal-Abad region) were organized.



Events. The AUCA organized a series of events: (1) lecture on Earth observation data and geospatial technologies for Global Agendas monitoring (February 28) and Sustainability Week (March 27-31); (2) workshops "Sustainable environment" (March) and "Integrated Water Resources Management for Building Resilience to Climate Change and Environmental Protection"²⁶⁹ (September 22-23); (3) research conference "Prospects and opportunities for achieving carbon neutrality in the Kyrgyz Republic until 2050" (October 20); (4) EcoMovieDay (November 4); (5) environmental conference EcoTEDx-3 (November 11).

AUCA in collaboration with partners hosted a Climate Week (September 16-23), "Green Month", including the art object opening (October 6), a tree planting event at Elm Grove and others.

Achievements. AUCA secured the 1st position among Kyrgyz universities in the prestigious QS World University Rankings Asia 2024. Additionally, it placed within the Top-10 universities in Central Asia.

AUCA successfully completed its second voluntary environmental certification with the Waste Manage-

ment Network in the Kyrgyz Republic (WasteNet.kg), demonstrating its ongoing commitment to eco-friendly practices and compliance with eco-labelling standards.

Source: AUCA

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

The Kyrgyz-Russian Slavic University named after B.N. Yeltsin (B.N. Yeltsin KRSU) was established in 1993. Education in the University is offered in 24 disciplines. KRSU has the Dissertation Councils of the Higher Attestation Commission of KR, postgraduate program (on disciplines 05.23.07 "Hydraulic engineering construction" and 25.00.30 "Meteorology, climatology and agrometeorology"), doctoral school (05.23.07 "Hydraulic engineering construction"), and the Inter-branch Scientific-Research Center for High-Altitude Dam Monitoring. The Center, among others, studies the effects of earthquakes and microseisms on hydraulic structures and makes forecasts of their state in order to prevent failures. Water education is offered at the Architecture, Design and Construction Faculty (ADCF) and at the Faculty of Science and Technology.

Major Events and Activities in 2023

Events. KRSU held: (1) Green Economy Week, including the international scientific and practical forum "Green Economy and Sustainable Development" (February 14-17) and the winter school "Green Economy and key directions of development in Kyrgyzstan" (February 16-18); (2) roundtable "Green Economy of the EAEU: Challenges and Prospects" jointly with the Russian Council for International Affairs (Bishkek, October 25).

The ADCF organized a NEXUS game "Agreement on water resources management" (October) and a seminar devoted to the World Science Day. The latter served to discuss how to promote energy efficiency and energy saving in construction (November 10).

Publications. KRSU published 12 issues of the "KRSU Newsletter". Faculty members from the Department of Water Resources and Engineering Disciplines have made contributions to the range of fields: (1) Frolova G.P., Ershova N.V., Strizhantseva O.M. "Classification of rivers on the northern slope of the Kyrgyz range by the features of their hydrological regime"/Collection "Improving the system of forecast, reduction and mitigation of damage caused by hazards". Bishkek, KRSU, 2023, pp.38-42; (2) Yakovleva N.V. "Methodological instructions for practical work in the discipline "Water chemistry and microbiology" for the area "Environmental engineering and water use". Bishkek: KRSU, 2023. 20 p.; (3) Training modules: No.1 "Basic

²⁶⁷ Open Society University Network (OSUN) is a global network of educational institutions that integrates learning and the advancement of knowledge across geographic and demographic boundaries

²⁶⁸ CEPF is the Critical Ecosystem Partnership Fund

²⁶⁹ jointly with the USAID Regional Water and Environment Project

concepts of integrated water resources management and economic instruments"; No.2 "Water market features and regulation of water services"; No.3 "Water Demand Management and Water Services"; No.4 "Strategic and medium-term planning in the water sector: challenges, methods and instruments", Bishkek-Moscow-Paris-Luxemburg, 2023.

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 (K.I. Skryabin KNAU) was established on January 30, 1933. The University consists of 6 faculties, including the Hydromelioration, Ecology and Land Management Faculty (HELMF) which trains: (1) bachelors on "Land reclamation, recultivation 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 2023

Research. KRSU's faculty has been actively involved in several projects: (1) "Development of higher education content aimed to support industries for sustainable production of qualitative agri-food in Uzbekistan and Kyrgyzstan" (AgroDev) and "Human capacity development for the water sector of Central Asia to strengthen resilience to climate change and support sustainable development, peace and

security" (HWCA). KRSU's contributions to these projects were highlighted at the October 20 meeting in Bishkek; (2) "Sustainable regional management and value creation to conserve endemic apple varieties in Kazakhstan and Kyrgyzstan "ALMA"²⁷⁰. This project culminated in the opening of the "Kyrgyz-German Institute for the Protection of Ecosystems and Biodiversity in the Kyrgyz Republic" in April 20, 2023; (3) "On promotion of organic farming and human resource development to study soil and crop analysis technologies at KNAU" funded by the JICA. A greenhouse was opened to facilitate practical training and research (May 18).

Capacity building. Visiting professors from the Hugo Kołłątaj University of Agriculture in Kraków, Poland, conducted guest lectures and master classes²⁷¹ (May 2-4). Faculty, master's students, and undergraduate students participated in the online webinar "QS Sustainability Ranking: Find out more" (November 28) and the workshop on "Modern Agricultural Development in SCO Countries" (December 6).

Students had the opportunity to gain practical experience through an internship under the Logo.ev program in Germany (April 28-October 27) and by attending the Summer University at Ural Federal University in Ekaterinburg, Russia (July 10-24).

Events. K.I. Skryabin KNAU hosted several significant events: (1) Republican Student Scientific and Practical Conference "Innovative development of modern science: status of challenges" (April 4); (2) Environmental Marathon "Ecology begins with me" organized by the Ecology Club of the University (April 5-May 25); (3) Exhibition of Research and Experimental Developments and Achievements devoted to the Science Day (November 9).

The faculty, master's students and undergraduate students actively participated in several events in Bishkek: (1) Conference "The role of youth in the development of agribusiness: motivation, support, initiatives" (October 22); (2) Exhibition of scientific achievements of higher education institutions in Kyrgyzstan at the Kyrgyz National University named after J.Balasagyn (November 10); (2) MAKE-A-THON "Smart Technologies in Agriculture"²⁷² at the Kyrgyz State Technical University named after I.Razzakov (December 5-8).

Cooperation. K.I. Skryabin KNAU signed a bilateral agreement with the rectors of Peoples' Friendship University of Russia (PFUR) and Kalmyk State University named after B.B.Gorodovikov (October 13, Osh).

Publications. KNAU published 4 issues of its "KNAU Newsletter".

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



Opening of the "Kyrgyz-German Institute for the Protection of Ecosystems and Bio-diversity in the Kyrgyz Republic", April 20, 2023

²⁷⁰ jointly with the NETSCI GmbH with the financial support from the German Federal Environmental Fund (DBU)

²⁷¹ as part of the project "Development of higher education content to support industries for sustainable production of qualitative agri-food in Uzbekistan and Kyrgyzstan" (AgroDev) funded by the Erasmus+ 619039-EPP-1-2020-1-LV-EPPKA2-CBHE-JP

²⁷² initiators: Seoul International Friendship Organization (SIFO), Kyrgyz State Technical University (KSTU), FabLab Bishkek and Korea International Cooperation Agency (KOICA)

9.1.3. Tajikistan

Tajik Agrarian University named after Shirinsho Shotemur

The Tajik Agrarian University named after Shirinsho Shotemur (Sh. Shotemur TAU) was established in 1931. The University has 9 faculties, including the Hydromelioration Faculty, which offers the following disciplines: "Irrigation and water management", "Hydraulic engineering", "Rational use and protection of water resources", "Land reclamation and water management".

Major Events and Activities in 2023

Research activities carried out under the University's research plan for 2021-2025 include 15 mandatory topics. These topics include: "Impact of climate change on the botanical composition of native grasses while improving the state of transitional (seasonal) pastures of Tajikistan" (2021-2025) RKD No.01011TD075; "Monitoring and prospects of land use in the Republic of Tajikistan" (2022-2026) No.0122TJ1316; "Development of effective use of land and water resources of the Upper Zeravshan for the expansion of agricultural production and food self-sufficiency" (2022-2026) No.0122TJ1318.

Events. Sh. Shotemur TAU hosted several important events: (1) Scientific-Practical Conferences "Urgent issues of using green energy and energy-saving machines in agricultural mechanization in Tajikistan" (November 4), "Current issues of sustainable land management and use in Tajikistan" (November 20) and "Agrarian economy in the context of globalization and integration" (December 16); (2) Round-table on green energy (November 21).

The managerial and teaching staff participated in the Regional Scientific-Practical Seminar "Sowing techniques using laser equipment for cultivating

cereal crops on waterlogged lands" (Hissar, Tajikistan, November 17) and COP28 (Dubai, UAE, November 30-December 10).

Cooperation. Sh. Shotemur TAU signed a cooperation agreement with the Penza State Agrarian University of the Russian Federation²⁷³ (March 2).

The University opened: the Career Development Center, the educational production greenhouse built by the TIKA²⁷⁴; and, the first greenhouse of Korean-style Smart Farm²⁷⁵ for training in smart-farming.



Publications. In 2023, the University published 4 issues of its *Kishovarz* journal.

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 named after Academician M. Osimi (TTU) 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 training 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, correspondence and second higher education).



²⁷³ in the course of the 9th conference on interregional cooperation between Russia and Tajikistan

²⁷⁴ with the support of the Turkish government

²⁷⁵ with the support of the South Korea government and such companies as Shinhan A-tech, Hyundai Nongong Metal, Ilseon Highpoly

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 2023

Events. The University hosted: (1) republican scientific-practical conferences "Prospects of development of building material production in the Republic of Tajikistan" (March 30), "[Reasonable use of water resources: environmental awareness and water quality](#)" (May 20) and "Heat-power engineering and thermo-physical properties of substances" (December); (2) international scientific-practical conference "Energy: status and prospects for development" (December 20).



The teaching staff, postgraduates and students participated in the 29th international scientific and technical conference "Radio Electronics, Electrical Engineering and Power Engineering" (March 16-18, Moscow, RF), workshop "Strengthening the role of women and youth in water management in the Kafirnigan River Basin" and in the environmental campaign (February 27, Sughd Province).

Cooperation. Within the framework of the Tajik-Chinese forum on engineering education held in the Center named after Lu Ban²⁷⁶, an educational agreement on certain disciplines for bachelor's and master's degree "Engineering Geodesy and Heat Supply" was signed between the TTU, the Tianjin Urban Construction Management Vocational and Techni-

cal University and the Tianjin University of Urban Planning (December 13).

For advanced training and retraining and also for the on-the-job internship of students, the TTU signed co-operation agreements with the "Varzob" power plants of "Barki Tojik" OJSC (October 30) and "Roghun HPP" JSC (September), in line with which branches of University's departments have been opened at these agencies.



Publications. In 2023, TTU published [4 issues](#) of its academic journal "Polytechnic newsletter series: Intelligence, Innovation, Investment" and [4 issues](#) of "Polytechnic newsletter series: Engineering Studies". For the article of masters of the "Electrical Power Plants" department, Power Engineering Faculty in the Scopus (Q3) review journal "International Journal of Electrical and Computer Engineering (IJECE)" (Indonesia), please, visit https://ijece.iaescore.com/index.php/IJECE/article/view/33578?fbclid=IwAR3482YjSZHNwxXo8fmn0U4p0Qv07m_ospLFakWMegVxM3fF87VWgLCkuc

Achievements and awards. The Assistant Professor of the Department of Electrical Power Engineering, Power Engineering Faculty was awarded a second degree diploma and a breastplate at the international competition among CIS' scientific and educational institutions – "The Best Young Scientist-2023".

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 named after S.A. Niyazov (S.A. Niyazov TAU) was founded in 1930.

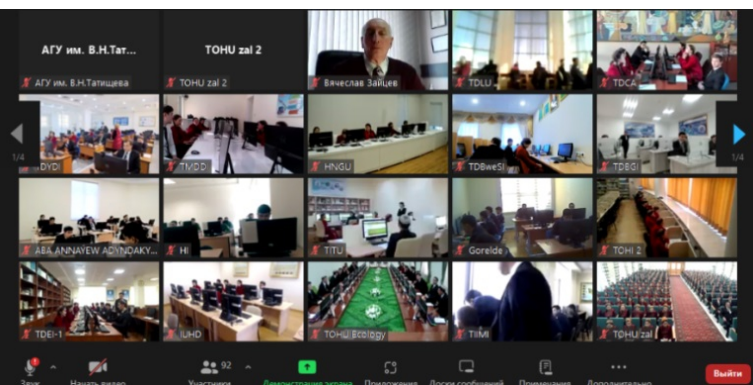
The University consists of 8 faculties, including the [Hydromelioration Faculty](#), which offers training in such disciplines as "Hydromelioration" and "Land construction and cadastre". The bachelor's degree program in the discipline "Information Security Management in Agriculture" was opened in 2023.

²⁷⁶ Tajik-Chinese workshop named after Lu Ban was opened at the Faculty of Civil Engineering and Architecture

Major Events and Activities in 2023

Capacity building. TAU organized weekly scientific and practical workshops covering a wide range of topics, including drip irrigation (May 13; September 16), development of agroecology and agroforestry in Turkmenistan and in the world (October 14). TAU held: (1) international competition of scientific projects "The role of youth in achieving the sustainable development goals" among students of higher education institutions in Turkmenistan and abroad (May-June); (2) exhibition and competition of scientific works and projects "Scientific Youth - the Future of the Country" (November 11); (3) 2nd open international Internet Ecology Olympiad among students (December 5).

TAU in collaboration with the Federal State Educational Institution of Higher Education of the Russian Federation "V.N.Tatishchev Astrakhan State University" (FSBEI HE "V.N.Tatishchev ASU") conducted an online course on the topic "Ways to use effectively the capabilities of geoinformation systems in agriculture".



Source: <https://www.ablaikhan.kz/>

Events. The teaching staff and students took part in: (1) the forum of the University Alliance of the Silk Road entitled "Development and innovations in higher education in the age of new technological reforms" (Xi'an, PRC, October 7-9); (2) the international exhibition and scientific conference "Health care, education and sports during the revival of the new era of a powerful state" (Ashgabat, October 10-12); (3) the international scientific-practical conference on "Advancing Sustainable Future" (ICASF 2023) (Dubai, UAE, December 5-6); (4) the international scientific-practical conference and multidisciplinary exhibition for summing up the results of the outgoing year "Happy Youth with Arkadag Serdar" (Ashgabat, December 27).

Cooperation. As part of bilateral meetings, scientific and education issues of cooperation were discussed

with: (1) the representatives of "Ion Ionescu de la Brad" University of Social Sciences in Iasi, Romania (November); (2) the delegation of the Federal State Educational Institution of Higher Education of the Russian Federation "Moscow State University of Geodesy and Cartography" (December 25).

Memos and agreements were signed with: (1) the Gorgan University of Agricultural Sciences and Natural Resources (IRI) (Tegeran, IRI, May 30); and, (2) FSBEI HE V.N.Tatishchev Astrakhan State University (Ashgabat, October 13).



Source: <https://tohu.edu.tm/?/HABARLAR/&page=habar&habar=690>

Achievements and awards. TAU took the 456th place with 6545 points in the UI GreenMetric World University Ranking²⁷⁷, and the 2nd place among the universities of Turkmenistan.

The teaching staff and students became winners of the Youth Award of Turkmenistan in 2023; students were awarded about 20 medals and more than 70 diplomas at international Olympiads and academic competitions, teachers became winners in the annual competition of scientific works held on the occasion of Science Day²⁷⁸.

Source: S.A. Niyazov TAU

Turkmen Agricultural Institute

The Turkmen Agricultural Institute (TAI) was established in 2010 at the Ministry of Agriculture and Environmental Protection of Turkmenistan²⁷⁹. The Institute offers training at the Hydromelioration and Agricultural Mechanization Faculty in such disciplines as "Operation of hydro-reclamation systems", "Hydromelioration" and, since 2022, "Hydraulic facilities". TAI

²⁷⁷ UI GreenMetric World University Ranking is a ranking on green campus and environmental sustainability initiated by the University of Indonesia in 2010. It determines the rankings by universities' environmental commitments and initiatives. The universities are ranked in 6 criteria (university infrastructure/SI; Energy Efficiency and Climate Change/EC; university-generated waste disposal/WS; transportation policy reducing emissions of carbon dioxide and harmful particles/TR; environmental education in university programs/ED; water/WR) and 39 indicators

²⁷⁸ organized jointly by the Academy of Sciences of Turkmenistan and the Central Council of Youth Organization named after Magtymguly

²⁷⁹ the Ministry of Agriculture of Turkmenistan was established on the basis of the Ministry of Agriculture and Environmental Protection by the Decree of the President of Turkmenistan No.240 dated 14.07.2023

includes the Training and Production Facility and the Research and Production Center (RPC). The UNESCO Club "Environmental Protection – an important concept of sustainable development" was opened at the institute in 2023 (March 11).

Major Events and Activities in 2023

Capacity building. Training workshops were held: (1) on the topic "Adaptation to climate change in urban and agricultural water supply"²⁸⁰ (on the base of the Institute in Dashoguz city, November 13-15); (2) on the use of digital technologies in agriculture (December); (3) in such areas as "GIS and its capabilities", "Innovative technologies in agriculture", "Digital economy", "Digital technologies in agricultural mechanization", "Innovative technologies in veterinary medicine" for personnel from the Dashoguz velayat hakimlik (municipal administration), production associations "Dashoguzgallaonumleri" and "Dashoguzsuvkhodzhalik", Dashoguz land-building research field stations and others (November).

The following competitions were also held: the hackathon "AgriHack" between the students of higher educational institutions of Turkmenistan (September 30); the Environmental Brain Ring among the youth²⁸¹, organized jointly by the UNDP in Turkmenistan and the USAID Youth Development Activity (YDA) (December 2).

The teaching staff took part in the NEXUS interactive game²⁸² (February), professional development courses organized by the Magtymguly Turkmen State University (February).

Events. TAI held the following: (1) the scientific-practical conference "Sustainable Development Goals and the prevention of global drought through the use of scientific-proven natural substances to improve the saline landscapes for agricultural production" (June 17); (2) the conference devoted to the International Youth Forum on Climate Change LCOV-2023 (October).

The teaching staff took part in the international conference "Central Asia: towards a sustainable future through a strong regional institution" dedicated to the 30th anniversary of the IFAS (Dushanbe, June 5-7).

Achievements and awards. The teachers and students from the TAI took part in the competition of scientific works held on the occasion of Science Day and took top places (Ashgabat, June 12).

In 2023, declared the year of the happy youth with Arkadag Serdar, students of the Institute won: (1) 12 awards, namely 1 silver medal, 1 bronze medal, 3 awards of the I degree, 6 awards of the II degree and one award of the III degree in international Olympiads and competitions; (2) 30 awards, including 9 diplomas of the I degree, 11 diplomas of the II degree and 10 diplomas of the III degree in national Olympiads.

TAI took (1) the 1058th place with 3080 points in the UI GreenMetric World University Ranking; (2) the 1001st position in the Times Higher Education²⁸³ (THE).

Source: TAI

9.1.5. Uzbekistan

National Research University "Tashkent Institute of Irrigation and Agricultural Mechanization Engineers" (NRU "TIAME")

NRU "TIAME" is the first and single national research university in Uzbekistan; it has a long history as a leading educational institution that offers research, higher education and expert consultations on water and environment.

NRU "TIAME" consists of: a parent university with 7 faculties, Research institute of fundamental and applied sciences, Bukhara Institute of Natural Resources Management, Karshi Institute of Irrigation and Agrotechnology, Educational and Scientific Center in Tashkent region, UNESCO Chair on Water Diplo-

macy, Water Resources Management and Environmental Protection (established in 2018), which serves as a platform for multidisciplinary education and research. The University offers about 40 curricula for bachelor's degree, 36 – for master's degree and 21 – for doctoral.

Major Events and Activities in 2023

Research efforts were carried out under 5 fundamental and 11 applied projects (for an amount of 6.4 billion soums), economic contracts concluded with 58 organizations (over 1.6 billion soums) and 9 international research grants (over \$500 thousand).

The following results were achieved: (1) Optimized cotton irrigation technology: Through the application

²⁸⁰ within UNDP projects "Developing the National Adaptation Planning Process in Turkmenistan" and "Conservation and Sustainable Management of Land Resources and High Nature Value Ecosystems in the Aral Sea Basin for Multiple Benefits" (GCF, GEF)

²⁸¹ the competition was held within the framework of the project "Conservation and Sustainable Management of Land Resources and High Nature Value Ecosystems in the Aral Sea Basin for Multiple Benefits", implemented by UNDP and the Ministry of Environmental Protection of Turkmenistan

²⁸² held as part of the USAID Regional Water and Vulnerable Environment Activity in collaboration with the EU "Central Asia Nexus Dialogue project: Fostering Water, Energy and Food Security Nexus and Multi-Sector Investment (phase II)"

²⁸³ the ranking, which assesses the universities for their contributions to the SDGs by comparing them in four areas: research, governance, outreach activities and teaching

of the FAO CROPWAT model, irrigation water use was reduced by 17% in the Kashkadarya River basin, resulting in a 31% increase in cotton yield; (2) Intelligent sensor technology: Developed theoretical foundations for intelligent sensors to enhance the energy efficiency of pump units; Smart crop cultivation system: Created an automated system for efficient resource management, conserving energy, water, and fertilizers while preserving ecosystems; Two-phase flow modeling: Established a closed equation system to describe the complex dynamics of two-phase flow (gas and liquid) relevant to agricultural processes; (3) Meteorological parameter analysis: Refined methods for analyzing meteorological parameters, considering the influence of micro- and macro-topographic features on atmospheric stability. Computational algorithms were developed to assess stability within the atmospheric surface layer; (4) Embankment dam hydraulics: Investigated the hydraulic behavior of embankment dams, developing mathematical models to account for factors such as structural weight, filtration, moisture distribution, and dynamic stress; (5) Precision agriculture mapping: Produced high-precision digital maps illustrating groundwater levels and salinity, and soil salinity distribution in the Boyovut district; (6) Water intake optimization: Assessed the impact of turbid sediments on hydraulic elements and channel siltation during water intake from reservoirs, providing guidelines for optimized water extraction; (7) Innovative cultivation tool: Designed a universal cultivator that enables efficient inter-row cultivation based on water-saving principles and precise row formation.

Capacity building. The University, in collaboration with international partners, has implemented 12 specialized curricula. University departments have integrated practical learning into their programs, with students spending one day per week at organizations within the Ministry of Water Management, Ministry of Energy, Cadastral Agency, and "Uzbekhydroenergo."

University students and researchers have showcased over 20 innovative projects at events such as INNOWEEK 2023, covering areas like scientific research, commercialization, youth initiatives, and creative education (Tashkent, October 16-20).

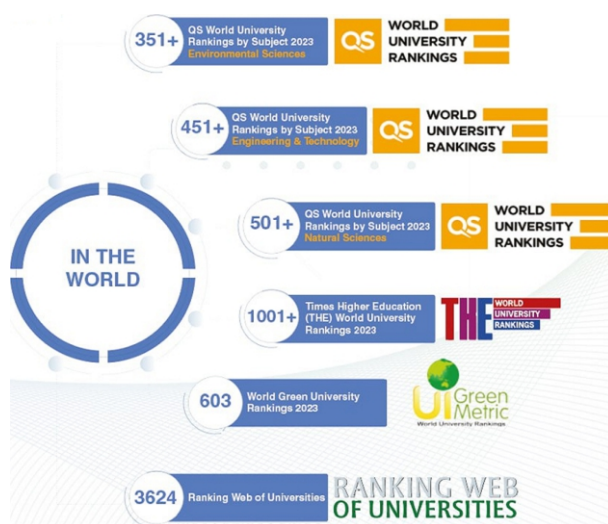
The Information-Resource Center houses a [digital library](#) equipped with RFID technology for efficient material tracking. All educational and scientific literature is cataloged within the IRBIS64+ program. Additionally, a partnership with Felder KG has led to the establishment of an Innovative Training Center for Woodworking.

40 dissertations were successfully defended for the degrees of Doctor of Science (DSC) and Doctor of Philosophy (PhD). The national stage of the regional student Olympiad "Sustainable Development Goals"

was hosted, with participation from Central Asian countries. The University held: (1) 2nd International Summer School "Assessing the sustainability of water-energy-food-ecosystem nexus for irrigated agriculture: interdisciplinary approaches for Central Asia"²⁸⁴ (August 21-25); (2) workshops "Educational course on water-saving irrigation technology in agriculture" (September 7-14), "Groundwater level response to climate change and human activities: A Case Study in the Amu Darya Delta"²⁸⁵ (September 25), "Climate protection: international energy transition, energy security and decarbonisation policy"²⁸⁶ (September 26), and "Decision-making support to improve water security under climate change in Central Asia"²⁸⁷ (October 20).

Events. NRU TIAME hosted 13 international scientific-practical conferences and symposiums and one republican conference, including on the themes: "Construction Mechanics, Hydraulics and Water Resources Engineering (CONMECHYDRO-2023)" (April 26-28); "Agricultural Engineering and Green Infrastructure Solutions (AEGIS-2023)" (March 28-30); "Current problems of agriculture and water supply" (May 12-13); "Problems related to water resources and agriculture management under climate change in Central Asia" (May 18-20); "Priorities of land resources management in Uzbekistan: challenges and solutions" (May 25); "Engineering for Environmental Technologies and Sustainable Development" (October 14); "Construction Mechanics, Hydraulics and Water Resources Engineering (CONMECHYDRO 2023)" (December 21-22); "Water, Energy and Food Security in the Context of Global Climate Change and Water Scarcity" (December 22).

Achievements and awards. NRU TIAME, for the first time among the universities of Uzbekistan, entered



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

²⁸⁴ in cooperation with IWMI and a number of German institutions

²⁸⁵ in cooperation with scientists from the Xinjiang Institute of Ecology and Geography (XIEG) of the Chinese Academy of Sciences

²⁸⁶ in cooperation with the German Embassy

²⁸⁷ in cooperation with partners from Germany and CA countries within the framework of the international platform "Tashkent Water Security Lectures"

the Top-500 world universities by Subject 2023 in three disciplines: (1) Engineering and Technology – ranked 451-500 with a score of 60.9 points; (2) Natural Sciences – ranked 501-520 with a score of 58.0 points; (3) Environmental Science – ranked 351-400 with a score of 66.2 points.

NRU TIAME has achieved significant global recognition: (1) QS Stars Rating: the university earned a 4-star rating with a score of 689 out of 1000; (2) QS World University Rankings: Asia 2024: ranked 249th in the Asia-Pacific region with a score of 88 points; (3) QS World University Rankings: Asia 2024 – ranked 9th among Central Asian universities and 1st among Uzbek universities.

Publications. NRU TIAME publishes several scientific journals in Uzbek, Russian, and English, including “Irrigation and Land Reclamation”, “Sustainable Agriculture”, “Fundamental and Applied Research”, and “Ecosystems and Biomass”. The university has also published 53 manuals, 105 textbooks, and 80 monographs, and obtained 16 patents and 80 certificates. NRU TIAME researchers published 939 articles in journals indexed by the international databases QS (Q1, Q2, Q3, Q4) and Web of Science. These publications have garnered over 16,200 citations, representing 20% of all citations for Uzbek publications.

Source: NRU TIAME, <https://tiame.uz/>

National University of Uzbekistan named after Mirzo Ulugbek

The National University of Uzbekistan named after Mirzo Ulugbek (M. Ulugbek NUUZ) was established on May 12, 1918. The University has in its structure 16 faculties, including Geography and Natural Resources, Ecology, Geology and Geoinformation System, Hydrometeorology²⁸⁸.

Major Events and Activities in 2023

Research activities. As part of the Uzbek-Indian co-operation, the following projects were completed: (1) “Evaluation of effect of dams and climate change on water scarcity and drought in arid and semi-arid river basins of India and Uzbekistan” (2021-2023), following the results of which the annual and seasonal variability of the Chirchik River runoff was assessed; the meteorological and hydrological drought indices (SPI, SSI, Run theory) and correlations²⁸⁹ between them were determined; a memorandum of understanding was signed between the M. Ulugbek NUUZ and Maharaja Sayajirao University of Baroda (December 22, Baroda, India) and joint workshops were held on the effective water use and management in Uzbekistan

and India in the context of climate change (December 1 and 19); (2) “Studying the dynamics of glacier degradation in the mountain ranges of Uzbekistan based on remote sensing” (2021-2023). The project assessed the long-term changes in areal and linear characteristics of glaciers, in meteorological parameters of high-mountain zone and in glacial runoff and mass balance in Uzbekistan.

A number of projects are ongoing, including: (1) “Development of a system of monitoring over changes in the glacier mass balance and building scenarios of glacier future in the face of global climate change”; (2) “Integrated use of ground-based observations and solar radiation data from geostationary weather satellites for the sustainable development of agriculture, water and energy”; (3) “Climate change, renewable energy and public health in Uzbekistan”²⁹⁰. The University hosted a training workshop, while the faculty participated in a scientific workshop at the Potsdam Institute for Climate Impact Research/PIK (November 15-16).

The University’s faculty and students participated in the international project “Anchor Schools for the Development of Entrepreneurship Skills Related to Natural Resources and Climate” (WB). As part of this project, a workshop²⁹¹ on climate change and environmental awareness, education, and entrepreneurship was held (December 5).

Capacity building. Since the 2022-2023 academic year, NUUZ, in collaboration with the Russian State Hydrometeorological University, has organized an online course in “Meteorology and Climatology” under the 3+2 program.

Specialists from renowned foreign universities and research institutes have delivered lectures, practical classes, and training workshops for NUUZ’s students. Notably, Dr. Iulii Didovets and Bijan Fallah from the Potsdam Institute for Climate Impact Research (PIK) conducted training sessions on “Mathematical Modeling of Hydrometeorological Processes” and “Climate Monitoring and Climate Models.” Additionally, experts from the Leibniz Institute for Tropospheric Research (Germany) provided insightful lectures on “Dust Research and Dust Processes in Central Asia.”

The University’s faculty participated in a training seminar on “SPACECOM: New Curriculum in the Area of Space Systems and Communications Engineering” at the Technical University of Berlin (August 21-25). Additionally, G.U. Umirzakov, Associate Professor at the Department of Hydrometeorology and Environmental Monitoring, Faculty of Hydrometeorology,

²⁸⁸ Faculty of Hydrometeorology was formed in the 2021/2022 academic year in accordance with the Decree of the President of Uzbekistan No. PP-4896 dated November 17, 2020 “On measures to further improve the Hydrometeorological Service of the Republic of Uzbekistan. The Faculty has 3 departments: “Land hydrology”, “Hydrometeorology and Environmental Monitoring”, “Meteorology and climatology”. “Land hydrology” Department offers PhD and DSc programs in the disciplines “Land Hydrology”, “Water Resources”, and “Hydrochemistry”

²⁸⁹ “Hit-score” indices were determined through different meteorological and hydrological drought indices

²⁹⁰ as part of the research cooperation program “Uzbekistan-Germany”

²⁹¹ Jointly with the Ministry of Ecology, Environmental Protection and Climate Change of the Republic of Uzbekistan, M. Ulugbek NUUZ, Central Asian University of Environmental and Climate Change Studies (Green University), and the WB

completed a scientific internship at the [University of Fribourg](#). The internship focused on studying geodetic and modeling methods for determining glacier mass balance and conducting research on the Barkrak Glacier in the Pskem River basin (Fribourg, Switzerland, April 1-30).

Students from the Department of Land Hydrology, Faculty of Geography at Lomonosov Moscow State University, completed a field academic internship on the Ugam River near the Charvak Reservoir (July 15-30) at the NUUz Camp in Uzbekistan.

In 2023, Z.F. Khakimova, a faculty member of the Faculty of Hydrometeorology, successfully defended her dissertation in the field of Land Hydrology, Water Resources, and Hydrochemistry (11.00.03).

Events. M. Ulugbek NUUz hosted two international scientific-practical conferences: "Integrated management and reclamation of degraded soils for food security: new approaches and innovative solutions" (April 19-21) and "Water resources of arid regions under climate change conditions: problems and solutions" (October 20).

Students from the Faculty of Hydrometeorology participated in events commemorating International Water Day (March 11) at NRU "TIIAME" and won prizes in the international subject student Olympiad on "Land Hydrology" (April 26-27).

Achievements and awards. M. Ulugbek NUUz was ranked as a 5-star university in 4 categories (education, employment, opportunities for students, and inclusive education) based on the performance analysis results at the "QS Higher Education Summit Asia Pacific 2023".

Publications. Since 1997, NUUz has been publishing the "NUUz Newsletter" to showcase the results of research activities and articles by faculty and students.

In the current academic year, the University published 1 manual and 2 textbooks. Faculty and students from the Department of Hydrometeorology and Environmental Monitoring contributed significantly, authoring 4 monographs, over 70 scientific articles, including 8 in international journals and 20 in national journals.

Source: M. Ulugbek NUUz, <https://nuu.uz/en/university/>

Samarkand State University named after Sharaf Rashidov

The Samarkand State University named after Sharaf Rashidov²⁹² (SamSU) was founded in 1927. The University has 14 faculties. The [Faculty of Geography and Ecology](#) offers training in such disciplines as "Ecology and environmental protection", "Hydrometeorology" (Bachelor's degree) and "Ecology", "Hydrology" (Master's degree).

Major Events and Activities in 2023

Capacity building. A group of students and researchers from the Institute of Agrobiotechnology and Food Safety at the SamSU visited the international [Arid Land Research Center](#) of the [Tottori University](#) (Japan) as part of the "Sakura science exchange program"²⁹³, where they got a chance to become familiarized with the specifics of salt tolerance of agricultural crops and technologies for growing fruit trees on sandy soils (December, Tottori, Japan).

SamSU has organized several international collaborations: (1) professors from the [University of Bologna](#) (Italy) delivered [lectures](#) on establishing and maintaining intensive orchards in arid regions, particularly focusing on resource-efficient and innovative methods for grape cultivation in drought conditions; (2) faculty from the University of California (USA) conducted a workshop on "Analysis of Water Quality Data Based on QGIS and Remote Sensing Methods"; (3) a professor from the [University of Debrecen](#) (Hungary) presented [lectures](#) on modern agricultural technologies, followed by practical sessions on geoinformatics systems, 3D modeling, and satellite remote sensing.

Events. SamSU hosted: (1) international scientific-practical conferences "Geographical problems of countries and regions: fundamental and practical aspects"²⁹⁴ (April, online) and "Modern geographical research: theory, practice, innovations" (May 12-13);

M. Ulugbek NUUz in the international rankings:



Source: <https://www.instagram.com/p/CyIFD5JNVcP/>

²⁹² by the Decree of the President of Uzbekistan No.PP-82 dated January 13, 2022 "On measures to further improve the activities of the Samarkand State University"

²⁹³ in 2014, the Japan Science and Technology Agency (JST) started the "Sakura Science Program", the purposes of which are to support the development of talented human resources from overseas who have the potential to contribute to innovation in science and technology, to promote continuous collaboration, cooperation and interaction between Japanese educational and research institutes and those overseas

²⁹⁴ jointly with the North Caucasus Federal

(2) conference "Geographical basis for the sustainable development of mountain and lowland landscapes" dedicated to the 85th anniversary of Lapas Alibekov (September); (3) V international conference "Food Security: Global and National Problems" (October 13-14); (4) international conference "Opportunities for increasing stability under conditions of transboundary water scarcity: Central Asia case study"²⁹⁵ (November 1-3); (5) international workshop "Development of a Central Asian model of climate change" (November 27-29).

Cooperation. SamSU had meetings with the delegations of: (1) the University of Malaysia Terengganu

(UMT) and signed a memorandum of cooperation (December); (2) the Xi'an Jiaotong University (XJU) led by Deputy Minister of Education of the PRC and Vice President of the XJU and signed a Memorandum of Cooperation to establish a "Chinese Research Center"²⁹⁶ (December).

Publications. SamSU published 6 issues of the "Scientific Newsletter of the Samarkand State University" and 3 issues of the "Food Security: National and Global Challenges" journal in 2023. These publications featured articles by the Institute's staff members.

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

9.2. Regional Higher Education Institutions 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 2023

SIC ICWC organized: (1) jointly with the IWMI, training workshops as part of events dedicated to the 30th anniversary of IFAS: "Efficient Allocation of Water Resources in the Syr Darya River Basin in the context of Climate Change" for experts from the BWO Syr Darya and water management organizations in the Fergana Valley (Tashkent, February 23-24) and "Efficient Allocation of Water Resources in the Amu Darya river basin in the context of climate change" for experts from the BWO "Amu Darya" (Urgench, September 28); (2) a roundtable in memory of Prof. V.A. Dukhovniy "Improvement of regional water and energy cooperation in Central Asia" (August 16, online); (3) in colla-

boration with the Potsdam Institute for Climate Impact Research (PIK), training workshop "From Climate Modelling to River Flow: High-resolution scenarios and hydrology in Central Asia's climate change context" for climate change experts from the CA countries (Tashkent, October 24-26).

As part of collaboration with NRU "TIIAME": (1) SIC ICWC held an introductory meeting with TIIAME to present information about the ICWC and SIC ICWC (June 26); (2) Deputy Director Sh. Muminov participated in the 6th series of lectures on water security in Tashkent, delivering a presentation on "Water Security Outlook in Khorezm, Navoi, and Samarkand Provinces of Uzbekistan" (Tashkent, October 20).

Director D.R. Ziganshina delivered a lecture on "Specifics of Transboundary Water Allocation in Central Asia" for IWRM Master's students of DKU (February 21, online) and participated in the Peer-to-Peer workshop: how to use the two global Water Conventions to promote cooperation on the ground" organized by the Secretariat of the Water Convention (Geneva, July 3-4).

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

The University of Central Asia was founded in 2000 to promote socio-economic development in Central Asia, particularly in 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 Activities in 2023

Research activities. UCA experts conducted research: (1) on climate impact on economy and local communities in the Isfara river catchment. The findings of this research were presented at the National Forum on

²⁹⁵ in collaboration with the US Academies of Sciences, Engineering and Medicine, and the Universities of California and Oklahoma

²⁹⁶ this center aims to address critical issues such as water and land resource management, dust storm mitigation, environmental pollution, agricultural productivity, and biodiversity conservation

Climate Change in Bishkek, Kyrgyzstan, held in conjunction with the 28th Conference of the Parties of the UN Framework Convention on Climate Change (November 10); (2) on food security in the high mountain regions of Central Asia. The results of this research were published in the prestigious BioScience journal in an article titled "Food Security in High Mountains of Central Asia: A Broader Perspective."

Capacity building. UCA organized: (1) a workshop in Naryn, Kyrgyzstan, to discuss the impacts of climate change on water resources (April); (2) the EcoKyzdar Hackathon on "Climate Change and Environmental Sustainability" in Naryn (April 15-16); (3) a training course in Tajikistan to equip key stakeholders with the skills to map snow avalanches (June).

UCA GSD and the University of Oxford jointly organized and held a Social Science Research Summer School (August).

Events. UCA held: (1) a side event²⁹⁷ "Adopting the Water-Energy-Food-Environment Nexus for a water-energy transition" (New-York, USA, March); (2) the youth forum addressing the Sustainable Development Goals (Naryn, May); (3) the expert workshop on developing the agricultural value chains in Central Asia (October); (4) the Youth Climate Action Conference²⁹⁸ (Naryn, Kyrgyzstan, November).

Collaboration. As part of its Mountain Universities Partnership (MUP), UCA has established state-of-the-art facilities at Khorog State University (KSU), including geology laboratories, a digital library, a tourism center, and an IT hub.

UCA signed a Memorandum of Understanding with Ala-Too International University in March. UCA also signed a Memorandum of Understanding with Naryn State University to strengthen collaboration in various areas, particularly focused on improving the quality of life in Naryn and its surrounding regions (December).

UCA's post-doctoral fellows from the Institute of Public Policy and Administration visited Oxford University's School of Geography and Environment and Cambridge University to discuss potential research collaborations.

Publications. UCA published: (1) an article "Food security in high mountains of Central Asia: A broader perspective"/Roy C Sidle, Aziz Ali Khan, Arnaud Caisserman, Aslam Qadamov, Zulfiqor Khojzoda//BioScience, Volume 73, Issue 5, May 2023, pages 347-363, <https://doi.org/10.1093/biosci/biad025>, noted as the "Editor's choice"; (2) a policy brief by Asel Murzakulova "Climate Change Concerns in Central Asia Public Discourse", <https://ucentralasia.org/media/licf2k1h/uca-policy-briefclimate-change-concerns-in-central-asia-public-discourse.pdf>; (3) a book by Yuri Badenkov "Life in the Mountains: Environmental and Cultural Diversity – Diversity of Development Models", ucentralasia.org/publications/2023/April/chhubook.

UCA produced a documentary film "Cold Wind Valley"²⁹⁹ addressing the impact of climate change on the Khan Tengir Nature Park, www.youtube.com/watch?v=NQfBdL0CA5c.

Source: <https://ucentralasia.org/ru>

9.3. Professional Development Courses and Trainings

9.3.1. Professional Development Courses and Trainings in 2023

February 3, March 3, April 7, November 3, December 1 – GOFC-GOLD CARIN (Central Asia Regional Information Network) Webinar Series/[CARIN](#) (№№ 9-13)

March 9-13 – workshop on the RDS process for a group of national experts from Central Asian countries within the framework of the USAID Regional Water and Vulnerable Environment Activity in Central Asia

March 27-28 – workshop on "Learn to use Earth-observation and remote sensing facilities/GIS to improve the water resources management on the transboundary river Qaratogh"

April 18-19 – workshop on climate risks in Central Asia

April 19, July 13; July 27; September 17 – WEFE Nexus lecture series within the framework of the USAID Regional Water and Vulnerable Environment Activity in Central Asia

April 27-28 – CAWAMNET regional seminar within the framework of the IAMO project "Central Asian Water Conflict and Migration Network"

June 12-23 – online International Summer School-2023 "Smart and innovative agriculture – effective technologies and practices"

June 13-14; July 11-12; September 12-14; September 20; November 13-15; November 16-17 – workshop series within the framework of the project "Developing a National Adaptation Planning Process in Turkmenistan" (UNDP/GCF) on such topics as: "Climate and water resources", "International cooperation on climate change and water", "Implementation of IWRM as an adaptation tool to climate change", "National legislation, policies and institutions on water and adaptation to climate change" and "Impact of climate change on the water and agriculture sectors and adaptation efforts"

²⁹⁷ this event was organized by the UCA and Aga Khan Development Network agencies along with Tajikistan Ministry of Energy and Water Resources, International Hydropower Association, "ITAIPU Binacional" company, Executive Committee of IFAS, USAID, and GIZ

²⁹⁸ the event was a collaborative effort by the UCA, the World Bank, Resilient CA+ project, Anchor Schools (an education and community development advisory firm based in Philadelphia, USA)

²⁹⁹ this film was directed by A. Baiymbetov and produced as part of the "Voices from the Roof of the World" project, a joint initiative of Aga Khan University, Aga Khan Agency for Habitat, Aga Khan Foundation, and the University of Central Asia

June 20 – workshop “Climate Finance Tracking: Reporting, Methodologies and Best Practices”

July 24-28 – summer school “Geospatial Technologies for Building Resilience”, Budapest, Hungary

August 17-18 – workshop “Operational monitoring and forecast of seasonal water availability in Central Asia using the MODSNOW tool”

August 21-31 – summer school on the Aral Sea organized by DKU

September 11, 13, 15, 19, 22 – IWMI regional workshops in Central Asia, in collaboration with partners, within the framework of the US Forest Service project “Improving and strengthening water security and watershed management in Central Asia”

October 9-12 – regional workshop on climate action transparency

November 21-23 – training for trainers (lecturers) on water diplomacy and international water law

NASA Applied Remote Sensing Program Trainings/ARSET: **July 18-25** – “Monitoring Water Quality of Inland Lakes using Remote Sensing”; **September 19-21** – “Building Climate Risk Assessments from Local Vulnerability and Exposure”; **October 26-November 9** – “Spectral Indices for Land and Aquatic Applications”

Series of webinars held by the **International Water Training Institute**, <https://hydroschool.org/webinars/>

9.3.2. Professional Development Courses and Trainings in 2024

CAREC training workshops:

February 13 – webinar “Energy Sector and Climate Risks”

March 11-15 – workshop on climate finance issues

March 12-15 – workshop on transboundary cooperation in Central Asia

April 25 – webinar “Green jobs and skills assessment”

June 26-28 – webinars and workshop on reporting in adaptation (GIZ methodology, best practices, ICAT tool)

July 3-5 – practical training on LEAP³⁰⁰ and GACMO³⁰¹ models

July 22-August 2 – summer academy covering a wide range of topics in climate action and reporting³⁰²

September – Annual Central Asian Leadership Programme on Environment for Sustainable Development/CALP

Online education on environmental protection and sustainable development/free online courses, see <http://elearning.carececo.org/>.

The **International Water Training Institute/Hydroschool** provides training on the following disciplines: “Surface Water Hydrology”, “Surface Water Hydraulics”, “Water quality”, “Groundwater”. In addition, the institute offers a series of webinars in 2024

The **International Water Association/IWA** offers short-term courses (refer to <https://iwa-network.org/iwa-learn-short-term-courses/>), self-paced courses (refer to <https://iwa-network.org/iwa-learn-self-paced-courses/>), webinars (refer to <https://iwa-network.org/iwa-learn-webinars/>).

The **University of Geneva/EUG** conducts a short-term course “International Water Law and the Law of Trans-

boundary Aquifers” (see <https://www.unige.ch/formcont/en/courses/water-law#t1>).

The **UCAS China-Danish College** will organize the International Summer School “Global Change and Environmental Health” on July 18-27 in Beijing (refer to <https://ekois.net/mezhdunarodnaya-letnyaya-shkola-globalnye-izmeneniya-i-ekologicheskoe-zdorove/#more-44396>).

The **Leibniz Institute** for Agricultural Engineering and Bioeconomy, the **Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI)**, the Research Institute for Sustainability – **Helmholtz Centre Potsdam (RIFS)** and the **University of Potsdam** will conduct the Potsdam Summer School entitled “Ecosystems Change & Resilience in the Anthropocene” on September 16-20 (refer to <https://potsdam-summer-school.org/>).

NASA Applied Remote Sensing Program Trainings/ARSET, for more details refer to https://appliedsciences.nasa.gov/get-involved/training?program_area=All&languages=All&source=All&page=0

Geneva water hub offers a diverse range of classes and teaching modalities, including an annual summer school, distance-learning courses, free Massive Open Online Courses and others. For more details, refer to <https://www.genevawaterhub.org/what-we-do/education-and-training>

UNESCO-IHE Online Courses on <https://www.un-ihe.org/courses/online>

DKU Online Courses on sustainable development, <https://edu.dku.kz/>

GOFC-GOLD CARIN (Central Asia Regional Information Network) Webinar Series, on <https://icluc.umd.edu/content/gofc-gold-carin-webinar-series-2023>

³⁰⁰ Long-range Energy Alternatives Planning System

³⁰¹ Greenhouse Gas Abatement Cost Model

³⁰² as part of the ReCATH project





10

SECTION

Science
and Innovations

10.1. Innovations in 2023

Water Saving Technologies

The engineers at the Technology Center of the Academy of Sciences of Turkmenistan have developed an [innovative injector for a drip irrigation system](#). This injector conserves water, fosters conditions for the growth of beneficial microorganisms that nourish plants, and recycles various industrial emissions. It is composed of lump sulfur, activated carbon, metal shavings, river sand, and soapstock³⁰³ or other recyclable industrial waste. The injector is a tubular device that is inserted deep into the soil, reaching the root zone. It is connected to the main water supply system, delivering water and nutrients directly to the root system. This approach prevents direct contact between water and the aerial parts of plants, thereby inhibiting decay and fungal growth.

The Kyrgyz Research Irrigation Institute has developed an [ultrasonic level meter USN 5.0](#). This device is designed for contactless measurement of water levels in irrigation and drainage facilities. Equipped with a high-precision "Maxbotix" ultrasonic rangefinder, the meter features built-in memory and a GSM module for data transmission via MQTT (JSON) protocol. Data collection and transmission can be configured by the user to occur at frequencies of 1, 2, 4, 6, 12, or 24 times per day. The collected data is utilized to regulate flow rates in irrigation canals, thereby improving water management and promoting water conservation.

Specialists at SlySoft Community (Kyrgyzstan) have developed software that optimizes water distribution systems for agricultural fields. This system enables Water User Associations (WUAs) to calculate water use and get important recommendations for water conservation and efficient irrigation. These recommendations are based on data such as selected crops, canal type, bed form, flow capacity, and other relevant parameters.

Scientists from State University of Ponta Grossa in Brazil and the University of Louisiana in the United States have jointly investigated the [impact of floating solar](#) on the water evaporation rate in reservoirs. The researchers used the Penman-Monteith method to measure the rate of water evaporation. The 130 kW installation, occupying 1,265.14 m² of area, reduced evaporation by 60% from the Passauna reservoir that spans 8.5 km² and has an average depth of 6.5 meters. The results indicate that a 5 MW system could save about 16,000 m³ of water per year.

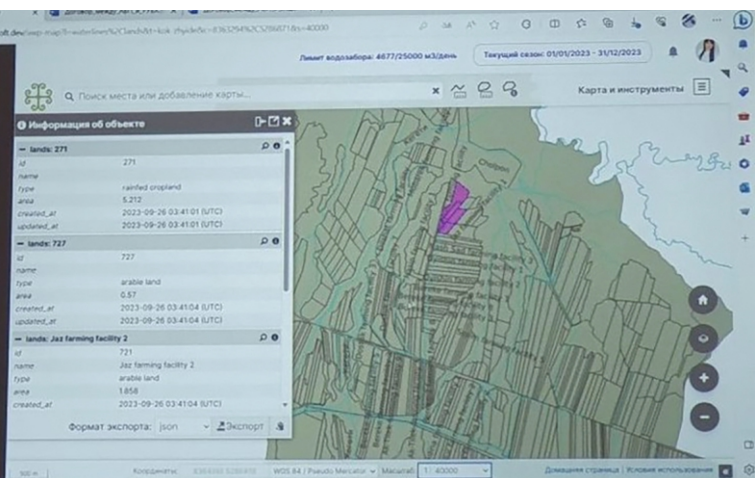
Water Treatment and Desalination

The genetic scientists from the North Carolina State University (USA) engineered [genetically modified bacteria](#) to break down plastics in saltwater. This hybrid consists of two species of microorganisms: (1) bacterium *Vibrio natriegens* that thrives in saltwater and reproduces very quickly; (2) bacterium *Ideonella sakaiensis* producing enzymes that allow it to break down PET plastics³⁰⁴ into components. This hybrid will help clean up the oceans by breaking down plastics in the water without removal.

Scientists from the Daegu Gyeongbuk Institute of Science and Technology (South Korea) developed a [high-efficient water purification system](#) that can filter out microplastics, as well as other pollutants. Covalent triazine framework (CTF), a highly porous material possessing large surface area, was used in this study. Molecules in the CTF were modified to increase hydrophilicity, and the material – exposed to mild oxidation. The filter has demonstrated the highest purification efficiency, removing more than 99.9 per cent of contaminants in 10 seconds, such as microplastics in water at ultra-high speed. The material is also capable of being reused many times without degradation of its performance.

Researchers from the University of Erlangen Nuremberg (Germany) developed [nanoparticles that are intended for water purification](#). This "smart rust" captures various pollutants, such as oil (petroleum), nano- and microplastics and even hormones depending on the particles' coating. The base materials used by researchers are iron oxide nanoparticles in a superparamagnetic form. They are drawn to magnets, but not to each other. To make them smart, nanometer-sized spheres are coated with phosphonic acid molecules. One end of the molecule is attached to the nanoparticles, and the other end can be tuned to be sensitive to different types of pollutants. The magnetic nature of the small rust allows particles to be removed easily from water using a magnet, taking the pollutants along with it.

Researchers at the Helmholtz-Zentrum Dresden-Rossendorf (Germany) developed the [wastewater treat-](#)



³⁰³ soapstock is sludge byproduct of alkali refining in the vegetable oil and fat processing industry. It is classified as recyclable waste

³⁰⁴ polyethylene terephthalate

ment technique with magnetotactic bacteria, which is used in mining (including uranium). Microorganisms accumulate dissolved heavy metals in their cell walls, and a magnetic field is used to remove them from water. Magnetotactic bacteria can survive at neutral pH values, even in aqueous solutions containing relatively high concentrations of uranium. The treatment can be carried out directly in the surface water or by pumping water from underground mines where mining is in progress and directing it to treatment plants.

Engineers from the Norwegian startup Vitaloop introduced the **Defender graphene-filter water purifier**. The purifier weighs 0.49 kg, measures 26.5×7.5 cm and is very simple in use. Just pour water of any quality into it and press a button to get about 480 ml of clean drinking water. The battery is capable of delivering up to 100 cleaning cycles per charge and the filter can withstand up to 200 cycles. The purification system consists of five parts. The first is a coarse metal mesh filter for separating coarse debris. Next is a fine (mesh) filter to capture the smallest dirt particles. The third filter retains the most part of viruses, the fourth is an activated carbon filter which purifies the water from heavy metals and toxins. The final graphene filter removes microplastic particles from water and disinfects it.

Engineers from the Massachusetts Institute of Technology (USA) and China developed a **seawater desalination system**, powered only by the sun. The device's configuration allows water to circulate in artificially created eddies, similar to the natural "thermohaline" circulation³⁰⁵ of water in the ocean. This circulation, combined with the sun's heat, causes the water to evaporate, leaving behind salt in the water. The resulting water vapor is then condensed and collected as clean drinking water. Meanwhile, the remaining salt circulates in and out of the device, rather than building up and clogging the system. The new system has a higher water output and better salt removal than all current passive solar desalination concepts currently being tested. The researchers estimate that if the system is scaled up to the size of a small suitcase, it would produce 4 to 6 liters of drinking water per hour and last for several years before needing replacement parts.

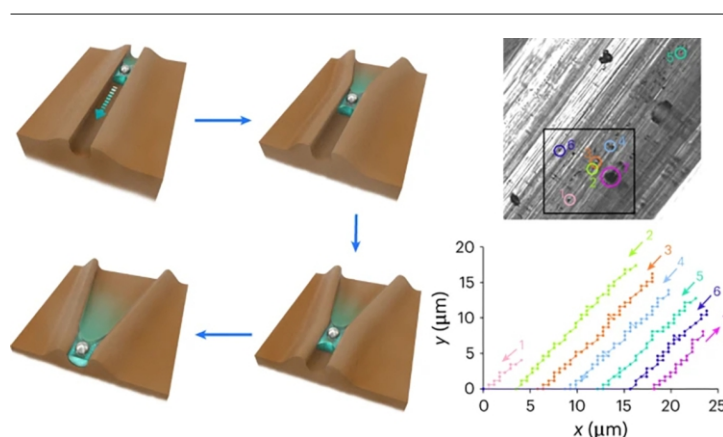
Water from Air

Engineers from the Massachusetts Institute of Technology (USA) synthesized **hydrogel** that can quickly extract water from dry air. The researches enhanced the hydrogel's absorbency by adding lithium chloride – a type of salt that is known to be a powerful desiccant. The material can pull vapor from the air and hold in the moisture without leaking. The water could be heated, condensed, and then collected as ultrapure water.

Hydrogel harvesting freshwater from air was developed by the team of the University of Texas (USA). The process of extraction took 24 hours. Using their

hydrogel, the researchers were able to extract almost six liters of pure water per kilo of material, from air with 30% relative humidity. The basis for the new hydrogel became a polymer constructed from zwitterionic molecules. Polyzwitterions carry both positive and negative charged functional groups, which helped the polymer to become more responsive to the salt in this case. Initially, the molecular strands in the polymer were tightly intermingled, but when the researchers added the lithium chloride salt, the strands relaxed and a porous hydrogel was formed. This hydrogel could significantly assist in water collection in arid regions.

Engineers from the New York University in Abu Dhabi (UAE) developed a **simple method of harvesting water from atmosphere** (fog and dew). The surface of a slowly subliming organic crystal of hexachlorobenzene allows collecting moisture droplets and guiding their motion. Transition of water from its vapour to liquid form and its movement in the desired direction were found to be caused by changes in the width of small channels that appear on the surface of the crystal. Due to sublimation (transition from the solid state to vapour), the surface of this material has a rigid topography with defined parallel channels.



Sublimation-caused widening of the channel on the crystal surface. As the channel width changes, the particles are picked up and transported by water along the channel.

Researchers from the Max Planck Institute for Polymer Research and Swiss Federal Institute of Technology (ETH Zurich) have developed a **specially coated metal mesh to extract water from fog and remove environmental pollutants**. A close-meshed net is made out of metal wire and coated with a mixture of polymers and titanium oxide. The polymers are selected in such a way that the water droplets are optimally deposited on the mesh and then flow as quickly as possible into a collection container so that they are not blown away by the wind. Titanium oxide acts as a chemical catalyst. It breaks down organic pollutant molecules contained in the droplets, rendering them harmless. The technology requires minimum mainte-

³⁰⁵ "thermohaline" circulation is a circulation driven by differences in the water density which are caused by variations in temperature and salinity distribution in the ocean

nance and no electric energy as the sunlight is sufficient for its work. The titanium dioxide must receive regular irradiation with UV light to regenerate.

Innovations in Agriculture

Researchers at Russian Space Systems (Russia) have developed a complex of 'Digital Earth' geoservices powered by artificial intelligence. This platform enables users to access Earth remote sensing (ERS) data, view satellite images of the Earth's surface, filter images by region, date, and cloud cover, extract data from satellite images related to the state and development of objects and natural resources, monitor emergency situations, and conduct environmental monitoring. Additionally, the application allows users to order custom ERS products, specifying requirements such as spectral channels, bits per pixel, map projection, and other parameters.

Scientists at the Technology Center of the Academy of Sciences of Turkmenistan have developed **eco-granules** that accelerate the reclamation of saline soils, improve the absorption of plant fertilizers, and promote the growth of beneficial soil microorganisms. The mixture for these granules is made from calcined algae, trace elements from thermal mineral water, slaked lime, zeolite, and other additives. Importantly, this mixture is a byproduct of lake and canal cleaning processes, providing an additional source of organic matter for cultivated areas. The emulsion containing eco-granules can be directly sprayed onto plant stems.

Scientists at Belgorod State University (Russia) have developed a mobile application that can simulate optimal planting schemes for various crops in specific areas. The program can assess greenhouse gas (carbon dioxide) dynamics, crop area parameters, and help select optimal planting locations to maximize yields. The application utilizes augmented reality to visually represent the growth and development of crops in a given area and visualize the spatial and temporal distribution of greenhouse gases. To function properly, it requires a mobile phone camera and GPS.

The **AI-based LaserWeeder agricultural robot**, developed by engineers from the Carbon Robotics (USA), is

a 6-meter-wide trailed unit with three rows of 10 lasers, towed behind the tractor. The robot is able to identify and remove weeds with millimeter accuracy without any damage to the basic crop. As it moves, the lasers precisely target the weeds and generate a concentrated beam of thermal energy to disrupt the weeds' cellular structure that kills them. The AI-based system is able to distinguish weeds from crops, ensuring that only unwanted plants are affected. The agricultural bot is capable of operating in large-scale fields and killing over 200,000 weeds per hour, which is equivalent to the work of 70 persons.

Researchers at Cognitive Pilot Company (Russia) have designed an agricultural robot, the Cognitive Soil Analyzer, to analyze soil composition and condition. The robot measures the degree of absorption and reflection of electromagnetic quanta across various spectral bands to determine mineral content, and utilizes electromagnetic induction to assess soil acidity and electrochemical potential. The analysis can be conducted up to one meter deep. Additionally, the robot can measure soil compaction by determining its mechanical resistance to applied force. Soil measurements are automated and conducted in real-time as the robot traverses a predefined route at a specified frequency. To achieve accurate measurements, a grid of points is established, with distances between points ranging from 25 to 100 meters or other user-defined resolutions. Measurements are stored as sets of geo-referenced soil parameters. As a result, the Cognitive Soil Analyzer contributes to optimized field map illustrating the distribution of soil indicators.

An **unmanned 20-storey vertical "plants factory"**, launched in Chengdu (China), was developed by specialists at the Institute of Urban Agriculture under the Chinese Academy of Agricultural Sciences. It is a multi-layered system that enables continuous and highly-efficient green food production through innovative technologies, starting from simulation of natural conditions and ending with energy-saving artificial lighting. The produce (leafy greens, fruits and mushrooms) do not differ, in terms of vitamin and microelement content, from those grown in a "traditional" greenhouse. This system can be utilized for food production in urban areas as well as in deserts and on barren land.



Alternative Energy

Japanese battery startup company PowerX unveiled its inaugural ship – a [tanker designed to transport electric energy by sea](#). The company aims to complete its first tanker by 2025. The electric tanker equipped with 96 containerized marine-grade batteries, providing a total capacity of 241 MWp, will be 140 m long. PowerX will utilise its own proprietary battery system based on lithium-iron-phosphate battery cells that can manage a lifespan of over 6,000 charge cycles. The tanker with an electric cruising range of up to 300 km is designed to transport electric energy by sea to the above distance.



Researchers at the Royal Melbourne Institute of Technology (Australia) have developed a [proton battery](#) with such an energy-per-unit mass which is comparable with the best commercially-available lithium-ion batteries. Batteries are based on chemical reac-

tions with proton exchange, provide safety in operation and enable their complete recycling. The main resource used in a new battery is carbon, which is much more available and cheaper than other resources such as lithium, cobalt and vanadium.

Researchers at the Massachusetts Institute of Technology (USA) have developed a [technology of concrete batteries](#) that are both building material and an energy-storing unit. This technology allows turning the entire building into a giant battery without change in its service, manufacturing thousands of kilometers of concrete roads that will also serve as an energy-storage system. When mixing concrete, a mortar of cement powder, water and carbon black is used. The liquid naturally forms a branching network of openings that penetrate the whole concrete, and the carbon migrates into these spaces, thus turning concrete into a giant conductor or electrode. Capacitors are formed of a set of two conductive plates of modified concrete which are separated by an insulator and a suitable electrolyte. Relying on calculations, a concrete block of 45 m³ in size would have enough capacity to store about 10 kWh of energy.

Specialists of the Ambri startup (USA) have developed a [liquid-metal battery](#) composed of liquid-metal electrodes and molten-salt electrolyte. A battery consists of three liquid layers arranged by density. The bottom layer with the highest density is a cathode made of molten antimony. The top layer with the lowest density is an anode made of calcium alloy. And electrolyte made of molten calcium chloride is the middle layer between the top and bottom ones. The battery needs no membranes or separators between these layers. The liquid-metal battery is not flammable, unlike lithium-ion battery, and resistant to capacity fade. The tests demonstrate that the battery retains 95% of its capacity even after the long-term operation.

10.2. Leading Research Institutes of EECCA Countries

Belarus. Republican Unitary Enterprise “Central Research Institute for Complex Use of Water Resources” (RUE “CRICUWR”)

RUE “CRICUWR” is the sole specialized state research institution in Belarus dedicated to fundamental and applied research in sustainable water use and protection. The institute is responsible for providing scientific support to the sectoral policies developed by the Ministry of Natural Resources and Environmental Protection of Belarus in the realm of water use and protection. As an accredited scientific organization³⁰⁶ and holder of an environmental compliance certificate³⁰⁷, the institute conducts research and development in natural and engineering sciences. Addi-

tionally, it offers training programs in Geoecology (25.03.13) and Land Hydrology, Water Resources, and Hydrochemistry (25.03.05).

RUE “CRICUWR” focuses its **research and development** efforts on: (1) addressing socio-economic and environmental policy objectives in Belarus, and (2) the areas aligned with strategic goals and targets set under the SDGs³⁰⁸, National Strategy for Sustainable Social and Economic Development of the Republic

³⁰⁶ certificate of accreditation of a scientific organization No.18 dated July 26, 2021 of the State Committee on Science and Technology of the Republic of Belarus and the National Academy of Sciences of Belarus

³⁰⁷ BY/112.04.19.074.02.00015 for providing environmental protection services in accordance with STB 1803-2007 “Environmental protection services. General requirements”

³⁰⁸ according to the UN GA Resolution 70/1”

of Belarus for the period up to 2030³⁰⁹ and the Concept of the National Strategy for Sustainable Development of the Republic of Belarus for the period up to 2035³¹⁰, Strategy in the field of environmental protection for the period until 2025³¹¹ and in the Strategy for scientific, technical and innovative development in the field of environmental protection and sustainable use of natural resources for the period up to 2025³¹².

The Institute's primary areas of focus include: (1) development of river basin management plans and water balance assessments; (2) environmental impact assessments for engineering activities within river basins; (3) assessment and forecast of changes in water resource conditions under both natural and human-induced factors; (4) evaluation of the recreational potential and capacity of water bodies; (5) development of environmental protection measures to safeguard and restore surface and groundwater bodies; (6) development and updating of schemes and projects for water protection zones, coastal strips, and sanitary protection zones for water intakes; (7) comprehensive assessments of the ecological state of river basins experiencing significant human impact; (8) maintenance of the State Water Cadastre (SWC) of the Republic of Belarus; (9) provision of postgraduate education and training in relevant fields; (10) engagement in international scientific-technical co-operation.

Activities in 2023

RUE "CRICUWR" provides information services to various economic sectors, offering data on water bodies, water resources, hydrological regimes, water quality, water usage, and wastewater discharge. Additionally, the organization prepares information materials for international organizations such as the UN and UNESCO, focusing on water resources and their utilization. To support these services, RUE "CRICUWR" develops and maintains the following information systems and resources: (1) SWC Interdepartmental Database, which consolidates summary data on water resources and their use; (2) Information Database for SWC Sections. This web-based application provides online access to summary data in Excel table format and dynamic graphs of indicators. Data is categorized by administrative-territorial entities (regions, districts, cities of regional subordination, and Minsk city), river basins, and economic activity types; (3) automated information system "State Statistical Reporting on Water Use" (1-water).

Events. RUE "CRICUWR" hosted the following: (1) II international scientific-practical conference "Topical issues of efficient and integrated water use", which

adopted [resolution](#) (Minsk, March 22-24); (2) workshop "Youth Policy in RUE "CRICUWR"" (Minsk, [October 30](#)); (3) roundtable "Specifics of regulation and control of wastewater and stormwater sewerage system in settlements" (Minsk, [November 29](#)).

Representatives of the Institute took part in: (1) exhibition of scientific and technical achievements "Intellectual Belarus" (Minsk; [January 21-22](#)); (2) workshops "Sound use of water resources" (Vitebsk, [March 3](#); Brest, [March 31](#)), "Treatment facilities. Examples of implementation. Audit of existing treatment facilities" (Minsk, [April 18](#)) and "Sound use of water resources" (Gomel, [September 8](#)); (3) roundtable³¹³ "Uniting the efforts of the public and private sector to guarantee environmental wellbeing" (St. Petersburg, Russian Federation, May 26); (4) II international specialized exhibition "ECOLOGY EXPO-2023" and XVII Republican Ecological Forum (Minsk, August 22-24); (5) Festival of Science (Minsk, September 2); (6) practical workshop of experts of the joint Belarusian-Russian Commission on the protection and sustainable use of transboundary water bodies and laboratory services of the Russian Federation and the Republic of Belarus (Pskov, Russian Federation, [September 20](#)); (7) XX international scientific conference of young scientists "Youth in Science-2023" (Minsk, [September 20-22](#)); (8) Republican Competition of Innovation Projects 2023 (Minsk, [December 6](#)).



³⁰⁹ approved by the meeting of the Presidium of the Council of Ministers of the Republic of Belarus (Protocol No.10 dated May 2, 2017). <https://economy.gov.by/uploads/files/NSUR2030/Natsionalnaja-strategija-ustojchivogo-sotsialno-ekonomicheskogo-razvitija-Respubliki-Belarus-na-period-do-2030-goda.pdf>

³¹⁰ <https://economy.gov.by/uploads/files/ObsugdaemNPA/Kontseptsija-na-sajt.pdf>

³¹¹ <https://faolex.fao.org/docs/pdf/blr212332.pdf>

³¹² <https://minpriroda.gov.by/uploads/files/Strategija-na-2021-2025-gg..pdf>

³¹³ as part of the 10th Nevsky International Ecological Congress (St. Petersburg, Russian Federation, [May 25-26](#))

Cooperation. The Institute signed: a program of scientific, technical and innovative cooperation with the FSBEI "Russian State Hydrometeorological University" for the period up to 2025 (St. Petersburg, Russian Federation, [May 26](#)); an agreement with the Belarusian Agricultural Academy (BSAA) on the organization of a branch of the Department of Hydraulic Structures and Water Supply at the Institute (Gorki, Mogilev region, [July 7](#)).

Publications. Articles of the Institute's members were published in (1) journals [Natural resources](#), No.1-2; [Ecology](#) No.1, 3; [Melioration](#) No.4; [Industrial ecology](#) No.1, 12; [Water sector of Russia: problems, technologies, management](#) No.6; collection of scientific papers [Urgent problems of ecology](#); (2) proceedings of conferences [Topical issues of efficient and integrated water resources use](#) (March 21-22); [Innovation technologies in water, utilities sectors and water transport](#) (April 27-28); [Sakharov readings 2023: environmental problems of the XXI century](#) (May 18-19); [Youth in science-2023](#) (September 20-22); [Minsk Scientific Readings-2023](#) in 3 volumes (December 6-8).

Source: RUE "CRICUWR", www.cricuwr.by, <https://www.instagram.com/cricuwr/>



Signing of a program of scientific, technical and innovative cooperation with the FSBEI "Russian State Hydrometeorological University"

Kazakhstan. "Kazakh Scientific Research Institute of Water Economy" TOO (KazSRIWE)

The KazSRIWE TOO established in 1950 in Taraz is the leading research organization in the area of water management, land reclamation and irrigation, watering technology and technique, agricultural water supply and pasture watering, and water economics. The Institute's mission is to deliver research, design and educational activity to ensure effective and sustainable development of the water sector in the context of integrated water use and water security of the country.

Activities in 2023

Research. [Research efforts](#) of the Institute are focused on irrigation technologies and technique for new irrigated land and reconstruction and modernization of existing irrigation systems.

The Institute has been implementing the following items from the Concept of Water Management System Development in the Republic of Kazakhstan for 2024-2029: Development of a handbook on water-saving irrigation technologies; Development of a mechanism for setting regional water use limits for provinces, cities, capital, districts and primary water users, based on short-term forecasts of water availability, environmental and sanitary-epidemiological status of water bodies, and the level of stress on water resources; Studies to modernize the design parameters and operating regimes of large reservoirs on transboundary rivers (Kapchagai, Bukhtarma, Shar-dara) in light of changing transboundary inflows; Assessment and forecasting of water balance of the transboundary Syr Darya River. This is part of prepara-

tions for joint research with Central Asian countries aimed at improving and justifying the allocation of water resources between countries.

Capacity building. KazSRIWE jointly with the POMU (Production and Operational Management Unit) of the Zhambul branch of the RSE "Kazvodhoz" held a training workshop for water employees on operational hydrometry, water accounting, operation of collector-drainage network and vertical drainage wells (Taraz, [March 13-17](#)).

Events. KazSRIWE held a [technical meeting](#) on automation of water management, in which representatives of such companies as Rubicon (Australia), GWF (Germany), GST EURASIA, and HST Systemtechnik took part. The Institute was assigned the role of a single operator of digitalization in the national water sector.

Representatives of the Institute took part in: (1) the regional workshop on monitoring, assessment and information exchange in Central Asia (Astana, [February 1-2](#)); (2) roundtable "Young water professionals" (Taraz, [March 15](#)); (3) working meeting held at the JSC "Institute of Geography and Water Security" under the Ministry of Science and Higher Education of the Republic of Kazakhstan (Almaty, [December 23](#)).

Media. The interviews were given: to the Kazakhstan's agrarian online site [ElDala.kz](#) on how to save 30% of irrigation water ([April 6](#)) and to the TV channel 24kz on how to combat water scarcity" ([October 2](#)).

Source: https://www.kaziwr.isd.kz/page.php?page_id=3&lang=1

Kyrgyzstan. Kyrgyz Irrigation Research Institute (KIRI) at the Ministry of Agriculture, Water Resources and Processing Industry of the Kyrgyz Republic

KIRI was established in 1953 as the Institute of Water Management and Energy. In 1973, the Institute was granted the status of All-Union Research Institute for Integrated Automation of Irrigation and Drainage Systems.

The Institute was renamed KIRI in 1992. In 2022, it was transferred to the Ministry of Agriculture³¹⁴. It currently operates as a subordinate organization with its own charter.

KIRI comprises six scientific laboratories focused on meliorative hydrogeology and water management challenges, irrigation and soil erosion research, crop irrigation regimes and agromelioration, surface water monitoring, hardware and software for automation of water metering and water distribution, geoinformation systems and databases. Additionally, KIRI includes a Center for the Development of Digitalization and Water Management Systems.

The Institute employs 68 staff members, including 6 Doctors of Science, 6 Candidates of Science, and 29 researchers.

KIRI's primary areas of focus include: (1) research and development, design and commissioning in the fields of water management, agriculture, ecology, and information technology; (2) development and promotion of advanced techniques, new technologies, and devices in irrigation and drainage facilities; (3) integrated water resource management; (4) digitalization of agricultural sector, provision of services to design and industrial companies, as well as peasant farms and agricultural enterprises; (5) crop growth and development; (6) development of normative and technical documentation for the water industry; (7) automation system development and maintenance; (8) education, training and consultation on information technology and sustainable natural resource use.

Activities in 2023

Research. The research efforts have focused on the following areas: (1) development of rational schemes for groundwater use and management in the western part of the Chuy Valley to ensure sustainable irrigation and desalinization in the context of water scarcity; (2) selection of irrigation technologies and technique for growing crops on sloping land of Chuy province with the use of GIS technologies; (3) study of

the impact of actual irrigation regimes on crop yields in the Chuy and Naryn intermountain basins, development of recommendations on their correction; (4) development of recommendations for agricultural production on irrigated land in light of current and forecast changes in river runoff under conditions of global climate change; (5) integration of automated water metering, water distribution and irrigation control systems to improve irrigation water use efficiency in the Chuy Valley; (6) development of reference-analytical database of indicators on irrigated land conditions in the Chuy province with the use of GIS technologies.

The Institute has got **8 certificates** of practical application of its research: **1 certificate for implementation** of the "Procedure for calculation of horizontal, vertical and combined drainage systems in Bishkek city"; **7 certificates on putting into operation** of the computer program for calculation of CDW (collector-drainage water) flow and compilation of the final inventory of observation wells, as well as transfer of 27 paper maps and their electronic versions to computers of Sokuluk, Moscow, Zhayyl and Alamedin land reclamation field offices (Chuy province).

Contract-based activities on development and implementation of automated irrigation water delivery and distribution accounting system are in progress in the Chuy district water management organization. Similar activities have been started in other districts of Chuy province.

Events. KIRI specialists presented their research findings at 17 international and national scientific-practical conferences, workshops, roundtables, and coordination meetings.

Publications. KIRI staff members have published: chapter "Creation of Rational Groundwater Management Schemes in the Chuy Valley, Kyrgyz Republic based on Groundwater Modeling" in the [monograph](#) "Groundwater in Arid and Semi-Arid Areas. Monitoring, Assessment, Modelling and Management", Springer, 2023; articles in the journal [News of Higher Educational Institutions of Kyrgyzstan, No.6, 2022](#) – "Soil protection in Kyrgyzstan", "Agrophysical and chemical soil properties in the Chuy valley and their change during prolonged irrigation", "Fertilizers – the basis of soil fertility and crop yields".

Source: KIRI

³¹⁴ now the Ministry of Agriculture, Water Resources and Processing Industry

Kyrgyzstan. Institute of Water Problems and Hydropower of the National Academy of Sciences of the Kyrgyz Republic (IVP&GE of NAN KR)

The IVP&GE of NAN KR was established in 1992. The Institute's activity is focused on fundamental research and applied technology development in the area of hydrology and hydropower. The [Tien Shan Highland Research Center](#) (TShHRC) and the [Ala-Archa Polygon](#) for studies of hazardous hydrological processes, and also 6 laboratories operate at the Institute.

Activities in 2023

Research. The Institute has been implementing the program "Analysis of opportunities for forecasting and management of water and energy resources in the Kyrgyz Republic in the context of climate change and under anthropogenic load" for 2021-2023. The key areas of this research include: (1) monitoring of the potential for catastrophic outburst floods from high-mountain lakes; (2) studying regional patterns of formation, regime, distribution, interrelationships, protection, assessment, and interaction of surface and groundwater resources; (3) development and justification of groundwater management schemes in the eastern part of the Chuy Valley based on non-stationary geofiltration models; (4) studying hazardous exogenic hydrogeological processes in the Tien Shan; (5) creation of remote sensing-based geoinformation system for monitoring water and land resources in Kyrgyzstan.

Researchers continuously monitor the status of potential outburst lakes in the Ala-Archa River valley through regular stationary measurements of key hydrometeorological parameters.

The Institute continues its participation in the UNESCO project "Strengthening the resilience of Central Asian countries by enabling regional cooperation to assess high-altitude glacio-nival systems to develop integrated methods for sustainable development and adaptation to climate change." The project's goals, methodologies, and anticipated outcomes were presented at the project's inception workshop (Paris, France, July 6-8).

The Institute collaborates with the Federal Center for Integrated Arctic Research of the Ural Branch of the Russian Academy of Sciences (FECIAR UrB RAS) on glacier research. As part of a youth grant from the Russian Science Foundation, a joint expedition near the Ala-Archa River collected samples of water, ice, and precipitation. They also performed field measurements of water properties (temperature, conductivity, pH, etc.). Laboratory analysis will reveal glacier melt rates and their impact on river basin water



Expedition near the Ala-Archa River

balance and degradation of buried ice and permafrost, and their contribution to river runoff.

Capacity building. The following events were held at the TShHRC³¹⁵: (1) 3rd summer school-2023 "Knowledge Transfer and Data Exchange" under the program "Integrated Glacier Monitoring"³¹⁶, during which the participants got acquainted with the work of TShHRC field stations, such as the lake zone at Kara-Bulun, the forest zone at the Chon-Kyzyl-Suu hydrometeorological station and the nival-glacial zone of the Kara-Batkak glacier (Kyzyl-Suu village, August 8-15); (2) safety procedure training on the Kara-Batkak glacier (Teskei Ala-Too ridge) – the most difficult one for glaciological monitoring (August 31-September 5).



Safety procedure training on the Kara-Batkak glacier

An open lecture "School of Scientific Interests" was held³¹⁷ for students of the Kyrgyz National University named after J.Balasagyn in such areas as "Geography", "Ecology and Nature Management" (Bishkek, February 28.).

Staff members of the Institute took part in the expedition³¹⁸ aimed to assess the ecological status of the

³¹⁵ supported by the OSCE programme office

³¹⁶ organizers: TShHRC; [USAID](#) Regional Water and Vulnerable Environment Activity; [Kyoto University](#) (Kyoto, Japan); Laboratory of Space Geophysical and Oceanographic Studies [LEGOS](#) (Toulouse, France); Research Center for ecology and environment of Central Asia (RCECA)

³¹⁷ as part of the project "Women's Place in Science" implemented by the Kyrgyzpatent (State Agency of Intellectual Property and Innovation under the Cabinet of Ministers of the Kyrgyz Republic)

³¹⁸ organized by USAID for young scientists of Central Asia

Amu Darya river basin, during which they visited the BWO Amu Darya, head HPP in Levakand, Danghara irrigation tunnel, Rogun and Nurek HPP (Tashkent-Muynak-Nukus-Urgench-Bukhara-Alat-Farab-Termez-Bokhtar-Levakand, April 23-May 5).

Events. The IVP&GE organized: (1) round table "The reason for water scarcity in the Bishkek city and in Kyrgyzstan as a whole" (June 15); (2) [international scientific-practical conference](#)³¹⁹ "Problems of monitoring, modeling and forecasting of water and energy resources of Central Asia in the context of climate change" (III Mamatkanov Readings) (November 9).



Representatives of IVP&GE of NAN KR took part in: (1) international conference "Environmental and socio-economic security as a factor of sustainable mountain development"³²⁰ dedicated to the results of the "2022 International Year of Sustainable Mountain Development" and the roundtable "The role of documents adopted at the concluding event of the International Year of Mountains – Bishkek Global Mountain Summit (2002) for the sustainable development of mountain regions in the period from 2002 to 2022" (Bishkek, January 19-21); (2) roundtable "UNESCO Global Geoparks: Opportunities and Potential in the Kyrgyz Republic"³²¹ (Bishkek, February 9); (3) conference "Water Resources in Central Asia: Challenges and Prospects"³²² (Bishkek, [March 18](#)); (4) the meeting "Water Resources in Central Asia: challenges and prospects"³²³ (March 31); (5) ["Bishkek Water Forum-2023"](#)³²³ ([May 31](#)); (6) the Issyk-Kul Forum "Actual issues of environmental research for sustainable development in arid zones" (Chok-Tal village, Issyk-Kul, [August 16-17](#)); (7) [International Forum](#) on Sustainable Development of Ecology and Environment in the Silk Road Economic Belt (Urumqi, China, September 17-19); (8) [10th Euro-Asia Economic Forum](#) (Xi'an, China, September 22); (9) [Regional Meeting](#) on Robust Decision Support (RDS) Process for the Amu Darya River Basin, the 5th meeting of the [Regional Coordination Com-](#)

[mittee](#), and the [celebration of the Amu Darya River Day](#) at the regional level (Khiva, Uzbekistan, September 25-27); (10) All-Russian Conference "Il Lave-rov Readings – The Arctic: Current Problems and Challenges"³²⁴ (Arkhangelsk, RF, November 13-17); (11) Central Asian forum ["Women in Science and Education"](#) (Bishkek, November 16); (12) international scientific-practical conference "Mudflow Safety – 50 years of Kazselezaschita's activities: Status and Prospects" (Almaty, Kazakhstan, [November 22-24](#)); (13) III Congress of Young Scientists (Sochi, RF, November 28-30); (14) international roundtable "Application of Digital Technologies in Science" (December 11, Bishkek); (15) [2nd meeting](#) of the regional working group to discuss a mutually beneficial mechanism for water and energy cooperation (Almaty, Kazakhstan, December 15).

Cooperation. The IVP&GE of NAN KR signed a memorandum of cooperation with the [Xinjiang Institute of Ecology and Geography](#) (XIE&G) of the Chinese Academy of Sciences (March 1).



The Institute held meetings with: (1) a delegation of the Xinjiang Branch of the Chinese Academy of Sciences (February 15), (2) a WB water expert (February 15), (3) EU representatives (April 26).

Media. Interviews were given to: (1) Kyrgyz Radio "1" on "Today is a World Water Day" (March 22) and "Kyrgyz Mountains as a Source of Water" (November 27); (2) the online journal "Vostochny Express 24" on "How Kyrgyzstan conquers the Russian Arctic..." describing collaboration between the IVP&GE of NAN KR and the Federal Center for Integrated Arctic Research of the Russian Academy of Sciences (June 22); (3) the State television and radio broadcasting company "EITR" (November 30).

Source: <http://iwp.kg/>,
<https://www.facebook.com/iwp.istc.kg/>

³¹⁹ jointly with the Green Alliance of Kyrgyzstan and with the support of the OSCE Programme Office in Bishkek

³²⁰ organized by the International University of Kyrgyzstan jointly with the National Academy of Sciences of the Kyrgyz Republic

³²¹ organized by the National Commission of the Kyrgyz Republic for UNESCO jointly with the GIZ

³²² organized by representatives of the "Green Alliance of Kyrgyzstan", "Open Innovations and Green-4" with the support of UNDP and the EU

³²³ organized jointly with the Cabinet of Ministers of the Kyrgyz Republic and the World Bank

³²⁴ within the framework of the ILL Lomonosov Readings on the basis of the FSBS (Federal State Budgetary Institution of Science) FECIAR RAS

Russia. Federal State Budgetary Institution “Russian Research Institute for Integrated Water Management and Protection (FSBI “RosNIIVKh”)

FSBI “RosNIIVKh” was founded in 1969. It consists of the lead institute in Rostov-on-Don and branches in Yekaterinburg, Vladivostok, Chita, Perm and Ufa. Since 2009, the Water Museum has been functioning at the Institute. The Water Sector Professional Development Center (WSPDC) started to function since 2020. FSBI “RosNIIVKh” is a member of the [EECCA Network](#) of Water Management Organizations.

The main areas of activity include: (1) scientific, methodological, and information support for the study, use, and protection of water resources; (2) development and support of information systems for government authorities at all levels, including informative, advisory, diagnostic, expert, research, design, and control systems; (3) development of pre-design materials for the use and protection of water bodies, as well as for the prevention and mitigation of floods and other water-related hazards, and ensuring the safety of hydraulic structures; (4) development and implementation of high-tech, science-intensive management tools for water resource use and protection; (5) monitoring of water quantity and quality and conducting laboratory analyses of water and sediment quality; (6) technical regulation, standardization, and water certification.

Activities in 2023

Events in which the FSBI “RosNIIVKh” took part include: (1) environmental marathon “River Defender’s Day” and roundtable “How to save our rivers: federal and re-

gional projects and initiatives” (Vladivostok, March 1); (2) educational campaign dedicated to the World Water Day and exhibition “At the Frontiers of Water Sector Development” (Water Museum of the Ural Branch, March 16); (3) II international specialized exhibition “ECOLOGY EXPO-2023” (Minsk, [August 22](#)); (4) All-Russian scientific-practical conference “Water resources in the face of global challenges: ecological problems, management, monitoring” (Rostov-on-Don, September 20-23); (5) XIV meeting of the joint Belarusian-Russian Commission on the protection and sustainable use of transboundary water bodies (Minsk, August 23); (6) III Russian Environmental Forum focused on environmental monitoring, state support and building of new infrastructure for solid municipal waste management, green investments and sustainable financing, formation of a closed-loop economy in Russia (Moscow, October 9-11); (7) bilateral working meeting of experts from Russia and Kazakhstan during which the implementation of the Unified Roadmap for enhanced scientific cooperation in large river basins, such as Ural (Zhayyk), Irtysh (Ertis) and others was discussed (Ekaterinburg, October 20).

Publications. In 2023, the Institute published 6 issues of the journal “Water sector of Russia: problems, technologies, management”, in which, among others, the articles of the Institute staff members were included. The Institute also publishes twice a month a water sector digest.

Source: FSBI “RosNIIVKh”

Tajikistan. Institute of Water Problems, Hydropower and Ecology of the National Academy of Sciences of Tajikistan (IWPH&E of NAST)

IWPH&E of NAST was founded in 2002³²⁵. It carries out diverse research, including comparative analysis of energy efficiency of large rivers in Tajikistan, development of a unified economic criterion of hydropower development; development of methods for regulation and forecasting of flow for hydropower and irrigation purposes, assessment of economic value of water under joint use for hydropower and irrigation; optimization of hydropower operation and planning of hydraulic facilities in river basins of Tajikistan; studies of climate impact on water and energy resources and development of methods for hydropower adaptation; analysis of international and national legislation on transboundary water and energy sharing, causes of hydropower and irrigation conflicts between the Aral Sea Basin countries and development of proposals for their solution.

The Institute [offers](#): (1) master’s programs in such disciplines as “Hydraulic engineering”, “Ecology”, “Natural water and wastewater treatment”, “Environ-

mental monitoring”, “Rational use and protection of water resources”, “Energy efficient technologies and energy management” since 2014; (2) PhD programs in such disciplines as “Ecology”, “Hydrology”, “Meteorology”, “Hydraulic engineering and facilities”, “Water resources and water use”, “Construction” since 2017.

Activities in 2023

Research. [Research efforts](#) were continued on: (1) “Problems of formation and regulation of solid runoff in waters of Tajikistan and their solution” (2020-2024); (2) “Development strategy and optimization of energy balance. Hydro-coal scenario of energy sector development in Tajikistan” (2020-2024).

Events. The Institute held³²⁶ the international scientific-practical conference “Water Resources, Innovation, Resource and Energy Conservation” on [October 6-7](#) in Dushanbe.

³²⁵ PP RT No.279 of 03.07.2002 “On establishment of the Institute of Water Problems, Hydropower and Ecology of the National Academy of Sciences of Tajikistan”

³²⁶ as part of events dedicated to the International Decade of Action “Water for Sustainable Development”, 2018-2028



Participants of the conference "Water Resources, Innovation, Resource and Energy Conservation"

Representatives of the Institute took part in: (1) conference "Transformative Future for Water Security"/TFWS (Cape Town, South Africa, February 15-17); (2) scientific-theoretical conference "Global Initiatives of Tajikistan on Water Issues" (Dushanbe, February 20); (3) workshop "Science for Diplomacy" (OSCE Office, Dushanbe, [March 20-24](#)); (4) 2nd International Summer School "Assessing the sustainability of water-energy-food-ecosystem nexus for irrigated agriculture: interdisciplinary approaches for Central Asia (WEFCA)" (Tashkent, August 21-25); (5) national training on integrated water-energy modelling using the WEAP and LEAP software (Dushanbe, November 15-16); (6) international scientific-practical conference "Mudflow Safety – 50 years of Kazselezaschita's activities: State and Prospects" (Almaty, Kazakhstan, [November 22-24](#)).



2nd International Summer School

Cooperation. The IWPH&E hosted a meeting with the delegation of the Xinjiang Institute of Ecology and Geography at the Chinese Academy of Sciences and signed a Memorandum of Cooperation (Dushanbe, [March 9](#)).

In 2023 the IWPH&E signed the [agreements and memoranda](#) of cooperation also with the River Ecosystems Laboratory of the Environmental Institute at the Ecole Polytechnique Federale de Lausanne/Research Group on Environment & Climate of the Department of Geography at the University of Zurich (March 27), China University of Geosciences (Wuhan)/Xinjiang Institute of Water Resources and Hydropower



Signing of a Memorandum of Cooperation with the Xinjiang Institute of Ecology and Geography

Research (May 22), Northwest Institute of Eco-Environment and Resources of the Chinese Academy of Sciences (June 20), Navoi branch of the Academy of Sciences of the Republic of Uzbekistan (September 15), College of Water Conservancy & Agricultural Engineering of the Shihezi University (October), Institute of Geography and Water Security of the Science Committee at the Ministry of Science and Higher Education of the Republic of Kazakhstan (November), Iran Water Research Institute (December 28).

Media. Prof. Ya.E. Pulatov gave an interview to the correspondent of the NIAT (National Information Agency of Tajikistan) "[Khovar](#)" on the importance of the UN Water Conference held on March 22-24 in New York.

Publications. In 2023, the Institute published 4 issues of its journal "[Water Resources, Power Engineering and Ecology](#)".

Other publications included: monograph by M.S. Safarov, A.R. Fazylov "Remote sensing and monitoring of mudflow-prone mountainous territories of Tajikistan" – Dushanbe: "Promexpo", 2023. – 192 p.; Proceedings of the international scientific-practical conference "[Water resources, innovation, resource and energy saving](#)" – Dushanbe, October 6-7, 2023. – 288 p.

In partnership with the State Enterprise "Research Institute of water engineering and amelioration" (TajikNIIGIM), a book by Ya.E. Pulatov and Kh.U. Yuldashev titled "Water resources, hydrochemical characteristics and reclamation of saline land in the Syr Darya River Basin" was published.

Awards. The Institute staff members – A.R. Fazylov and J.B. Niyazov – were awarded the jubilee medal "50 years of Kazselezaschita" (for work in the area of mudflow control).

On occasion of the 32nd anniversary of Independence of the Republic of Tajikistan, Dr. Gulakhmadzoda Aminjon Abdudzhabor, director of the scientific-educational and analytical division of IWPH&E was granted the Ismaili Somoni Award for young scientists for his outstanding work in science and technology ([August 30](#)).

Source: <https://www.imege.tj/ru/>

Tajikistan. State Enterprise “Tajik Research Institute of Water Engineering and Amelioration” (SE “TajikNIIGiM”)

SE “TajikNIIGiM” was founded in 1978 as a branch of the A.N. Kostyakov All-Union Research Institute of Irrigation and Water Management (VNIIGIM). In 1994, it transformed into the Scientific and Production Association (SPA) “TajikNIIGiM.” Subsequently, in 2009, it was granted the status of a State Enterprise. The Institute encompasses four key research centers: Gissar Research Center; Scientific-Research Center of J. Balkhi district; Sughd Scientific-Research Center; and, Bokhtar Scientific-Engineering Center. The primary focus of the Institute and its affiliated organizations is conducting research and demonstration projects in the field of crop irrigation techniques and technologies.

Activities in 2023

Practical application of research. The Institute's scientists have collaborated closely with farmers in the districts of Danghara, Bobojon Gafurov, Mastchoh, Jayhun, Jaloliddin Balkhi, and Gissar to implement scientific advancements. Notable achievements include: construction of geomembrane reservoirs of 5,000 cubic meters; intensive gardening; slope gardening on an area of 2 hectares, equipped with a drip irrigation system.



Geomembrane reservoir

The Institute also plans to conduct in-depth research on crop irrigation scheduling in the context of climate change in Tajikistan.

Capacity building. The Institute has organized the following events: (1) field day titled “Ways to Prevent Soil Degradation and Increase Productivity Using Innovative Methods: A Case Study of Shahritys District” for representatives of district irrigation and land reclamation organizations and farmers (March 1); (2) lecture on the challenges of agricultural machinery and technological equipment use in Tajikistan delivered to graduates of the Faculty of Agricultural Mechanization at the Sh. Shotemur Tajik Agrarian University (April 8); (3) roundtable discussion on “Conventional and Modern Methods for Determining Flow Velocity and Rate and Their Significance in Water

Resource Development” for representatives of the local irrigation and land reclamation organization, Amu Darya and Vakhsh Basin Authorities, WUAs and farmers (June 22); (4) training sessions on digital protection and information security in the water sector (March) and international and national water law (November 24).



Field day titled “Ways to Prevent Soil Degradation and Increase Productivity Using Innovative Methods: A Case Study of Shahritys District”

By the decision of the Higher Attestation Commission of the Russian Federation, B.S. Sanginova, head of the Irrigation Technique and Technology Department, was awarded the degree of Candidate of Agricultural Sciences in Farming and Crop Production.

Events. A Republican scientific-practical conference titled “Financial and Economic Mechanisms for Improving Water Resources Management for Sustainable Development of Tajikistan” was held on December 15th in Dushanbe.

Cooperation. The Institute maintains ongoing collaborations with various organizations, including: Institute of Water Problems, Hydropower, and Ecology of the National Academy of Sciences of Tajikistan (IWPH&E); Institute of Soil Science and Agrochemistry of the Academy of Agricultural Sciences of Turkmenistan; Tajik Agrarian University named after Sh. Shotemur; All-Russian Hydraulic Engineering and Land Reclamation Research Institute (VNIIGIM); GWP; GWP, SIC ICWC, FAO, UNDP, NRU “TIIAME” and KIRI.

Publications. The Institute's publications in 2023 included: Handbook for Determination of Flow Velocity and Rate in WUAs by the Traditional Method and with the Use of Digital Technologies; Textbook “Land Use and Its Improvement”; Recommendations on use of saline irrigated land in the South-Eastern Zone of Tajikistan; Recommendations on innovative technologies of crop irrigation in the context of climate change in Tajikistan; Guidelines on development of integrated measures for more efficient water and energy use for designed new and modernized old pumping irrigation systems in Tajikistan; Volume VI of the Collection of scientific papers titled “Water

Management: Problems and Ways of Sustainable Development".

Kh. Sharofiddinov's article titled "How do the number of water users and a land reform impact on agricultural water availability?" was published in *ELSEVIER-Agricultural Water Management*, Issue 293, 2024.

Media. The Institute's scientists have been featured on various television channels, including Tajikistan, Safina, MIR, and BBC Tajikistan, as well as on radio programs.

Source: SE TajikNIIGIM



Uzbekistan. Research Institute of Irrigation and Water Problems (RIIWP)

RIIWP is a major research institution in the area of water management and land reclamation in Uzbekistan. One of the main areas of Institute's activity is the research and development on water resources and their use. The Institute includes 15 research laboratories, 5 regional centers (Karakalpakstan, Bukhara, Namangan, Samarkand and Surkhandarya), Water Engineering Center, and Research Consulting Center for Water Saving Technologies.

Activities in 2023

Research. The Institute successfully completed 26 research and development projects, amounting to a total of 6.2 billion UZS. This includes 15 projects funded by water funds (1.2 billion UZS) and 11 projects supported by state scientific-technical programs (4.9 billion UZS).

The Institute is currently implementing several grant-funded projects. (1) Development of Hydraulic Technologies for Soil Moisture Control in Crop Irrigation (WB, \$200,000): constructed shallow drainage systems on a 6-hectare area of the "Karshiev Temurbek" farm in Nishon district, Kashkadarya region, developed and applied an online meter for measuring salinity levels, temperature, and groundwater depth, created 3 physical models to determine shallow drainage parameters; (2) Mechanical and Biochemical Analysis of Sediments of Talimarjan Reservoir³²⁷ (USAID, \$19.95 thousand): conducted mechanical and biochemical analyses of sediments, prepared scientific recommendations for sediment utilization; (3) Supporting an Inclusive Transition to a Green Economy in the Agri-food Sector and Development of a Climate-Smart Uzbek Agriculture Knowledge and Innovation System ([EU-AGRIN](#), UNDP): drip irrigation project implemented in Tashkent region (UZ\$449 million), constructed water intake well, drip irrigation system, and an alternative solar-cell power plant in the "Koshtepa" mahalla of Akkurgan district, procured field research equipment worth \$107,000.

Application of scientific achievements. The Institute has successfully applied its scientific achievements by obtaining patents from the Intellectual Property Agency for the following industrial designs: (1) Hydraulic pressure-control valve for irrigation pipes (No.SAP 02382 of 06.02.2023): this innovative valve has been implemented at a polygon within the "Indorama" cluster in Sardoba district, Syrdarya region; (2) Equipment for determination of water turbidity and seepage flow (No.SAP 02427 of 16.08.2023).³²⁸

The Institute has got 3 copyright certificates for computer programs it has developed: (1) Program for shallow-water equation by control volume method (Certificate No.DGU 27691 of 27.09.2023); (2) Program for irrigation system water balance assessments (Certificate No.DGU 27353 of 08.09.2023), which assesses water balance of irrigation canals, helps to distribute canal water and improve water use; (3) Monitoring of changes in the surface area and banks of water bodies (Certificate No.DGU 31703 of 12.12.2023).

The Institute secured the 3rd position among 105 scientific organizations in the national ranking, based on its research and innovation achievements in 2023.

Capacity building. RIIWP staff members have participated in internships at institutions in China, Germany, Russia, Belarus, Kazakhstan, Poland, and Kyrgyzstan. They have also attended conferences and workshops on implementing new innovative technologies in Tajikistan's water sector.

Currently, 80 doctoral students are actively engaged in research, including 74 PhD students, 6 DSc students, 4 intern researchers, and 15 independent researchers. 5 Institute's researchers successfully defended their PhD theses, and 6 members were promoted to the rank of senior researcher.

Cooperation. The Institute has established partnerships with the following organizations: (1) XIE&G of the

³²⁷ within the framework of the USAID Regional Water and Vulnerable Environment Activity

³²⁸ within the framework of the project "Development of hydro-control technology for the operation of hydraulic facilities with damless water intake from large rivers"

Chinese Academy of Sciences: Jointly drafted and submitted the "Water Resources Management in the Aral Sea Basin" project to the Chinese Science and Technology Center; planned collaborative projects on risk assessment of saline soil, sand storms, and natural environment protection; agreed to implement a joint "3+1" educational program to train scientific personnel; (2) Hungarian University of Agriculture and Life Sciences/MATE: Developing a short-term internship program for RIIWP researchers to learn advanced water resource management technologies; (3) A.N. Kostyakov Research Center for Hydraulic Engineering and Land Reclamation; (4) IVP&GE of NAN KR; (5) Riga Technical University;

(6) State Enterprise "TajikNIIGiM"; (7) Institute for Land Reclamation of the National Academy of Sciences of Belarus (with plans to open a laboratory at RIIWP for scientific justification of subsurface drain characteristics, considering Uzbekistan's soil and land reclamation conditions); (8) NRU "TIAME"; (9) M. Ulugbek NUUZ; (10) Tashkent State Agrarian University; (11)

Tashkent University of Architecture and Civil Engineering; (12) Tashkent State Technical University.

Publications. The Institute has published 26 scientific recommendations and approximately 64 articles³²⁹ in international journals indexed in the Web of Science and Scopus databases.

Additionally, the Institute has published two scientific monographs: (1) M. Ikramova, U. Dalabaev, A. Khodjiev, Kh. Kabilov, O. Ikromov. "Dynamics and evolution of the Amu Darya system in the context of climate change and under anthropogenic impact"// Monograph. "MCHJ Lesson Press" Tashkent. 2023, 162 p.; (2) F.Sadiev, Yu.I. Shirokova, G.K. Paluashova. "Experimental substantiation of desalinization of hardly reclaimable soils using biological and chemical agents"// Monograph. "Renessanspress LLC" Tashkent. 2022, 165 p.

Source: RIIWP

Ukraine. Institute of Water Problems and Land Reclamation of the National Academy of Agrarian Sciences (IWPLR of NAAS)

The IWPLR of NAAS was founded in 1929. The Institute carries out fundamental and applied research in the area of hydraulic engineering, irrigation and drainage, water management, agricultural water supply, land reclamation and environmental monitoring. It deals also with the design of water facilities and water supply and sanitation systems. The Institute offers postgraduate and doctoral programs on: 06.01.02 – "Agricultural land reclamation" (technical, agricultural sciences); 201 – "Agronomy" and 192 – "Construction and civil engineering". In 2022, the Academic Council was established at the Institute for awarding degree of Doctor of Science. 192 – "Construction and civil engineering".

Activities in 2023

Research. The Institute's scientists are currently working on the following fundamental research projects under the NAAS 04 program "Sustainable Water Use, Enhancement of Water Security, Development of Land Reclamation, and Effective Use of Reclaimed Land Under Climate Change": (1) Study of formation of water and nutrient regimes under combination of different irrigation and tillage methods on reclaimed land in the context of climate change (2021-2025, 04.02.00.11F); (2) Study of formation processes and development of scientific and methodological bases for soil water regime management on reclaimed land in current farming practices under climate change conditions (2022-2025, 04.02.00.25F).

The Institute's staff members in Kyiv province have established two experimental sites³³⁰. Agrofirma Kievskaya LLC (Makarovsky district) on 2 ha and Agrotehlab farming enterprise (Boryspil district) on 2.8 ha. These sites are equipped with advanced monitoring equipment, including: mMetosBase digital Internet soil-moisture monitoring station with Watermark 200 SS-5 soil moisture sensors and BBT-II Type tensiometers; digital weather station developed by the IWPLR; digital automatic tensiometer developed by the IWPLR; and, precipitation gauges. These sites will be



Putting into operation of two experimental testing sites

³²⁹ <https://doi.org/10.1051/e3sconf/202336503009>, <https://doi.org/10.1051/e3sconf/202336503016>, <https://doi.org/10.1051/e3sconf/202339201038>, <https://doi.org/10.1063/5.0113295>, <https://doi.org/10.1088/1755-1315/1142/1/012004>, <https://iopscience.iop.org/article/10.1088/1755-1315/1284/1/012042>, <https://www.intechopen.com/chapters/85510>, <https://doi.org/10.1051/e3sconf/202340102007>, <https://doi.org/10.1051/e3sconf/202337602010>, <https://doi.org/10.1051/e3sconf/202340101008>, <https://doi.org/10.1051/e3sconf/202339201039>, <https://doi.org/10.1051/e3sconf/202337101011>, <https://doi.org/10.1051/e3sconf/202340101023>, etc.

³³⁰ as part of the agreement No.DZ/136-2022 dated 21.10.2022 "Development of water-saving technology of pulse drip irrigation" concluded with the Ministry of Education and Science of Ukraine

used for conducting applied and fundamental research on irrigation regimes, assessing the impact of water quality on irrigation equipment performance, and other related studies.

The Institute participated in workshops organized by the European Institute of Innovation and Technology (EIT) Climate-KIC to develop a "Roadmap for Climate-Smart Post-War Recovery in Ukraine." These workshops took place online on February 16th and March 23rd.

Capacity building. The Institute's staff members participated in the following professional development activities: (1) Lecture on modern requirements for preparing scientific papers (Kyiv, April 5); (2) webinars on improving soil management (March 9)³³¹ and professional development³³² (July 19).

During a visit to the "Water Laboratory" of the Water Supply and Sanitation Department of the [Kyiv National University of Construction and Architecture](#)³³³, postgraduate students of the Institute learned operation of the experimental plant that selects types and doses of coagulants for drinking water treatment. An agreement was reached on joint research on water supply (Kyiv, [October 13](#)).

The Institute's scientists conducted a workshop for students at the [National University of Life and Environmental Sciences of Ukraine](#). The workshop focused on micro-irrigation equipment testing procedures, compliance with international and national standards, and relevant normative documents and safety requirements (Kyiv, [September 29](#)).

Events. The IWPLR held online XI international scientific-practical conference "Accelerating changes to overcome the water crisis in Ukraine", the outcomes of which were presented in the [Conference proceedings](#) (Kyiv, March 22).

The Institute's management and scientific staff actively participated in various events: (1) scientific-prac-

tical conference: "Prospects of development of geo-information technologies in the context of climate change" (Kyiv, April 20); (2) international conference "Impact of the Kakhovka Reservoir's Destruction on ecology and economy of the Northern Black Sea Region" (Kyiv, July 27); (3) Field Day (online, August 15); (4) World Water Week (online, August 24); (5) international seminar: "Subsoil and pulse drip irrigation for horticulture" (online, September 7); (6) All-Ukrainian Forum "Small rivers: climate and environmental challenges" (Zviahel, October 4-5); (7) meetings of the Presidium of the National Academy of Agrarian Sciences (Kyiv, September 13, October 25).

Cooperation. The Institute held a meeting with scientists from Wageningen University and the National University of Life and Environmental Sciences of Ukraine to identify promising areas for future collaboration and initiate the formation of scientific teams for joint project proposals.

In October, a delegation from Tajikistan, led by the Ambassador Extraordinary and Plenipotentiary of the Republic of Tajikistan to Ukraine, visited the Institute. The delegation was briefed on the Institute's key activities and achievements, and discussions were held on potential areas for future cooperation.

Publications. In 2023, the Institute published the monograph "Formation of irrigated bioenergetic agro-ecosystems in the forest steppe" edited by the acad. Yu. A. Tarariko. - Kyiv: Agrarna Nauka, 2023. - 128 p.

Media. The Director of the Institute was interviewed by TV channel "1+1" to discuss the environmental, water, and agricultural impacts of the Kakhovka HPP disaster and the consequences of the Kakhovka reservoir's drying up. Additionally, the Director was interviewed by the "Krym. Realii" radio channel on the issue of water shortages in Crimea.

Source: <https://igim.org.ua/>

10.3. International Research Institutes Working on Water Issues in Central Asia

Research Center for Ecology and Environment of Central Asia (RCEECA)

RCEECA was established in May 2013 by the Chinese Academy of Sciences in collaboration with the Kazakh, Kyrgyz and Tajik Academy of Sciences within the framework of "Developing Countries' Science & Education Cooperation" Program.

The Center's primary goal is to advance scientific research in ecology and environmental protection. This includes conducting fundamental and applied

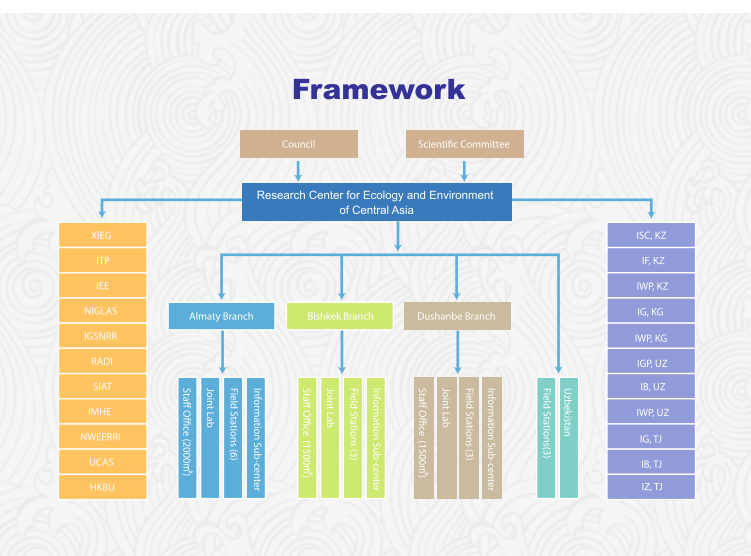
research in natural sciences and training highly qualified scientific personnel through graduate, postgraduate, doctoral, and targeted internship programs.

Currently, RCEECA operates through its Urumqi Headquarter and branches in Almaty, Bishkek, and Dushanbe. It also oversees 3 joint labs, 3 information centers, 15 field observation and research stations,

³³¹ organized by FAO, the Global Soil Partnership GSP and the German Environment Agency/Umweltbundesamt, UBA

³³² organized by the Center for Studies in Higher Education/CSHE at the Goldman School of Public Policy, University of California

³³³ as part of the cooperation agreement between the institutes



and 4 experimental and demonstration sites for agricultural and environmental technologies across Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan.

Activities in 2023

Research. As part of the project "History and Current Development of Riparian Forests in Uzbekistan in the context of Global Hydroclimatic Changes and Human Impacts"³³⁴, an expedition was conducted to assess the impact of hydrological and climatic changes on ecosystems in the Amu Darya, Syr Darya, and Zarafshan basins. The findings of this research will inform more sustainable water resource management, riparian forest conservation, and ecological restoration (Uzbekistan, April 22-May 1).

Recent activities included: (1) conducting UAV-based aerial surveys of the Maykhura River basin as part of the "Application of Unmanned Aerial Vehicles (UAV) for Monitoring the Typical Mountain Hazards in Tajikistan" project³³⁵; (2) collaborating with French geologists and paleontologists to study Eocene deposits in the Shibdara, Peshtova, Shuri-Bolo, and Argankul-Khibshon areas; (3) monitoring the state of glaciers and glacial lakes in the Surkhob River basin using UAV technology.

Capacity building. RCEECA jointly with the XIE&G of CAS and National Ecosystem Science Data Center

held the "International Training Course on Terrestrial Ecological Monitoring Techniques and their Application in Central and West Asia" for experts from Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, Iran and Mongolia (Urumqi, PRC, September).



Events. Key events organized included: (1) International Symposium "One Belt, One Road" on sustainable development and natural disaster monitoring³³⁶ (Shenzhen, PRC, May 22); (2) I China-Iran Caspian Sea Ecosystem Symposium³³⁷ (Sari City, Mazandaran Province, Iran, July 8-9); (3) Issyk-Kul Forum "Actual issues of environmental research for sustainable development in arid zones"³³⁸ (Chok-Tal village, Issyk-Kul, August 16-17); (4) International Forum on Sustainable Development of Ecology and Environment in the Silk Road Economic Belt³³⁹ (Urumqi, September 18-19); (5) III International Symposium HiMAC 2023 (Urumqi, November 29-December 1).

A kick-off meeting was held for the China-Tajikistan Intergovernmental Cooperation in International Science and Technology Innovation Project. Information was presented on four sub-projects: Assessment of degradation and sustainable utilization of grassland resources in Tajikistan; Study on water volume change and balance of Lake Sarez in Tajikistan; Dynamic monitoring and early prediction of agricultural drought and locust plague in Tajikistan; RS-based accurate monitoring and potential risk assessment on plateau-quake lake under sky-ground coordination (Dushanbe, Tajikistan, July 21).

³³⁴ Innovative Development Agency of the Republic of Uzbekistan, XIE&G of the Chinese Academy of Sciences, Bishkek branch of RCEECA, Institute of Botany of the Academy of Sciences of the Republic of Uzbekistan

³³⁵ jointly with the scientists of the State Scientific Organization "Center for Glacier Research" at the National Academy of Sciences of Tajikistan, XIE&G of CAS and others

³³⁶ jointly with Shenzhen Institute of Advanced Technology of the Chinese Academy of Sciences, XIE&G of CAS and the Kazakh Scientific Research Institute of Soil Science and Agrochemistry named after U. Usmanov

³³⁷ jointly with the Sari Agricultural Sciences and Natural Resources University

³³⁸ jointly with XIE&G of CAS, National Academy of Sciences of the Kyrgyz Republic, Xinjiang Agricultural University, Institutes of Geology, Biology, Water Problems and Hydropower of the National Academy of Sciences of the Kyrgyz Republic

³³⁹ jointly with XIE&G of CAS and the Northwest Institute of Ecological Environment and Resources of the Chinese Academy of Sciences





SECTION

Key Water Developments in the World

11.1. Africa

The Grand Ethiopian Renaissance Dam on the Nile River. In 2023, Ethiopia [completed the fourth and final filling](#) of its huge Grand Ethiopian Renaissance Dam (GERD) situated on the Nile, near the Sudanese border. Dam's filling was initiated in the summer of 2020 causing concerns among the downstream nations such as Egypt and Sudan. Negotiations regarding the dam have oscillated for more than a decade. Mediation efforts by entities such as the United States and the African Union (AU) have [failed to yield a consensus](#). The AU's last sponsored direct negotiations on the dam occurred in 2021. Egypt, Ethiopia and Sudan resumed talks in July to work out a final plan by the end of 2023 for managing the project in a way that protects all three countries' interests. There were four rounds of negotiations since then. According to Egypt, the last fourth round of talks has failed. Egypt and Ethiopia [blame each other](#) for unwilling to compromise. The government in Cairo has long opposed the project because of worries about its future supplies of water from the Nile, on which it is heavily dependent. Ethiopia argues that it is exercising its right to economic development.

African Development Bank (AfDB) and the United Kingdom signed an agreement to fund up to U.S. \$ 2 billion in climate projects in Africa (Accra, Ghana, [May 25](#)). Two projects have already been identified as the first to benefit from the Room to Run financing mechanism. These are the El Asfar Wastewater Treatment Plant (WWTP) in Egypt which will be implementing a project on the reuse of treated wastewater in agriculture. In Senegal, the AfDB will finance a project providing sustainable and climate resilient access to safe water and sanitation services to some 1.45 million people. The governments of **Malawi** and **South Sudan** announced the launch of Presidential Compacts³⁴⁰ on Water and Sanitation (Stockholm, Sweden [August 21](#)). In the case of Malawi, in support of the \$145 million in funding received from the World Bank, the Compact will provide a blueprint for rebuilding water and sanitation infrastructure and enhancing climate resiliency following the devastation from Cyclone Freddy. In the case of South Sudan, the country has earmarked \$56 million to increase access to sanitation and also promised to expedite the passing of Water Bill 2014 to ensure a safe water supply.

Morocco will receive a 100-million-euro [loan](#) from EIB to help implement its strategy for boosting water and forestry sector resilience. The funds will be used to modernize and enhance the competitiveness of the water and forestry sector in Morocco, with a focus on climate change adaptation and biodiversity promotion.

WaterAid **Nigeria**³⁴¹ formally [launched](#) a new five-year [Country Program Strategy](#) for 2023-2028, to improve access to basic water and sanitation services.

The Country Program Strategy aims to improve access to clean water, sanitation and promote good hygiene for 17 million Nigerians.

The government of **Tanzania** has [announced](#) that it will launch a \$20 billion water investment program in the course of 2023. The aim of the program, which will run from 2023 to 2030, will be to boost water security in Tanzania through investments in four key areas: (1) investments to improve access to water and sanitation services, the promotion of gender equality and social inclusion, and livelihood improvement; (2) water governance by strengthening institutions, investing in human resources development, and leveraging other investments; (3) facilitating economic development; (4) improving climate resilience and environmental sustainability.

Heatwave and drought leave **Tunisia** farmers [struggling to survive](#). Farmers in northern Tunisia say conditions are getting progressively worse despite government efforts to combat climate change. There's a serious water scarcity, the wells are getting dry and the government is putting too many restrictions on water use. Satellite footage of Tunisia's water reserves taken before the current bout of extreme heat paints a stark picture. Levels in none of Tunisia's reservoirs exceeded 31%, while the country's largest freshwater reserve, the Sidi Salem reservoir west of Tunis, is only about 16% full. The capital and its surroundings have been earmarked as of special risk of water scarcity. In late March, SONEDE, the agency that manages Tunisia's water, announced that it would be cutting supplies to households from 9pm nightly, and prohibited its use for washing cars and cleaning public spaces. Those found to be infringing upon the new laws faced a fine and imprisonment of anything of up to six months.

South Africa sets ambitious plan for \$1.5B water project. The project aims at supplying major platinum and chrome operations, as well as hundreds of thousands of people with drinking water is anticipated to be finalized by 2030. It is planned to construct 400 kilometers of pipelines, delivering 250 million liters of water per day, which is approximately one-third of Cape Town's daily consumption. The project will also provide water to the city of Polokwane and the town of Mookgophong, located north of Johannesburg. This initiative represents a [significant departure from the usual approach](#) in South Africa, where the state has historically led water infrastructure projects, particularly of this magnitude. The world's largest mining companies *Glencore* and *Anglo American Platinum* were among the companies striving to secure half of the required financing by the end of the year, while the remaining funds would be sourced from municipalities and the government.

³⁴⁰ The Compacts are a part of an initiative by the heads of state aimed at developing water supply and sanitation services all over the world. The initiative was launched at Stockholm Water Week. See details on: <https://www.sanitationandwaterforall.org/heads-state-initiatives>

³⁴¹ International non-government organization dealing with WASH

South Africa and **Cuba** strengthen cooperation in the water sector. The island's specialists are currently working in South Africa in the operation and maintenance of pumping stations and systems, as well as in reservoirs associated with electricity generation, mining industries and food production. They are also involved in hydraulic and civil engineering work on

regional infrastructure projects, cost control associated with their development in municipalities, and drought relief programs. The parties agreed to work together on the development of green energy, including hydropower, as well as to address climate change and its impact on infrastructure and national disaster management.

11.2. Asia

Afghanistan

Economy. Afghanistan's economy remains exceedingly fragile, and the food insecurity remains alarmingly high. In October, during the postharvest season, approximately 13.1 million people are facing high level of **acute food insecurity**. In 2023, Afghanistan's **total exports** reached \$1.9 billion, a modest increase of 0.4 percent from the previous year. In particular: (1) food exports grew by 13% to \$1.3 billion; (2) textile exports also experienced notable growth, surging by 46% to reach \$281 million; (3) coal exports saw a 46% reduction.

Imports, more than half of which is comprised of food, textile and minerals, surged to \$7.8 billion, a 23% increase. Particularly: (1) food imports, accounting for 22% of the total, grew by 9% to \$1.7 billion; (2) minerals (fuel, mineral oils, salt, and sulfur) contributed 20% to total imports, rising by 15% (to \$1.6 billion); (3) textile imports increased by 11% percent (to \$0.72 billion).

The agriculture sector is a core component of Afghanistan's national economy. The country needs over 6 million tons of wheat every year from which 4.5 million tones are produced inside the country and the remaining 1.5 million tons are imported from abroad. The industrial sector also saw a contraction of 5.7% last year, as businesses – especially those owned by women – faced closures due to limited access to resources and financial challenges. Almost two thirds of Afghan families face significant challenges to keep their livelihoods.

Extremes. 2023 has become the third consecutive year of drought in the north and south Afghanistan. According to **FAO's assessment**, this drought was categorized as extreme and severe. In July, flash floods caused significant damage: as of 30 July, approximately 126,000 people have been affected by the disaster in 18 provinces, 1,360 residential houses have been partially or completely damaged, over 13,023 hectares of agricultural land have been washed away, and at least 1,128 livestock have been killed. The prolonged drought has aggravated the damage from floods since reduced soil capacity to absorb water.

Water infrastructure. The Taliban government in Afghanistan is **going ahead** with plans to build dams on major rivers as a source of hydropower, to provide irrigation facilities so that farmers in several drought-prone areas might revert to farming and not the least, to secure the country's freshwater supply.

Dam on Kunar River is an ambitious project, construction plans of which are already impacting the fluctuating political relations between Afghanistan and Pakistan. Kabul's decision to remedy its water shortages has been a source of considerable alarm for Pakistan, which believes that the Islamic Emirate's unilateral decision to construct a dam on the Kunar River amounts to a hostile act.

The Qosh Tepa Canal. This 285-kilometer canal is designed to provide irrigation for 550,000 hectares of land by redirecting 25% of the Amu Darya River's flow. Construction is planned to last to 2028, and the canal will be put into operation in three phases. The first phase – launch of the first 108 km – was completed on October 11th. The same day the second stage of the next 65 km has been launched. Over 8 billion Afghani has been allocated from the national budget for the first phase. 6,500 workers and over 4,000 pieces of equipment were engaged in the construction. The third phase is to create an irrigation network in Faryab, Balkh and Jawzjan provinces. This would create approximately 200,000 new job places. The satellite monitoring by UzbekCosmos showed on November 4th a water breakout on a 75.6 km on the right bank. The flooded area increased from **19.5 km² on November 5th to 23.8 km² on November 25th** and reached **30.3 km² by December 13th**.

The **completion** of **Kajaki dam** has resulted in a power capacity increase from 51 to 151 MW. Besides supplying electricity to Helmand, the dam now serves Kandahar as well. The Islamic Emirate of Afghanistan is steadfast in its commitment to domestic energy production. Efforts to generate electricity from natural gas in Jawzjan Province and harness wind energy in Herat Province are already underway. The goal is to prioritize the production of 200 MW of electricity and explore further renewable energy sources.

Kamal Khan, Shah Wa Aros, Pashdan, and Bakhshabad dams. The National Development Corporation has commenced the remaining works of the Kamal Khan Dam, which is expected to store 52 million cubic meters of water, irrigate 174,000 hectares of land, and generate approximately 9 MW of electricity. The ongoing construction of the Shah Wa Aros Dam, upon completion, will provide Kabul city with 5 million cubic meters of drinking water annually, irrigate 2,700 hectares of agricultural land, and generate 1.2 MW of electricity. The preliminary works for the Bakhshabad Dam have also begun, with an annual storage capacity of 1,360 million cubic meters of water. This dam has the potential to irrigate up to 100,000 hecta-

res of desert land and generate 27 MW of electricity. It will play a pivotal role in groundwater replenishment, flood control, and overall surface water management.

Humanitarian aid. Overall, the [humanitarian response](#) has reached 23.7 million people in 2023, with 20.8 million receiving direct aid at \$906 million by August. Despite the crisis scale, the humanitarian response plan is underfinanced, with 26.8% received only out of \$3.2 billion (the initial planned amount was \$4.6 billion).

The U.S. Government [aid amounted to](#), through international organizations: \$168 million (**implementing partners**); \$500,000 (FAO); \$430,000 (IOM³⁴²); \$1.2 million (OCHA³⁴³); \$8.3 million (UNFPA³⁴⁴); \$35 million (UNICEF); \$422 million (WFP); \$7 million (WHO), etc. The total financing reached **\$844 million**. Thanks to USAID's food-for-work effort, 10,000 Afghans across the country have [received baskets of food](#) for their work to rehabilitate irrigation systems. WB have continued to [provide support](#) for basic services and livelihoods in health, agriculture, and education, with more than \$1 billion in off-budget support implemented.

In 2024, [more than half](#) of Afghanistan's population will require humanitarian assistance. Communities highlighted food as a top need, in addition to health care services, education and water, sanitation and hygiene (WASH). Nearly half of households emphasized the importance of livelihood support.

China

China saw investment in water resources management [reach](#) a historical high in 2023. Almost 1.2 trillion yuan (\$166.7 billion) of investment was made for water resources management projects across the country last year, up by 10.1 percent year-on-year. The ministry managed to accomplish a total of 41,014 projects on flood control, water supply, irrigation, and ecological conservation. 13,083 projects were carried out in basins of the country's eight major water bodies, including the Yangtze, the Yellow River, and the Huaihe River, to enhance their flood control systems. The investment for these projects, many of which are for constructing reservoirs, dikes, and flood storage basins, reached 328.2 billion yuan. Over 8,000 projects with a total investment of 220.4 billion yuan were implemented to strengthen the ecological conservation of major rivers.

China has launched a large-scale operation to clean the Yellow River bed from sediment. It is not the first year that the river has been undergoing a coordinated release of water from several reservoirs. The aim of the 20-day operation is to flush out the loess sediment that is abundant in the country's second-largest waterway. By alternately opening the spillways of the

reservoirs, the riverbed is effectively cleared of sediment. By the end of the operation, more than 80 million tonnes of mud and sand will have been removed from the Huang He. Thanks to years of water level control, the sediment situation in the lower reaches of the Huang He has improved significantly. The channel has become wider and the negative impact on the river floodplain during floods has been reduced.

Ministry of Ecology and Environment [released](#) 2023 Report on the state of ecology and environment in China. According to the Report: (1) groundwater quality remained stable, with slight improvement; (2) surface water quality continues improving – water sections meeting Grade I-III standard³⁴⁵ increased from 87.9% in 2022 to 89.4% in 2023; sections with water quality inferior to Grade V+ remained the same – 0.7%; (3) all seven major river basins meet the targets of “Water Ten Plan” – Grade I-III standard >70% и V+ <5%; (4) four large river basins (Yangtze, Pearl, Huaihe and Haihe) were excluded from Grade V+; (5) more than 250,000 sewage outlets into rivers have been investigated, and about a third of them had completed rectification; (6) 70% of black and odors water bodies in country-level cities have been eliminated.

**Water Quality of China Main River Basins 2023
& comparison to 2022**

	Grade I-III	Grade IV-V	Grade V+
Yangtze	98.5% (+0.4%)	1.5% (-0.4%)	0.0% (0.0%)
Pearl	95.3% (+1.1%)	4.7% (-0.7%)	0.0% (-0.3%)
Yellow	91.0% (+3.5%)	7.5% (-2.8%)	1.5% (-0.8%)
Songhua	74.9% (+4.4%)	22.3% (-5.2%)	2.7% (+0.7%)
Huai	87.1% (+2.6%)	12.9% (-2.7%)	0.0% (0.0%)
Hai	79.3% (+4.5%)	20.7% (-4.5%)	0.0% (0.0%)
Liao	83.9% (-0.6%)	15.6% (+0.1%)	0.5% (+0.5%)

Note: (+) means improvement for Grade I-III but deterioration for Grade IV-V and Grade V+ between 2022-2023; on the other hand, (-) means deterioration for Grade I-III but improvement for Grade IV-V and Grade V+.

Source: CWR, MEE State of Ecology & Environment Report 2023

Climate litigation takes its first steps in China. China's highest court has released a guidance document on [climate change-related cases](#), which is a strong indication that the state is backing climate litigation as an effective channel to address environment

³⁴⁵ Grades: I – source water; II – primary protected zones of centralized domestic drinking water sources, rare aquatic habitats (and some other uses); III – secondary protection zones of centralized domestic drinking water sources (and some other uses); IV – industrial use and recreational purposes that do not involve skin contact; V – agricultural water areas; V+ – hardly any function

challenges. The new move will encourage China's public interest prosecutors to bring climate cases to court and pressure local governments and businesses to abide more strictly by emerging environmental laws.

In the past 50 years, glaciers on the Tibetan Plateau have shrunk by about 15 percent. According to research from the Chinese Academy of Sciences, the [use of geotextile](#) may slow melting of glaciers. In this context, scientists at Nanjing University have covered most of the Dagu Glacier in the Tibetan region with white sheets in an attempt to slow its melting caused by abrupt temperature rise and climate change. A study showed that a blanket installed over part of the Dagu Glacier was effective at slowing melting, with the covered area showing 15 percent less mass loss than uncovered areas. However, there are some limitations for using blankets, including high expenses, harsh geography and environmental impact of production of these textiles.



Dagu Glacier in the Tibetan region
Photocredit: Tencent

China has made significant progress in its **greening efforts** in 2023, with about 8.33 million ha of trees and grasses planted. Land restoration efforts have been taken on 1.9 million ha. However, a holistic approach is needed for protection of mountain, aquatic, forest, agricultural, steppe and desert resources and their management, as well as for further support of forest economy and ecotourism.

Southwest China's **Xizang Autonomous Region** has completed its first [water-use rights trade](#), with an agreement signed between Lhozhag County and Konggar County of the region's city of Shannan. Water-use rights trading allows for the buying and selling of water-use quotas to reallocate water resources through a market-based approach. A total of 1.81 million cubic meters of water will be transacted between the two counties, with a total transaction value amounting to about \$25,341.

In the Chinese Northern **province of Hubei**, a [water tax reform](#) model has been developed. The model presents four key scenarios: S0, which involves no water resource tax; S1, where a tax rate is based on

surface and groundwater use in all industries; S2, which imposes a 5% higher tax rate on water-intensive industries; and S3, proposing a high tax rate on industries with substantial water consumption and offering tax refunds to water users through subsidies. These scenarios consider various water sources, including conventional water (surface and groundwater) and unconventional water, which is not subject to water resource taxes. The total water consumption is calculated as the sum of conventional and unconventional sources.

The vast territory of **Hebei province** has encountered heavy precipitation since July 27. The average precipitation exceeded 146 mm, the equivalent of 27.5 billion m³, which is twice as more the total capacity of large and medium reservoirs in the province. 1.2 million have to be evacuated as a result of flooding.

Other Asian Countries

Vietnam. The 2023 rainy season began a month earlier than usual in southern Vietnam, where the second largest city of the country **Ho Chi Minh** is located, arriving in April. Ho Chi Minh City is one of the world's fastest-sinking coastal cities, alongside Tianjin and Shanghai in China, and Semarang and Jakarta in Indonesia. The city is also at increasing risk of substantial flooding from rising sea levels: a one-metre rise would be enough to submerge a fifth of the city by 2100. Ho Chi Minh is also criss-crossed by a network of tide-influenced rivers and canals that covers approximately 21% of the city. The government is currently betting on engineering to hold back the water in this city but with slow progress. Alongside large-scale engineering interventions, it is proposed to deploy "small-scale [rainwater detention measures](#)" (also known as the 'sponge city' approach), such as installing green roofs, rain barrels, porous sidewalks and water-detention basins as a "highly complementary adaptation pathway".



Ho Chi Minh City's District 8 is a low-lying, historically swampy area that has been built over in recent years, hindering water drainage

Cambodia. The World Bank has approved a \$163 million project to support Cambodia's efforts to [strengthen water supply](#) and sanitation services in four pro-

vinces, benefiting over 175,000 people. The six-year Water Supply and Sanitation Acceleration Project will support government actions to increase access to safe water supply and sanitation, improve the operation and maintenance of existing systems, and ensure the sustainability of services.

Japan. IAEA confirmed that Japan had **begun discharging** treated radioactive wastewater from the disabled Fukushima-1 Nuclear Power Station into the Pacific Ocean, 12 years on from the major meltdown there. The water has been used to cool the plant's reactors. Experts from the IAEA were present to monitor and assess that all relevant international safety standards were applied. An IAEA **report** said Japan's approach and activities to discharge the treated water were "consistent with relevant international safety standards". Furthermore, the "controlled, gradual discharges" of the treated water would have a "negligible radiological impact" on people and the environment. Japan's decision to release the treated water into the sea drew criticism both at home and in some neighboring countries. Protests have occurred there and in the Republic of Korea. China also announced that it will immediately ban seafood from Japan.

India. ADB has approved a **\$200 million loan** to strengthen flood and riverbank erosion risk management along the main stem of the Brahmaputra River in **Assam**. By stabilizing 60 km of banks, installing 32 km of pro-siltation measures, and building 4 km of climate-resilient flood embankments in five high-priority districts, the project will secure living spaces, support livelihoods, create employment opportunities, and ultimately enhance the navigability of the river. It will advance the institutional capacity in flood forecasting and warning systems, modern surveys, erosion and embankment breach modeling, asset management, flood risk mapping, land use planning, and pilot nature-based solutions and the graduation approach.

Delhi constructs **rainwater harvesting pits** to capture water during the monsoon and recharge aquifers. The installation of rainwater harvesting systems was made mandatory in 2012 for all plots exceeding an area of 100 m² and for buildings whose water discharge during rains can exceed 10,000 litres per day. Furthermore, new water connections to households are only approved if the building plans include a rainwater harvesting system. These measures are to satisfy the demand of the population of 21 million for some 477,000m³ of water per day.

Large River Basins in South Asia

Mekong River Basin

NGO China Water Risk released a **report** on the state of 10 rivers in the Hindu Kush-Himalayas region titled "No River, No Power: Can Asia's Rivers Power Growth in Changing Climate?", which analyses a third of global power generation capacity to find that escalating climate risks and rivers running dry can strand sizeable portions of national power generation assets. The information on the Mekong River is shown below.



NO RIVER, NO POWER
Can Asia's rivers power growth in a changing climate?

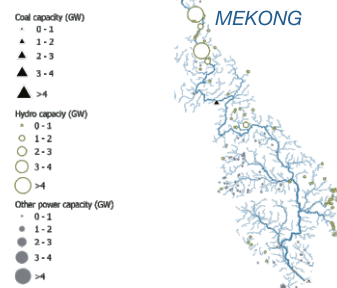
MEKONG RIVER

Mekong River flows over 4,800 km through six countries. Due to its seasonal variation in water level and the range of wetland habitats, the river is rich in biodiversity and productivity. The ecosystems supported by the river are fundamental to the viability of natural resource-based rural livelihoods of a population of 60mn people living in the Lower Mekong Basin.

To achieve optimal basin development, the six riparian countries are cooperating through various stakeholder groups such as the Lancang-Mekong Cooperation & the Mekong River Commission. Together, they are working to expand beyond transboundary water management to include improving connectivity, production capacity, economic cooperation, agriculture, water resource management and poverty alleviation. Hydropower clearly dominates the power generation capacity in this river basin.

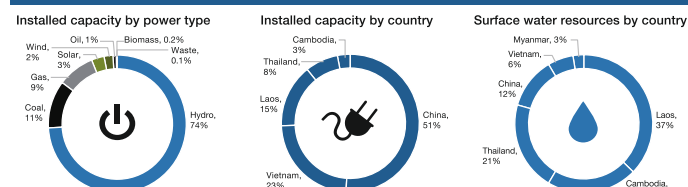
THE MEKONG RIVER BASIN

Length	4,800 km
Basin Area	0.81-0.90 million km ²
Annual flow	390-492 billion m ³
Flow through	China, Myanmar, Laos, Thailand, Cambodia, Vietnam
Share of ice & snow melt in upper reach	22-33% of runoff
Average surface water resources	588 billion m ³
Basin Population	57 million
Basin GDP in 2015	US\$160 billion (constant 2010 price)

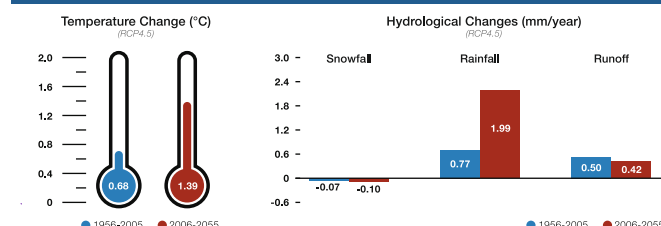


Note: Other power types include gas, solar, wind, oil, nuclear, biomass, geothermal and waste

34 GW OF INSTALLED POWER CAPACITY ON THE MEKONG



CLIMATE CHANGE: PAST & FUTURE TREND



Source: CWR, CWR's Report "No River, No Growth - Does Asia have enough water to develop?", 2018, Center for Water Resources Research, Chinese Academy of Sciences, Global Power Plant Database. The factbook is part of CWR's Report "No River, No Power - Can Asia's rivers power growth in a changing climate?" 2023 and should be read in conjunction with this report.

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The 4th Mekong River Commission (MRC) International Conference of Stakeholders was held with the theme "Innovation and Cooperation for a Water Secure and Sustainable Mekong" on April 2-5 in Laos. Representatives of the parties and regional and global experts presented and discussed the most up-to-date perceptions and innovative solutions around the problems of the Mekong River and other river basins. The participants **adopted** a landmark **declaration** reiterating the region's commitment to cooperate and safeguard a beleaguered river that's the lifeblood for some 70 million of their citizens. The Declaration states that while development opportunities exist to benefit from large water infrastructure projects, including hydropower, there is urgency to address the "growing risks and trade-offs" – especially, "adverse impacts, including transboundary impacts." These are further exacerbated by climate change-fueled floods and drought. In response, the Declaration calls for the MRC, its partners and other stakeholders in this region to further "intensify cooperation" and seek "innovative solutions." The Declaration appeals for greater coordination from an industry accustomed to private, autonomous decision-making on when to withhold or

release water; expresses the “highest political commitment” from each country’s leadership, for the multi-pronged role of the intergovernmental MRC: the MRC serves as a treaty-based forum for “water diplomacy” that aims to strike a balance between maximizing the benefits of development, while minimizing any harm to either the environment or the fishing and farming families. The Declaration also enshrines the essential MRC role as a “regional knowledge hub” dedicated to implementing “basin-wide strategies, procedures, guidelines and data- and information-sharing, that drives peaceful and mutually beneficial cooperation to achieve our shared vision.”

Politicians and experts expressed their anticipation for **Lancang-Mekong Cooperation (LMC)**³⁴⁶ to entering a new golden era in the next five years amid laudable achievements in recent years at the 2023 LMC Week Activities on Water Resources successfully held in Beijing (May 26). Representatives from the relevant riparian countries offered active suggestions on the Five-year Plan of Action Lancang-Mekong Water Resources Cooperation (2023-2027) and appealed for joint efforts in promoting technical exchanges, joint research, and pragmatic projects that directly serve people’s livelihoods in the fields of climate change adaptation, flood and drought disasters management, water information monitoring, technical standards and specifications, as well as infrastructure construction related to water, and other areas of common interest. In particular, the countries agreed to jointly build a demonstration zone for high-quality construction of the Belt and Road Initiative (BRI), an early zone for the Global Development Initiative (GDI) and an experimental zone for the Global Security Initiative (GSI).

PRC’s hydroelectric dams threaten Mekong River. In recent years, Mekong’s water levels have been among

the **lowest recorded**. Much of the vital sediment, which 15 years ago was estimated at 143 million tons yearly, is being blocked. Such conditions **contribute to** food insecurity and environmental crises for nearly 60 million people downstream. While acknowledging the role of climate change, experts say there is a direct culprit for the river’s woes: the PRC’s construction of 95 hydroelectric dams on the upper Mekong. Since 1995, China also has built 11 main-stream mega-dams, with more planned, and helped build two dams in Laos. It is not only the dams, but how they are managed that contributes to the crises downstream, with analysts contending that Beijing acts with little regard for other Mekong nations. The MRC estimates that by 2040 less than 5 million tons of river-borne soils will reach the delta each year. The commission works with member nations to manage water resources. The PRC, however, has not signed a water-sharing agreement with its neighbors.

Indus River Basin

On 6 July 2023, the **Court of Arbitration in Hague rendered its Award** on the Competence of the Court, in an arbitration initiated by the Islamic Republic of Pakistan against the Republic of India under the Indus Waters Treaty. In these proceedings, Pakistan requests the Court of Arbitration to address the interpretation and application of the Indus Waters Treaty to certain design elements of the run-of-river hydroelectric projects that India is permitted by the Treaty to construct on the tributaries of the Indus, Jhelum, and Chenab, before those rivers flow into Pakistan. In the Award, the Court carefully considered **objections** to the competence of the Court raised by India. In a unanimous decision, which is binding on the Parties and without appeal, the Court rejected each of the objections raised by India and determined that the Court is competent to consider and determine the disputes set forth in Pakistan’s Request for Arbitration.

11.3. America

In 2023, **the three out of seven states that make up the Colorado River Basin reached consensus on water conservation deal**. The Lower Basin states – Arizona, California and Nevada – have committed to conserving at least 3 million-acre-feet of river system water through the end of 2026 to address **ongoing severe drought conditions** along the river basin. Current operating guidelines are set to expire that year. More than two thirds of the expanded conservation efforts by the states will be financially compensated by the federal government. About 700,000 of the proposed volume would be voluntarily conserved without compensation.

Measures to protect the Colorado River Basin, which has been suffering from the impacts of drought since 2020. The U.S. Bureau of Reclamation in the Department of Interior has drafted a set of **three different**

options to preserve the water in the Colorado River Basin: a do-nothing scenario, a scenario in which states are allocated water rights based on the seniority of their rights, and a scenario in which each state must cut its water use by 13% beyond cutbacks in demand that have already been agreed to.

The water levels in the river’s main reservoirs – Lake Powell and Lake Mead – have recently fallen to critically low levels. At the beginning of December 2022, the river’s various water storage systems were only 28% full, triggering emergency water sharing measures between the United States and Mexico. The Bureau of Reclamation had also given the seven basin states until the end of January to discuss a new joint agreement of water reductions. The current options being presented relate to a revision of the short- and medium-term operating guidelines for the

³⁴⁶ LMC, formed in 2016, includes six countries, such as China, Thailand, Cambodia, Laos, Myanmar, and Vietnam

People were able to walk to Tower Rock, normally only accessible by boat, on October 19 2022, in Perry County, Missouri. Jeff Roberson/AP



Hoover and Glen Canyon dams as well as the allocations to the different states in the basin.

Mississippi River. Water levels along the Mississippi River are plummeting for the second year in a row. The drought comes as a critical harvest season approaches. Water level dropped below the baseline – to 3.24 m on September 28. A unique nature reserve Tower Rock normally only reachable by boat is accessible by foot for the second year in a row due to the [current situation](#). The US Army Corps of Engineers is making an underwater levee larger to prevent saltwater intrusion into drinking water systems of New Orleans.

The largest dam removal project in United States history is underway. Until the end of 2024, one reservoir will be emptied and four dams will be [demolished](#) on the Klamath River along the California-Oregon border. More than 2,000 dams have been removed in the U.S, with the bulk of those having come down within the last 25 years, but that on the Klamath River is the largest one.

Although the hydroelectric power generated by dams is considered a cheaper, clean, and renewable energy source, it causes significant environmental harm. These impacts include river shallowing due to substantial evaporation from the reservoir's surface, algal blooms leading to water toxicity, and barriers to fish migration routes. In particular, wild salmon in North America faces the threat of widespread extinction. However, upon the completion of the Klamath River project, over 600 kilometers of river will be reopened for salmon spawning.

The right to water in Mexico. In 2023, the Supreme Court of Justice of the Nation (SCJN) published two [decisions](#). Last April, the highest judicial authority protected a group of people and organizations against the Ministry of the Environment and Natural Resources (Semarnat), the National Water Commission (Conagua) and the Organismo de Cuencas Centrales del Norte, forcing them to take measures to preserve the main aquifer of the lagoon area of the state of Coahuila. The complaint dates back, at least, to 2021 when it was revealed that Conagua continued to grant exploitation permits to companies and residential developments, despite the depletion of this aquifer being proven. It was also found that the agency was not doing enough to stop illegal exploitation of the resource. The SCJN determined that the plaintiffs had the right to force Conagua to comply with an aquifer rescue program, as well as to stop being omisive in its supervision. Another relevant case is a lawsuit that was carried out in the municipality of Ecatepec, in the State of Mexico, where the municipal government is accused of not providing water service and for this reason it was intended to remove the mayor. The Supreme Court took up the case, focusing on determining whether the municipality is obliged to provide water to people who have not paid for the service and do not have a water contract.

Farmers in Chihuahua State in **Mexico** have approached the government to [reserve water](#) for irrigation rather than releasing it in order to comply with a treaty obligation to share water with the US. In 2020, protestors occupied the site of the La Boquilla Dam to protest an impending release of some 36 million m³ of

water from the reservoir. Technical reports of accumulated water deliveries from Mexico over the past five years showed a shortfall which was to be met by the 24th of October. Mexico has reportedly relied on waters downstream of the dam to meet its treaty obligations rather than making use of reservoir water.

No region of **Canada** has gone completely untouched by 2023's [devastating wildfire season](#). More than 15 million hectares have gone up in smoke across the country this year, shattering the previous record of 7.6 million hectares in 1989. By September, 6,118 wildfires have been reported across Canada. Nearly 200,000 Canadians have been placed under an evacuation order this season.

In **Brazil**, the **Amazon** River has fallen to its lowest level in 120 years, reaching 13.59 meters. For comparison, during the same period in 2022, the river's level was at 17.6 meters. This significant drop is attributed to a severe drought caused by the El Niño phenomenon, which originates from underwater ocean currents and triggers extreme weather events worldwide.

ClientEarth has [filed a legal complaint](#) against US-based agricultural giant Cargill over its failure to adequately deal with its contribution to soy-driven deforestation and human rights violations in Brazil. This is the first time the company – the largest privately held firm in the United States with annual revenue of \$165 billion – will face legal action in the US related to its deforestation footprint in the Amazon rainforest, Atlantic Forest and Cerrado savanna.

Panama Canal experiences lowest water levels in history. El Nino and climate change are currently [affecting](#) international trade. Although this is not the worst drought Panama has ever experienced, it could be a very long one, with serious consequences for the global economy. Water levels in Lake Gatún, which feeds the waterway, were at 24.2 meters last week, compared with 26.6 meters for the month of September in recent years. This could trigger further restrictions in navigation.

Since 2020, the Canal has been implementing the Water Program, an initiative that includes the identification and execution of a series of projects that would guarantee the availability of water to supply the population's consumption and ensure the waterway's operation for the next 50 years. Since technical solutions within the jurisdiction of the Panama Canal are not sufficient, there are also external solutions which are not part of the Panama Canal watershed, e.g. a project for additional reservoirs that would require a change in legislation.

Uruguay is currently facing its worst drought in 74 years. The city of Montevideo relies for its water supply on the **Paso Severino Dam**³⁴⁷, but dam's levels have been dropping. The authorities declared a [state of emergency](#). Dam's level reached just 4.6 million hm³ in early June, or 6.6% of total capacity. Water managers at the Aguas Corrientes water treatment plant which supplies potable water to the department of Montevideo have resorted to mixing water from the Paso Severino reservoir (fresh water) with water from the lower section of the Santa Lucia River, which has higher salt content. The utility submitted an application to the Ministry of Public Health to request permission to temporarily exceed the maximum salinity levels in the drinking water. In May, the authorities raised the limit for sodium in the water by 160%.

The government of **Ecuador** has completed the world's [largest debt for nature swap](#)³⁴⁸ with the support of the InterAmerican Development Bank (IDB) and the U.S. Development Finance Corporation (DFC). The IDB provided a \$85 million guarantee, while the DFC provided a \$656 million political risk insurance to purchase the country's existing debt at better financial terms. The agreement serves the double purpose of reducing the country's debt burden while releasing hundreds of millions of dollars for marine conservation around the Galapagos islands. The country will be considering other options to monetize Ecuador's biodiversity in the coming two years, including the protection of Amazon corridors.

11.4. Australia and Oceania

The **Australian parliament passed legislation that extends the timeframe for delivering the Murray-Darling Basin plan (MDBP)**. The Murray-Darling Basin is Australia's largest river system covering more than 1m sq km. The MDBP was introduced in 2012 to bring the basin back to a healthy and sustainable level by limiting how much water can be extracted and by [restoring environmental water flows](#) by 3,200GL a year. The plan had gone off track: an audit found the plan would probably fall about 750GL – about 1.5 times the volume of Sydney Harbour – short of its total of 3,200GL by the deadline of June 2024. About 315GL of the shortfall is due to major water saving projects either

running late or failing to materialise. The legislation says states responsible for this infrastructure should deliver the infrastructure by 2026. The legislation extends a deadline for the recovery of 450GL a year of environmental water to ensure flows to South Australia to 2027. It also lifts a cap on buy-backs to allow the government to purchase more water for the environment.

A new report reveals the [dire state](#) of many of **New Zealand's** fresh waterways: only 2% of large lakes were in "good or very good" health. More than half – 55% – of the country's total river length showed "moderate or severe impairment" from organic pollution or

³⁴⁷ a potential storage capacity of 70 million m³

³⁴⁸ the concept of debt for nature swaps was developed by Thomas Lovejoy at the World Wildlife Fund, and the first debt for nature swap was carried out in Bolivia in 1987. Since 1987, some 140 such deals have been concluded worldwide

nutrient enrichment – typically caused by effluent and runoff from farming, and 45% of rivers were unswimmable, due to campylobacter infection risk.

Tropical cyclone Gabrielle was the worst storm to hit New Zealand so far in the XXI century. The cyclone was expected to lead to bigger impacts since the weeks prior to its arrival had seen severe flooding across much of New Zealand. The storm brought further heavy rain on top of the record-breaking downpours in the preceding weeks as well as very high winds. The economic impacts of storm Gabrielle were significant, at nearly 1 per cent (about \$2.4bn) of New Zealand's GDP.

Source: Counting the cost 2022: A year of climate breakdown, Christian Aid, December 2023

In **Fiji**, the impacts of climate change, which has been driven by industrial development far from the country, are happening at an **accelerating pace**. As a result of storm surges, floods, destructive tides and landslide, 20% of Fiji's population living on coastal fringes, now face the prospect of having to move to higher ground. As part of the government program, six Fijian villages have already been moved and dozens more are currently being assessed. Relocating a village is not a simple matter of finding. In Fiji, it also means severing the very spiritual connections to ancestors and to the land and seas of the territory to which they belong – the traditional bonds known as "Vanua".

11.5. Europe

11.5.1. Western and Southern Europe

In a **judgement** believed to be the **most significant UK Court ruling** on the Water Framework Directive (WFD) of the last two decades, on the 20th of November, the High Court of Justice in England ruled that the Department for Environment, Food and Rural Affairs (DEFRA) had failed in its duties to review, update and implement measures to restore rivers and other water bodies. The case was brought by the Pickering Fishery Association together with an environmental organization, Fish Legal. In terms of WFD, EU member states need to implement the necessary measures to prevent deterioration of the status of all bodies of surface water and protect water bodies so as to achieve good 'ecological potential' and good 'surface water chemical status' by December 2027. Concerns have been raised about the adherence of the U.K. to European water quality standards, as, although the WFD was transposed into British law in 2016, there have been incidences of divergence from EU rules. For instance, the quality of the U.K.'s rivers is currently tested only once in three years, as opposed to once a year in the EU. The court found, for instance, that the DEFRA's river basin management program lacked the legally required measures necessary to achieve the obligatory targets for each waterbody – such as tightened environmental permits for controlling sewage pollution.

Lough Neagh, the largest freshwater lake in the **Great Britain**, is being **poisoned** by a toxic blue-green algae due to discharge from farming and sewage. It is killing fish, birds and dogs and there are serious concerns about public health because the lough provides 40% of Northern Ireland's drinking water.

The **Netherlands** announced that it had taken out a **'blue bond'** worth € 5 billion which will go towards efforts to mitigate flood risks. The government had announced also its new **Green Bond Framework**. The Netherlands seeks to create a Climate Fund which can be used to channel investments needed to align the economy and infrastructure to the new realities

under climate change scenarios and pledges. This development comes as the Netherlands seeks to adhere to the terms set out in the Paris Agreement on Climate Change which will require a minimum of 55% reduction in emission levels by 2030 relative to 1990.

The Rhône River has again become the **subject of negotiations** between Switzerland and France against the background of recent drought and water shortages in France. Importantly, the water of the Rhône is used to cool 14 of the 56 nuclear reactors providing France with electrical power.

A study by the French water agency warned that as a result of climate change, the level of the Rhone River could be lowered by up to 20% over the next three decades, and in certain tributaries such as the Isère and the Drôme, the reduction could amount to between 30% and 40%. Currently the summer demand on the Rhone does not exceed 15%. Nevertheless, in the medium term, it is envisaged that the Rhone is no longer going to be an inexhaustible resource. In the short term, the legal limits placed on the temperature of the water used to cool the nuclear reactors at the point of release into the river will force reduction in power production. Additionally, at the river mouth, the progressive ingress of salt water upstream in dry months could cause damage to crops and riparian vegetation.

Water utilities request transparency over discharge permits as Meuse River quality deteriorates. The Maas / Meuse River is a source of drinking water for some 7 million customers across Belgium and the Netherlands. Over the past year, concentrations **above the permitted levels** have been measured for 79 substances. In 11% of all measurements of water quality along the river, pollution levels were found that were above the maximum set by European norms. In addition, the river's flow has declined because of climate change, resulting in less dilution of the harmful chemicals.

To adequately perform their task of protecting water quality, the utilities state, it is essential to be able to identify the harmful substances that end up in the water, as well as to know where exactly they are being discharged. They are requesting a complete overview of all direct and indirect discharge permits and that substances that are harmful to drinking water supplies to be included in discharge permits.

All of **Spain** has been in **drought** since January 2022, but water supplies in Catalonia have fallen so low that authorities this week introduced laws including a 40% reduction in water used for agriculture, a 15% reduction for industrial uses, and a cut in the average daily supply per inhabitant from 250 litres to 230 litres. The average amount of available water had fallen by 12% since 1980, and projections suggested a further drop of between 14% and 40% by 2050. Spain's government in January approved a €23bn plan to protect and improve water supplies by investing in areas including infrastructure, water treatment and purification, irrigation modernisation and flood-risk management.

On the 1st of June, the **European Commission** decided to refer **Italy** to the European Court of Justice (ECJ) for breaching its obligations under the wastewater treatment directive. According to the EU, although Italy has made significant progress in the implementation of the wastewater directive, there are still five settlements where the terms of the ruling have not been observed. The EU argues that the lack of adequate wastewater treatment systems for these five agglomerations poses significant risks to human health, inland waters and the marine environment in the environmentally sensitive areas in which the untreated waste water is discharged.

In France, protests erupted against the **construction of agricultural reservoirs in the southeast of the country**. Some 50 different civil society groups including environmentalists and trade unions have grouped themselves together to oppose the further development of these storage structures. Currently, more than 100 such water pans are under development inland of la Rochelle and along the eastern border with Switzerland and Italy. Developed, a typical water pan covers some 10 to 16 hectares, is covered in thick plastic, and surrounded by a dyke of 10 m in height: such pans can therefore store up to 820 000m³ of water. Instead of being filled naturally through rainwater harvesting or runoff water, they are filled by pumping groundwater during winter and stored for use in times of peak agricultural demand. France, however, currently has critically low levels of groundwater. The current beneficiaries of the water pans are industrial agriculture, whereas what would be needed for a medium to longer term management is to retain the water in the soil through a transition to a form of agro-ecology.

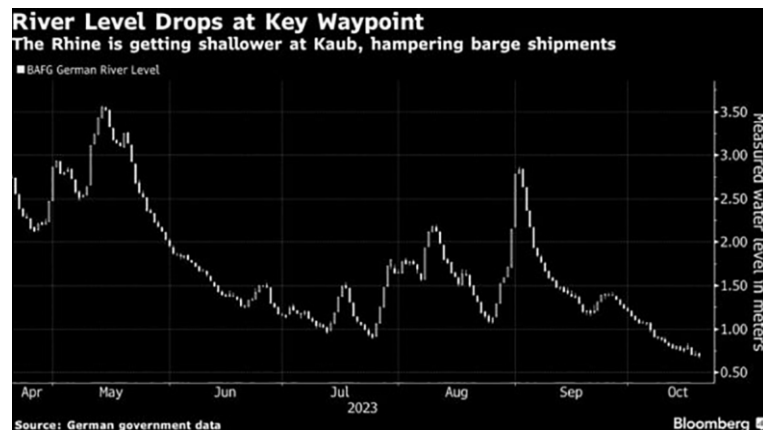
Revised EU Drinking Water Directive entered into force on **January 12**. The Commission launched a public consultation and came to the conclusion that the WFD needed to be reviewed in four key areas: (1) the list of substances to be monitored needed to be updated to include additional pathogens and che-

mical substances in the water; (2) extend the risk analysis beyond monitoring to include the whole water value chain from the catchment area through to abstraction, treatment, storage and distribution; (3) improvements in communication and public provision of information on water; (4) harmonisation of the rules with regard to the products that come into contact with water – such as pipes, treatment chemicals and filter media.

Rhine River Basin

At the annual plenary assembly of the International Commission for the Protection of the Rhine (ICPR) on **June 30, 2023**, the **Rhine Monitoring Programme Biology 2024/2025** was adopted. Every six years, the ICPR investigates within the context of an international monitoring campaign how five important bio-indicators (phytoplankton, benthic diatoms, macrophytes, macrozoobenthos and fish fauna) have developed along the Rhine. The results provide information on the ecological status of the Rhine and will be taken into account when reporting on the implementation of the Water Framework Directive in the Rhine river basin. The participants noted that progress has been made in restoring the ecological continuity of the southern Upper Rhine.

Fuel transit costs raise abruptly in Germany due to a **falling Rhine River** and the resulting decreased load capacity of barges. Water at a key waypoint Kaub not far from Frankfurt dropped to the lowest seasonal level since 2018 – to 67 cm. The lower water level makes barge shipments unprofitable and leads to growing prices.



Danube River Basin

Restored floodplains could remove 38.000 tons of nitrate pollution in the Danube river basin. Nitrogen **emissions** in the Danube river basin are currently estimated at around 500 000 tons per year, with 44% deriving from agriculture, 30% from urban areas and 23% from forests and natural areas. About 340 000 tons enter the Black Sea, into which the Danube drains. Nutrient pollution means that more than a fifth of surface-water bodies in the Danube river basin are at risk of failing good ecological status by 2027. Flood-

plains offer a vital ecosystem service through denitrification. However, 70-80% of the river basin's floodplains have been converted to arable land, or disconnected by dykes, engineering works for navigation and hydropower dams. Restoration of floodplains could increase in-stream removal by 9.2%, removing about 2,350 tons more nitrates per year. The greatest effect is expected from restoring the previously meandering Yantra and Tisza Rivers and the upper Danube. Reconnecting potential floodplains (e.g. by removing dykes) could remove an approximate additional 2,500 tons a year, representing a rise in potential denitrification of 32%. If both water bodies

and floodplains were reconnected, a total of 38,000 tons of nitrate could be retained by river-floodplain systems, per year.

As part of the **DANUBE4all project** (2023-2028), funded by Horizon Europe, a comprehensive, scientifically based, and practically orientated Restoration Action Plan is being developed to support the EU's Mission to "Restore our ocean and waters by 2030." With a Science-to-People approach, the project will promote the knowledge, awareness, and participation of local people and business actors in implementing freshwater ecosystem restoration.

11.5.2. Eastern Europe and Caucasus

Armenia

Water management. Large-scale reservoir construction projects are progressing across the country. This year, the construction of the Vedi Reservoir is nearing completion. Meanwhile, work on the Kapsi Reservoir, funded by the German Development Bank (KfW) and the state budget, is commencing. Discussions are also underway regarding the potential construction of the Yeghvard Reservoir and the Selav-Mastara Reservoir in the Aragatsotn region, with support from the Eurasian Development Bank (EDB). Additionally, tenders for the design and estimate works for 31 regulating reservoirs have been finalized.

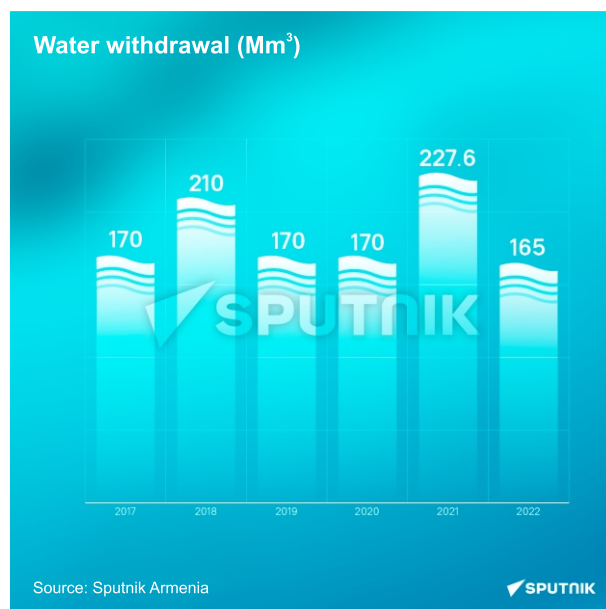
In 2022, the national government allocated 22.4 million drams (approximately \$53,000) for the design and

estimate works needed to restore the Araks River³⁴⁹ to its former course in the Araksavan and Burastan communities of Ararat Province.

On July 12, 2023, the Armenian Parliament approved a government bill authorizing an increase in water withdrawals from Lake Sevan from the initially permitted 170³⁵⁰ million m³ to 240 million m³ for that year. By July 23, the lake's water level had already receded by 16 cm compared to the same period in 2022. This increased withdrawal is likely to exacerbate the negative trend. It could result in a significant slowdown in the rate of lake level rise and potentially lead to a water level in January 2024 that is considerably lower than the level observed during the same period in the current year.



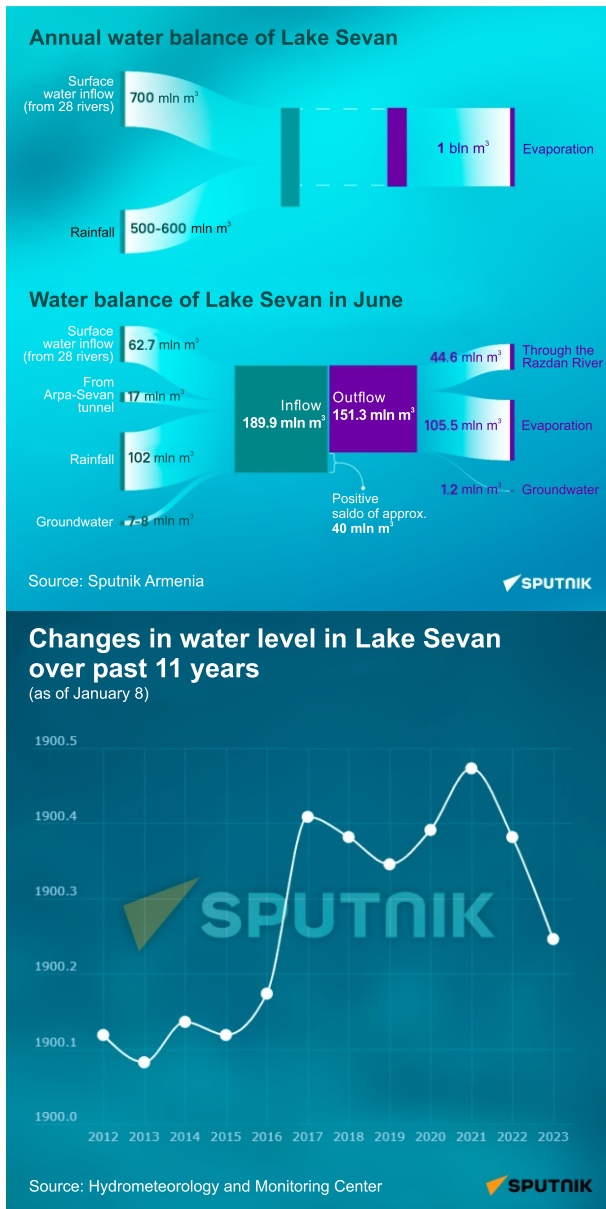
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Source: <https://am.sputniknews.ru/20230731/udar-po-ekosisteme-sevana-chem-opasen-dopolnitelnyy-zabor-vody-63628469.html>

³⁴⁹ the Araks River which forms part of the border with Turkey has changed its course due to illegal sand mining (channeling through the Razdan River), with the formation of an island on approximately 400 ha

³⁵⁰ the permitted amount of water releases from the lake is 170 Mm³, however, withdrawals have exceeded this limit in previous years



Source: <https://am.sputniknews.ru/20230731/udar-po-ekosisteme-sevana-chem-opasen-dopolnitelnyy-zabor-vody-63628469.html>

Agriculture. The Ministry of Economy of Armenia held meetings with: (1) USAID: discussions focused on enhancing cooperation, improving the investment climate, and ensuring the successful implementation of ongoing programs. USAID presented its 'Economic Foundations for a Resilient Armenia' activity, which prioritizes key sectors such as agriculture, tourism, and high technology (July); (2) SDC: meetings addressed the current state and future prospects of Armenia's agricultural development. Specific programs discussed included 'Modernizing Vocational Education and Training in Agriculture in Armenia' (MAVETA) and 'Sustainable and Inclusive Growth in Mountainous Armenia' (SIGMA) (November).

Energy. The Government approved a draft Presidential decree for a €6.5 million Financial Agreement with

the European Commission titled "Sustainable Energy, Energy Security and Climate Resilience in Rural Armenia." The agreement aims to address energy poverty, enhance energy security and independence, mitigate climate change impacts from an environmental perspective, and protect natural resources and ecosystems. To achieve these goals, energy efficiency and sustainable energy projects will be implemented in Tavush, Shirak, Gegharkunik and Syunik regions of Armenia.

The Armenian government will allocate \$65 million to extend the operational life of the second power unit of the Armenian Nuclear Power Plant (NPP) until 2036. The project is set to begin in 2024, with Rusatom Service overseeing its implementation.

Renewable energy is a key focus for the development of Armenia's energy system, with solar energy playing a particularly significant role. Currently, over 5% of the country's electricity is generated by solar power plants. As of June 1, there are more than 12,000 autonomous solar energy producers in Armenia, with a combined installed capacity of 220 MW. The country aims to increase the total capacity of solar and wind power plants to at least 2,000 MW by 2040. To support this effort, the German government will provide €12 million to Armenia for the third phase of a program aimed at expanding the use of renewable energy sources and enhancing energy efficiency.

Ecology and environmental protection. In December 2023, a draft law titled "On Environmental Service" was submitted to the Parliament and is set to come into force on January 1, 2024. The new service will consolidate inspectors from the state organization "Hayantar" ("Armles") and the national parks of the Republic, encompassing approximately 1,180 personnel in total.

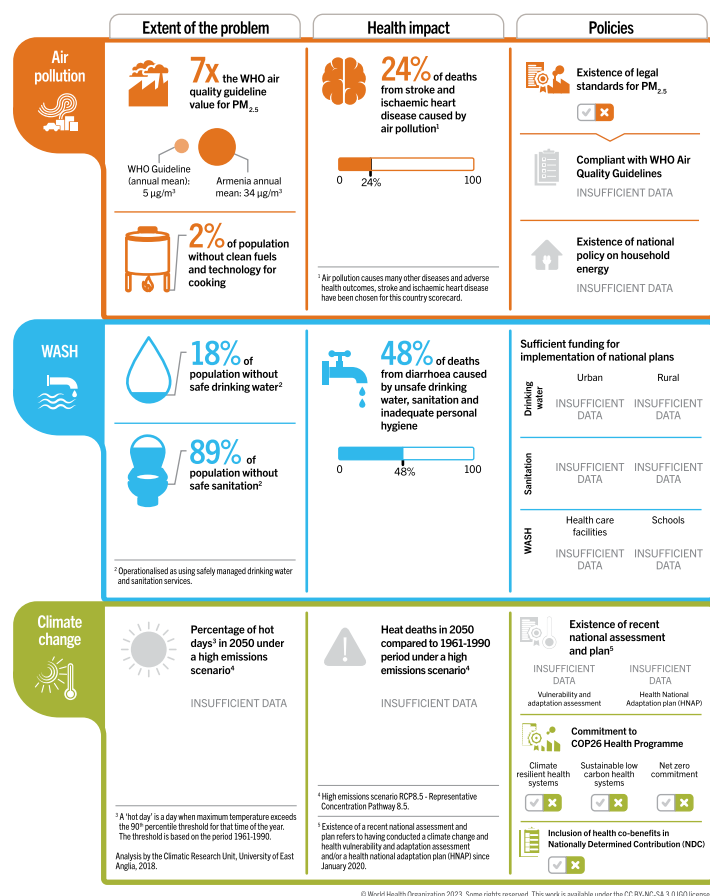
According to the 2023 activity report of the Armenian Ministry of Environment, significant achievements were made in environmental management and forestry. For the first time, aerobiological pest and disease control measures³⁵¹ were implemented across 4,120 hectares of forest in the "Armforest" SNCO area. Additionally, 38.8% of planned environmental projects were completed, including 226 hectares of reforestation and afforestation efforts. An 8-hectare seedling nursery was established, producing 250,000 seedlings with closed root systems.

The Centre for Hydrometeorology and Monitoring conducted activities in hydrometeorological services, environmental monitoring, and forest state monitoring. Notably, 20 automatic meteorological stations were purchased, with 9 funded by the state budget. Five stations were installed in the Lake Sevan basin, and two of these are equipped with mechanisms for monitoring evaporation from the water surface.

WHO has prepared a health and environment scorecard for Armenia in 2023.

³⁵¹ earlier chemicals were used in this work

Health and environment scorecard Armenia



Source: https://cdn.who.int/media/docs/default-source/country-profiles/environmental-health/environmental-health-arm-2023.pdf?sfvrsn=c0585840_14&download=true

International cooperation. Armenia and Iran will resume joint monitoring of the Araks River's border waters to identify pollution sources and locations.

Azerbaijan

Water management. The newly established State Water Resources Agency of Azerbaijan assumed control over JSC 'Azersu' and JSC 'Land Reclamation and Water Management of Azerbaijan'.³⁵² Concurrently, the charters of the Regional Water Reclamation Service, the United Service for Water Supply of Large Cities, the Water and Land Reclamation Research Institute, and the Irrigation and Drainage Design Institute were approved.

Two pilot projects have been formally launched: (1) a seawater desalination project to enhance drinking water production for Baku and surrounding areas,

and (2) a project to treat and reuse wastewater discharged from the Govsan aeration plant in Apsheron district, mitigating its impact on the Caspian Sea.

The World Bank is developing a new model of water resources management in the suburban and rural areas of Azerbaijan. A comprehensive inventory of water sources will be conducted, aiming to ensure equitable access to drinking water, secondary water, and irrigation water, particularly in rural areas, to address water supply challenges.

Agriculture. As part of the project on strengthening best practices in soil, nutrient, and water management agricultural practices for cotton, wheat and rice production, the Azerbaijani delegation took part in the training on climate-smart agriculture to improve soil fertility in Asia, combat salinization, improve water and nutrient application and productivity of main crops (Faisalabad and Islamabad, Pakistan, October). The Ministry of Agriculture of Azerbaijan and IAEA, which supports the project, also discussed the tasks to be solved by the project.

Energy. EBRD is allocating \$197.1 million (€186.9 million) for the construction of a 240 MW wind power plant³⁵³ in Eastern Azerbaijan. This project is poised to generate a substantial amount of clean energy, with an estimated annual output of up to 893 GW and thus reduce greenhouse gas emissions by more than 400,000 t.

JSC "AzerEnergy" is finishing the construction of hydropower cascade (HPPs Sarygyshlag, Shayfly, Zangilan, and Djakhangirbeili) on the Okhchuchai River. The 42 MW cascade is to generate annually more than 130 million kWh of green energy.

Environmental protection and green development. WHO has prepared a health and environment scorecard for Azerbaijan in 2023 as a tool to measure and track the progress of Member States.

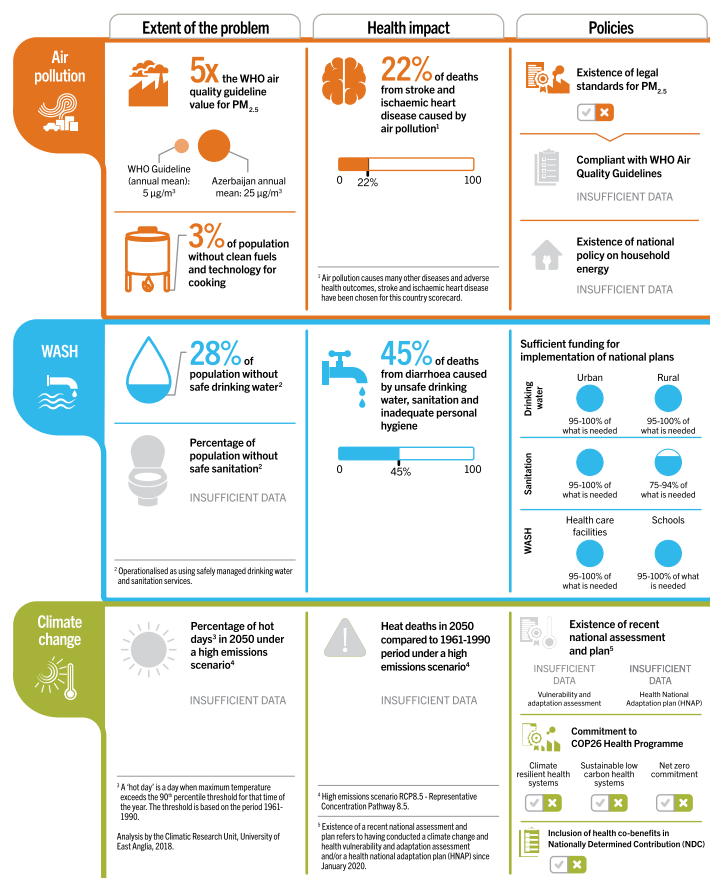
The OECD collaborates with Azerbaijan on advancing a green economy through two EU-funded programs. These include: (1) 'Green Economy EU4Environment', focusing on developing comprehensive green investment strategies, establishing robust green growth indicators, and ensuring strict adherence to environmental regulations; (2) 'EU4Environment Water and Data' to promote sustainable use of valuable water resources and support open access to environmental data.

International cooperation. The Ministry of Ecology of Azerbaijan announced the first joint expedition with Russia to the Samur River. The expedition aims to study biodiversity, water resources, and analyze changes in both ground and surface waters within the river basin. The collected data will be utilized to develop project proposals focused on climate change adaptation and the reduction of greenhouse gas emissions.

³⁵² by Presidential Decree of 30 March

³⁵³ first wind power project on domestic scale and the largest one in Caucasus

Health and environment scorecard Azerbaijan



Source: https://cdn.who.int/media/docs/default-source/country-profiles/environmental-health/environmental-health-aze-2023.pdf?sfvrsn=d9fab562_14&download=true

Georgia

Water management. Parliamentary committees in Georgia have decided to review a proposed law, "On Water Resources Management," which introduces new regulations for water use by companies. Under the draft law, water resources will be declared state property, and private companies will be granted authorization to use water for production purposes.

The Spanish company Aqualia, which owns 80% of Georgian Water and Power (GWP), plans to invest 363 million GEL in improving the water supply systems of Tbilisi, Rustavi, and Mtskheta between 2024 and 2026.

Agriculture. The French Development Agency (AFD) will allocate €70 million to Georgia for a program aimed at promoting irrigated agriculture. Of this, €35 million will be dedicated to infrastructure, particularly

the modernization of the Zemo Samgori irrigation canal. This initiative seeks to enhance the efficient production of high-quality agricultural products, improve food availability for the local population, boost the competitiveness of Georgian products in regional markets, and establish a sustainable irrigation system to address the challenges of climate change. The remaining €35 million will fund a budget support program designed to strengthen public policies for sustainable and inclusive water governance. This includes enhancing the policy and institutional framework to integrate climate-smart practices into agriculture and water management, as well as improving the governance and risk management of the Georgian Land Reclamation Company.

ADB will provide a loan of approximately €45 million to Georgia to implement a climate-smart irrigation sector program. The project aims to strengthen agricultural systems in eastern Georgia, with a particular focus on modernizing the Kvemo Samgori left main canal and its associated irrigation system in the Kakheti region.

Energy. By the end of the year, the Georgian government expects to complete the construction of hydro-power plants (HPPs) with a total installed capacity of approximately 118 MW. These plants are projected to increase Georgia's annual electricity production by over 540 GWh.

The German government will allocate €23 million to support the development of green hydrogen,³⁵⁴ marking the first investment project in this fuel technology in the Caucasus region. With the backing of an Arab investor, the largest power plant in terms of capacity will be constructed in the Gardabani municipality (Kvemo Kartli region). This project aims to reduce dependence on imports and diversify local sources of electricity supply.

Green development. The WB will provide a €46.3 million loan to Georgia as part of the country's first green and sustainable development policy operation. The funds will be allocated to promote sustainable agriculture, support irrigation projects, and develop the land market.

International cooperation. Georgia and Qatar have signed a Memorandum of Understanding (MoU) on water resources, air quality monitoring and control, biodiversity conservation, and the implementation of joint environmental projects and programs. The MoU aims to address the mitigation of risks caused by climate change.

The Georgian Ministry of Education and Science and the Helmholtz Centre for Heavy Ion Research have signed a memorandum of cooperation to collaborate on joint educational and research projects. These initiatives will focus on proton therapy, clean energy, hydrodynamics, ecology, radiation physics, and other scientific fields.

³⁵⁴ "Green" hydrogen is produced through the electrolysis of water, where electricity generated from renewable energy sources is used

Belarus

Water management. Water extraction indicators over the past five years have shown a steady downward trend. Total water use has decreased, with domestic and drinking water consumption remaining the largest component. In 2023, surface water withdrawal decreased by almost 3%, while groundwater extraction increased by less than 1%. Water usage for agricultural needs was 3% lower compared to the previous period, whereas water use for industrial purposes increased, with a notable 17% rise in energy-related water consumption.

Belarus is developing a set of measures for water conservation and restoration, which includes both immediate priority actions to be implemented within the year and long-term strategies for adapting water management to climate change. These measures also focus on the development of information systems and economic mechanisms. Currently, Belarus has 112 gauging stations, comprising 102 river gauging stations and 10 lake gauging stations.

The Pripyat River Basin Management Plan (RBMP)³⁵⁵ has been approved, with the main objectives being to identify environmental issues within the river basins and develop solutions. This includes creating measures aimed at improving the environmental status of surface water bodies (or their parts). These measures will be considered in the future formulation (or adjustment) of state programs and regional action plans for water protection and use.

A regular meeting of the interdepartmental working group was held, where the proposal to develop model examples of water storage and level regime maintenance using different flow regulation methods was supported. The approaches developed during the meeting are reflected in the set of priority measures aimed at improving water conservation for 2023 (Minsk, February 7).

Agriculture. In 2023, agricultural production contributed 6.5% to the country's GDP, with more than 251,000 people employed in the industry. As of January 1, 2024, there were nearly 1,500 agricultural organizations and 3,400 peasant (farm) households. Agricultural products are exported to over 100 countries, including all CIS countries, EU nations, countries in Asia, South and North America, the Middle East, and Africa. In 2023, new foreign markets were developed, including Bahrain, Somalia, Mexico, Senegal, and Cape Verde. Additionally, Belarus is ranked among the top five global producers of flax fiber, with 37.2 thousand tons produced in 2023.

Forestry. Belarus is ranked among the top ten European countries in terms of forest cover, forest area, and timber reserves per capita. Forests in the country cover more than 9.7 million hectares, with the forest

cover rate reaching a record 40.2%. There is approximately 1 hectare of forest per inhabitant. In 2023, the Ministry of Forestry planted around 29,000 hectares of new forests.

Energy. In Belarus, the primary focus is on increasing the use of wood fuel, which requires the smallest capital investments and has the shortest payback periods compared to other renewable energy sources (RES). Nearly 97% of the country's RES comes from biomass, mainly wood fuel, while just over 3% is derived from water, wind, and solar energy. Over the past 14 years, the capacity of RES installations has increased 14-fold, reaching 632 MW. This includes **84 solar power plants** with a capacity of 272.7 MW, **55 hydro-power plants** with a capacity of 96.5 MW, **108 wind power plants** with a capacity of 122 MW, **31 biogas complexes** with a capacity of 40.2 MW, and **11 mini-TPPs** using wood fuel with an electric capacity of about 100.5 MW. The development of renewable energy in Belarus was discussed during the press conference "Clean Energy. Development of Renewable Energy in Belarus" held on October 20 in Minsk.

Belarus has constructed its own nuclear power plant, which is now operating at full capacity with two power units. These units are expected to generate approximately 18.5 billion kWh of electricity annually, which will cover more than 40% of the country's domestic electricity needs. Additionally, this output will replace around 4.5-5 billion m³ of imported natural gas each year.

Ecology and environmental protection. An interactive map of nature conservation areas (NCAs)³⁵⁶ has been created as an online resource providing information on all unique natural landmarks in Belarus. As of January 1, 2023, the system of Belarusian NCAs covers a total area of 1.9 million hectares, represen-

Map of nature conservation areas in the Republic of Belarus



³⁵⁵ Joint decision (No.844/739/43-15/1053) of Gomel', Brest, Mogilyov and Minsk provincial executive committees of October 27, 2023

³⁵⁶ as part of international technical assistance project "Development of ecotourism to promote green transition to inclusive and sustainable growth"

ting 9.1% of the country's territory. The system includes 1,354 sites, comprising one nature reserve, four national nature parks, 376 sanctuaries, and 973 natural monuments of national and local importance.

The Ministry of Natural Resources has implemented five international [technical assistance \(ITA\) projects](#) focused on environmental protection, the rational use of natural resources, and climate change mitigation, with a total budget exceeding \$15 million.

During the year, 2,315 environmental activities were conducted, engaging approximately 160,000 participants, including over 30,000 young people. Over 550 members of the public actively contributed to discussions and solutions for more than 95 environmental challenges through a diverse range of events, activities, and campaigns. Key highlights of the year included: II International Specialized Exhibition "ECOLOGY EXPO-2023" (Minsk, August 22-24) and XVII Republican Ecological Forum (Brest region, August 25-26).

International cooperation. The following events were held: (1) A meeting of the Belarusian-Chinese Intergovernmental Cooperation Committee, which resulted in the signing of a memorandum of understanding on cooperation in environmental protection, sustainable development, and climate change mitigation and adaptation between the Ministry of Natural Resources of the Republic of Belarus and the Ministry of Ecology and Environment of the People's Republic of China (Beijing, July 11); (2) XIV meeting of the Joint Belarusian-Russian Commission for the Protection and Rational Use of Transboundary Water Bodies. The meeting addressed issues related to water quality and the condition of aquatic ecosystems in the transboundary water bodies of the Dnieper and Western Dvina river basins, ongoing water management and protection measures, and summarized the results of the work for 2022. It also discussed promising areas for further cooperation (Minsk, August 23).

Moldova

Water management. The Government of Moldova approved: (1) amendments³⁵⁷ to the Water Law. The new provisions are designed to properly recognize the value of water bodies as an indivisible commodity and to ensure that revenues generated from the provision of water resources for use are collected into the state budget; (2) the river basin management plan of the Danube-Prut and Black Sea hydrographic basin district cycle II (2023-2028).³⁵⁸

Agriculture. By the end of the year, the Ministry of Agriculture and Food Industry (MAFA) plans to introduce

70 EU regulations into the national legislation. Additionally, a law is being prepared to establish 10 agricultural chambers across the country, which will include all farmers who own land plots of 1.5 hectares or more. The leadership of these agricultural chambers will be elected by the farmers themselves. The Ministry will also cover the salaries of counselors and other employees working in the chambers.

The MAFA is establishing³⁵⁹ the Agency for Land Reclamation Policy Implementation by restructuring the Sustainable Development Fund of Moldova. This new agency will be responsible for the implementation of land reclamation policies and the management of investment projects related to the construction of centralized irrigation systems.

The WB and the International Bank for Reconstruction and Development (IBRD) will invest \$55 million and €50.1 million, respectively, in Moldova's agricultural sector through the Agricultural Governance, Growth, and Resilience Investment (AGGRI) project. This initiative aims to develop underperforming agricultural subsectors, increase farmers' incomes, create new jobs and market opportunities, introduce smart farming technologies, and promote organic production.

Energy. To accelerate Moldova's EU integration: (1) The AFD has pledged a €120 million loan to support energy sector reforms in Moldova. Key priorities include decarbonization efforts, such as enhancing energy efficiency in buildings, transitioning to electric public transport, and expanding the use of renewable energy sources; (2) The U.S. administration plans to provide Moldova with up to \$300 million in emergency energy assistance. This aid will be used to bolster local energy production and provide financial support.

Ecology and environmental protection. As part of the national program for forest expansion and restoration for 2023-2032, the Ministry of Environment, together with the Moldsilva agency, launched a nationwide greening campaign "Plant Your Future." The [EU Green Week](#) with the general theme "Delivering a net-zero world" was marked in the Republic of Moldova, via a large-scale information and awareness campaign, creative contests for children and outdoor events promoting green lifestyles (June 3-11). The fall campaign for forest restoration and expansion has begun, with plans to plant approximately 4,000 hectares of tree seedlings.

International cooperation. Moldova, Ukraine, and Romania will jointly manage the Prut River basin to enhance water resources management. The colla-

³⁵⁷ the need for amendments was driven by the political direction of the Republic of Moldova's European integration and the fulfillment of commitments outlined in the Association Agreement signed between Moldova and the EU, as well as the Treaty on the Establishment of the Energy Community

³⁵⁸ Moldova has harmonized its legislation with the Water Framework Directive (WFD). However, further harmonization with other aspects of EU legislation is still needed. In particular, a significant portion of the country's population still lacks access to quality water supply and sanitation services

³⁵⁹ this is the first time in Moldova's history that a single central administrative body with clear responsibilities for implementing land improvement policies has been established

boration aims to unify river basin management plans, address flooding and water scarcity risks, and conserve biodiversity, particularly in the Lower Prut region.

Russia

Water management. The federal law On Amendments to the Water Code of the Russian Federation and Certain Legislative Acts of the Russian Federation (No.657-FZ, dated 25 December) has been adopted. Under this law, municipalities, in coordination with regional authorities, must establish rules for the recreational use of water bodies by 1 March 2025.

The law also makes changes to the content of Master Plans for the integrated use and protection of water bodies. These plans no longer include measures related to water management, the protection of water bodies, mitigation of the negative effects of floods, or other adverse impacts of water. Additionally, the plans are no longer required to provide funding estimates for their implementation. Furthermore, the development of operational and improvement rules for reservoirs is no longer a requirement within these Master Plans.

The draft Water Strategy of the Russian Federation for the period until 2035 has been published. The Strategy outlines 5 key priorities and objectives: (1) preservation and restoration of water bodies; (2) guaranteed water supply; (3) protection of population and economic facilities from floods; (4) system management of the water sector, increasing the country's technological sovereignty in the water sector; and, (5) development of international cooperation in the water sector.

Three pilot regions – Stavropol Krai, the Chechen Republic, and Tula Oblast – have been selected for the initial implementation of a unified register of water resources.³⁶⁰ This register will include comprehensive data on freshwater stocks. Based on the findings of this pilot phase (concluding in October 2024), recommendations for the nationwide rollout of this register across all regions of Russia will be formulated.

As part of the following initiatives: (1) State Program 'Reproduction and Use of Natural Resources', more than 100 activities were financed, amounting to RUB 1.74 billion, to rehabilitate hydraulic structures in 44 regions of the Russian Federation; (2) 'Clean Water' Project, a total of 389 water supply facilities were commissioned. In 2024, work is planned for an additional 230 facilities.

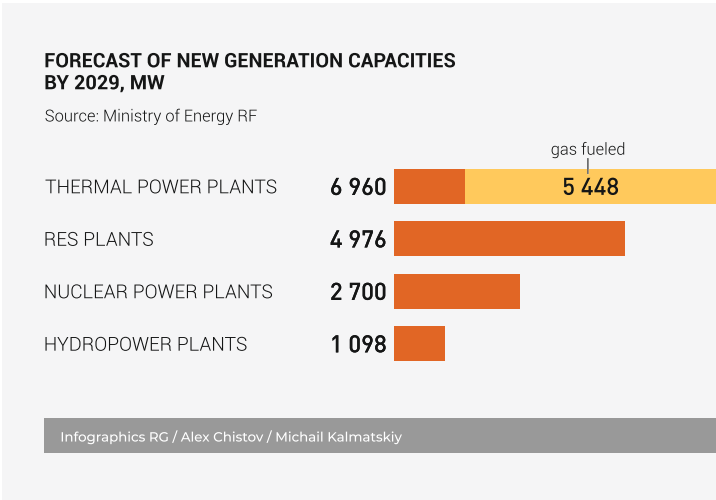
Rosvodresursy³⁶¹ received over RUB 27.3 billion from the Russian Federation's budget, primarily funded through payments for the use of water bodies. The largest contributors in the energy sector were hydropower plants of the Angara reservoir cascade, which accounted for RUB 3.2 billion.

Agriculture. The Russian agricultural investments decreased by 4% in the first 9 months of 2023 compared to the same period in 2022.

The Strategy for the Development of Organic Production until 2030 has been approved by Government Order No.1788-r, dated 4 July 2023. The Strategy aims to promote the growth of organic production and consumption, balance the domestic market and export of organic products, adopt and implement modern technologies in organic agriculture, and incentivize businesses to engage in organic production practices.

Energy. At the end of the year, electricity generation in Russia reached 1,151.6 billion kWh, while consumption totaled 1,139.2 billion kWh. The green energy sector contributed 6 GW, with investments amounting to RUB 600 billion. However, green energy's share in total consumption remained below 0.8%. Capacity growth was driven primarily by wind power, while small hydropower capacity increased by 25 MW and solar power capacity by 44 MW.

In 2024, a total of 482 MW of green energy projects is expected to be commissioned. By the end of 2025, the newly commissioned green energy capacity is projected to include 645 MW from solar power, nearly 1.4 GW from wind power, and 128 MW from small hydropower. According to the Electric Power System Development Scheme and Program in Russia, 15,734.3 MW of generating capacity is planned to be commissioned between 2024 and 2029.



Source: <https://rg.ru/2023/12/22/kilovatt-stanovitsia-chishche.html>

Ecology and environmental protection. In 2023, several federal environmental projects made significant progress: (1) 'Clean Country': 77 of the most hazardous sites of accumulated environmental damage

³⁶⁰ to maintain integrated monitoring of drinking and household water uses

³⁶¹ one of Rosvodresursy's key functions is administering revenues from fees collected for the use of federally owned water bodies. These revenues will be allocated for co-financing measures aimed at protecting water bodies and implementing flood control initiatives

were remediated; 66 landfills were decommissioned, including 19 in the Moscow region; (2) 'Integrated System of Solid Municipal Waste Management': 238 waste management infrastructure facilities were commissioned, with a combined capacity to process 19.493 Mt of waste annually, recycle 5.743 Mt of waste per year, and landfill 4.152 Mt of waste per year; (3) 'Clean Air': emissions were reduced by a total of 259.2 thousand t through implemented measures; 29 cities participated in an emissions quota experiment. The project aims to reduce emissions of "priority" pollutants that negatively impact the environment and human health.

Rosprirodnadzor continued its ongoing efforts to review and issue Integrated Environmental Permits (IEPs) to businesses³⁶². According to the public register of IEPs, a total of 269 IEPs were issued by Rosprirodnadzor during this period.

Actions towards carbon neutrality. For the first time in Russia, regulatory entities have submitted reports on greenhouse gas (GHG) emissions. This requirement is mandated by Presidential Decree No.707 of April 20, 2022, which obligates entities emitting more than 150,000 tons of CO₂-equivalent greenhouse gases into the atmosphere to submit these reports. Recognizing GHG emissions as a form of negative environmental impact, this decree aligns with the Russian Federation's broader climate goals. These goals include a 70% reduction in GHG emissions by 2030 compared to 1990 levels and achieving carbon neutrality by 2060.

International cooperation. Several important events took place in 2023, including: (1) XXIV Meeting of the Joint Russian-Azerbaijani Commission on the Samur River (July): the parties reviewed progress on shared initiatives and agreed on a work plan for the upcoming period (July); (2) 6th Joint Meeting of Environmental Ministry Panels of Russia and Belarus: discussions focused on the results and future prospects of 20 years of cooperation in transboundary water protection and use (October); (3) VII Meeting of the Joint Russian-Abkhaz Commission for Transboundary Water Protection and Use: the parties reported on surveys of the Psou River's main course³⁶³ and bank protection structures within their respective areas of responsibility; agreements were reached on procedures for joint environmental impact assessments of planned economic and other activities (November); (4) XIII Meeting of the Joint Russian-Kazakhstan Commission on Transboundary Water Use and Protection: progress was reviewed on drafting water balances for the Bolshoi and Malaya Uzen rivers, and agreements were made to enhance research cooperation in the basins of major rivers, including the Ural and Irtysh (December).

Ukraine

Water management. Several basin council meetings were convened: (1) Southern Bug: progress achieved over the past five years was reviewed, and reports on the status of preparing the South Bug River Basin Management Plan (RBMP) were presented (November 13); (2) Tisza River: a meeting focused on the preparation of the Danube RBMP for 2025-2030. Discussions included methods for restoring hydromorphological characteristics of watercourses, experiences from restoration projects in Ukraine and Hungary, and methodological recommendations for assessing rivers in the Carpathian region (May 30); (3) Middle Dnieper River: the council addressed water and environmental challenges within the Ros' River basin. A key presentation highlighted the project aimed at "Reducing excessive flow regulation and improving hydrological conditions of the Ros' River" (April 26).

The Nagornyanska, Tashbunarska, and Izmail irrigation systems will be repaired as part of the Agrarian Odeschyna program, funded by the regional budget with an allocation of UAH 94.5 million. Additionally, the USAID Agrarian and Rural Development (AGRO) program will contribute UAH 36 million to modernize these irrigation systems by implementing modern resource-saving technologies and irrigation automation. Each project will cover a service area of at least 200 hectares, and water management organizations are required to contribute at least 30% of the total project budget as part of the sub-grant.

Agriculture. A new law governing the leasing of state-owned agricultural land has been enacted.³⁶⁴ This legislation mandates the re-registration of all agricultural land currently utilized by entities such as the National Academy of Agrarian Sciences of Ukraine, the penitentiary service, and other state-owned enterprises. Under this law, the lease rate for these lands will be increased from 1% to 12% of their standard monetary value. Furthermore, the law allows for the sub-leasing of these lands through a competitive auction process.

According to the Draft Law of Ukraine "On Characteristics of Business Regulation in the Transition Period" (No.6013), farms will be restructured into business entities on preferential terms, ensuring that owners face no additional challenges or financial costs in the process.

The World Bank and the German Ministry of Agriculture are launching initiatives to support Ukraine's agricultural sector. The World Bank's "Ukraine Agriculture Recovery Inclusive Support Emergency" (ARISE) project aims to assist over 90,000 farmers in accessing concessional loans and grants for agricultural pro-

³⁶² in Russia, there are approximately 6,000 businesses that are required to obtain an Integrated Environmental Permit (IEP)

³⁶³ the Psou River originates in mountains and ends in the point of inflow into the sea, not far from the Adler city and makes the border between Russia and Abkhazia

³⁶⁴ about 3.2 million ha of agricultural land (7.5% of the total area) are in the permanent use of state-owned enterprises, institutions and organizations

duction. This project seeks to mobilize approximately \$1.5 billion in working capital to support Ukraine's agricultural sector. The German Ministry of Agriculture is providing €5 million to specifically develop Ukraine's horticultural sector. This funding will be used to support vocational education and consultancies, improve production processes and storage capacity, and foster the growth of horticultural start-ups.

Energy. The Energy Strategy until 2050 has been approved. This Strategy outlines a path towards carbon neutrality within the energy sector. Aligned with the objectives of the European Green Deal, it emphasizes a comprehensive approach to energy policy development and implementation. This includes creating a framework for the resilient and sustainable development of the Ukrainian economy.

The Cabinet of Ministers approved the Resolution on the implementation of an experimental project on the construction of the [Kakhovka hydropower plant](#)³⁶⁵ and reconstruction after the destruction. The experimental project consists of two stages. First, the design of structures as part of the preparatory measures of the Kakhovka hydroelectric unit, as well as the design and construction of a support structure in the lower bay of the Dnipro hydroelectric power station, were foreseen. The second stage – survey, dismantling of destroyed structures and structures of the Kakhovka hydroscheme, development of a design for the construction of the Kakhovka HPP; construction of temporary dams in the upstream and downstream of the Kakhovka HPP.

"Hydro Energy Ecology of Carpathians" Ltd. has [patented](#) a new-generation damless hydropower technology. A pilot project with a capacity of up to 50 kWh is planned for implementation in Transcarpathia. The project aims to demonstrate the technology's functionality and environmental safety, paving the way for potential expansion to larger capacities. This innovative damless hydropower system addresses two critical challenges: managing water drainage during floods and generating electricity.

Ukraine plans to develop a wind farm near the Chernobyl Exclusion Zone.³⁶⁶ The construction of the [Tiligul wind farm](#) in Mykolaiv region is expected to be completed in 2025. This project, with an installed capacity of 500 MW and a total investment exceeding €650 million, will be the largest wind power plant in Eastern Europe.

Environmental protection. The State Anti-Corruption Program on Environmental Protection, 2023-2025 was approved. The Program provides for: continued digi-

tization and public disclosure of up-to-date natural resource data; updating environmental registers and developing new information systems, integrated into the EcoSystems platform, which will streamline environmental services and make them accessible online; continuation of the national forest inventory, annual monitoring of the effectiveness of the unified state system of electronic timber accounting for all permanent forest users, and monitoring and systematization of data on the sale of 100% of untreated timber at auctions.

The Ministry of Environmental Protection and Natural Resources of Ukraine and the EU Delegation to Ukraine discussed the next steps toward establishing the Climate Office. The launch of this office is expected to provide substantial support for implementing Ukraine's Recovery Plan and aligning national legislation with EU standards. A key priority of the Climate Office will be the development and support of tailored climate financing approaches for Ukraine.

International cooperation. Reports indicate that Ukraine and Romania have reached a settlement regarding the long-standing dispute over the construction of the Danube-Black Sea deep-water shipping lane. The agreement was reached on the sidelines of the Ninth Meeting of the Parties to the Espoo Convention (Geneva, December 12-15).

Ukraine and the Republic of Moldova reached agreements on the sustainable use and protection of the Dniester River. The discussions also focused on coordinating and harmonizing actions in light of their status as EU candidate countries. Additionally, the parties reviewed the Regulation on Cooperation on Water Monitoring and Information Exchange in the Dniester River Basin (Ivano-Frankivsk, November 22-23).

The following events were held in 2023, including: (1) XVIII meeting of the Ukrainian-Slovak Commission on Border Waters: the parties reviewed cooperation on border watercourses for the period 2019-2023. Key topics included the implementation of hydraulic engineering and operational activities, measures for protecting the quality of border waters, the hydrometeorological situation in the region, and the development of joint international projects (Kaluza village, Slovak Republic, December); (2) XXV meeting of Ukraine and Hungary on border water management: the parties reviewed and summarized activities conducted from October 2021 to December 2023. Key issues on the agenda included the irrigation of border systems using water from the Borzhava and Tisza rivers, as well as exploring strategies for managing water scarcity (December).

³⁶⁵ Kakhovka HPP is a last structure in the Dnieper reservoir cascade. It is located on the south of Ukraine, 5 km far from New Kakhovka city. With the destruction of the Kakhovka HPP, Ukrhydroenergo lost a station with a capacity of 343.2 MW and about 1.5 billion to 2 billion kWh of electricity, which the station produced. The company also lost maneuvering capacity to regulate peak loads, in particular, in the Kherson and Mykolaiv regions

³⁶⁶ in 2018, the first solar farm was opened near the Chernobyl nuclear power plant. This project involved the installation of 3,762 solar modules, the construction and equipping of transformer substations, and the establishment of a robust system for the physical protection of the structures

11.6. Middle East

Seven out of the 10 [most water-stressed nations](#) are in the Middle East and North Africa. In those countries, the average water stress level is 820 percent, which means that the annual water withdrawal is eight times higher than the water supply from renewable resources. As of 2017, the countries with the highest water stress levels were: Egypt (6,420 percent), Bahrain (3,878 percent) and the United Arab Emirates (1,708 percent). To provide their residents with enough water, several countries in the region, particularly in the Gulf, rely on desalination.

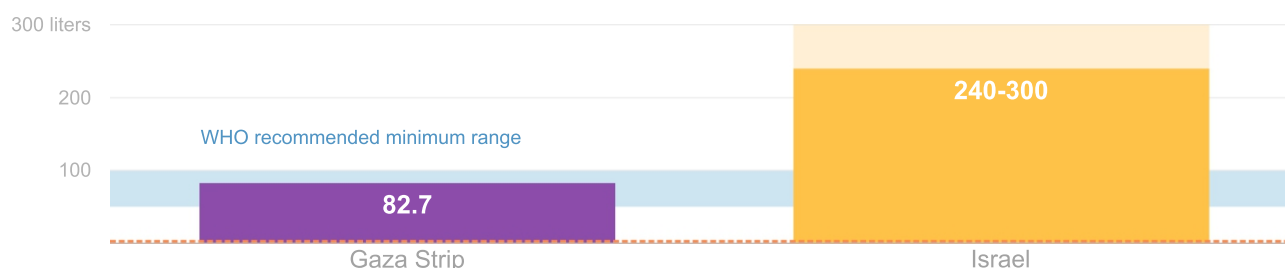
In response to growing water scarcity, **Egypt** is actively implementing new measures to mitigate the threat of water shortages. The government has committed to investing over \$4.7 trillion in water-related projects, including 30 new initiatives – nine assigned to the Ministry of Irrigation and 21 to the Ministry of Housing. To date, several large-scale projects have been executed in the water sector, notably the launch of the world's largest wastewater

treatment plant in Cairo and the construction of desalination plants along the country's coastline.

Gaza's limited water access. According to the Palestinian Water Authority, Gazans have long lacked access to the minimum amount of water required for daily needs.³⁶⁷ Most of their water supply comes from the coastal aquifer, which is severely over-extracted and affected by saltwater intrusion, sewage contamination, and near depletion. As a result, this water is salty and brackish, with up to 96 percent deemed unsuitable for human consumption.

United Nations are [warning](#) that millions of Palestinians face dehydration and are at risk of waterborne disease in an escalating water crisis as Israel continues to withhold essential supplies from Gaza in the wake of Hamas' Oct. 7 attack. The last functioning desalination plant shut down on Sunday due to lack of fuel, as did the last functioning wastewater treatment plant.

Daily water consumption estimates before the war, liters per capita



Sources: UN Atlas of Sustainable Development 2020 (Israeli consumption); Palestinian Water Authority (2021 Gaza consumption)
Graphic: Rachel Wilson, CNN

Jordan signed an [agreement](#) to receive a grant worth \$845.1 million from the United States, as part of annual U.S. financial aid to the Arab country. The grant will support Jordan in its efforts to implement a number of development projects and economic reforms in sectors such as public finance, water, energy, education, health and housing, among others.

Iraq's Ministry of Water Resources has warned that Iraq is facing its worst water shortage in a century with 7 million people experiencing reduced access to the resource. According to the United Nations, 90 percent of the country's rivers are polluted and Iraq will meet only 15 percent of its water demands by 2035. Moreover, Iraq is considered a country with [high water stress](#). About 98% of Iraq's surface water comes from the Tigris River and the Euphrates River, both of which originate from Turkey. It is suggested that by 2040, the Tigris River and the Euphrates River will be completely dry within the borders of Iraq.

Habbaniyah Lake is rapidly shrinking. Due to the declining flow of the Euphrates River from neighboring Syria, a barrage in Ramadi³⁶⁸ began redirecting the water away from the lake and towards Fallujah. 13,000 residents who live around the lake have been affected by shortages caused by redirection of water. The crisis in Habbaniyah Lake is just one aspect of Iraq's environmental threats.

One of the most significant climate disasters of all 2023 was the **Libya floods** in September. Around 11,000 people are thought to have lost their lives when Storm Daniel led to flash floods. One impact was the bursting of two dams near Derna. Rivers flooded in five provinces and almost 1 million people were affected, representing more than 10% of Libya's population. This kind of extreme event has become up to 50 times more likely and up to 50% more intense compared to a 1.2°C cooler climate. Source: Counting the cost 2023: A year of climate breakdown, Christian Aid, December 2023.

³⁶⁷ according to a UNGA resolution adopted in July 2010, every person shall have a right to sufficient water for personal and domestic uses, between 50 and 100 litres of water per person per day

³⁶⁸ a barrage in Ramadi was built in 1955 to fill Habbaniyah Lake with water



12

SECTION

Thematic Reviews

12.1. Climate Change

State of Climate in 2023

According to [WMO annual report](#), 2023 was the warmest year on record. Records were once again broken, and in some cases smashed, for greenhouse gas levels, surface temperatures, ocean heat and acidification, sea level rise, Antarctic sea ice cover and glacier retreat. 2023 has shown that ongoing climate change is having an increasing impact on our planet.

Key messages

Temperature. 2023 was the warmest year in the 174-year observational record: the global mean near-surface temperature in 2023 was $1.45 \pm 0.12^\circ\text{C}$ above the 1850-1900 average. It also clearly surpassed the previous joint warmest years, 2016 at $1.29 \pm 0.12^\circ\text{C}$ above the 1850-1900 average and 2020 at $1.27 \pm 0.13^\circ\text{C}$. The long-term increase in global temperature is due to increased concentrations of greenhouse gases in the atmosphere. The shift from La Niña to fully developed El Niño conditions in mid-2023 likely explains some of the rise in temperature from 2022 to 2023.

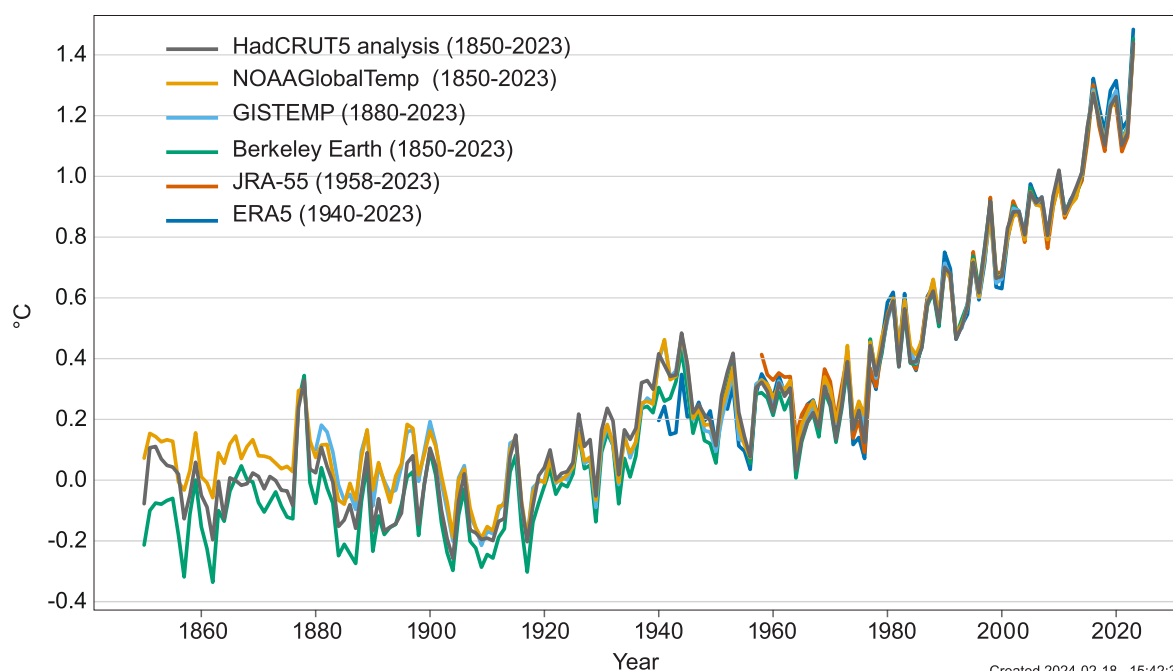
Greenhouse gases. Concentrations of the three main greenhouse gases – carbon dioxide, methane and nitrous oxide – reached record-high observed levels in 2022 and continued to increase in 2023.

Glaciers. 2023 showed the largest loss of ice on record (1950-2023), driven by extremely negative mass balance in both western North America and Europe. Glaciers in western North America and the European Alps experienced an extreme melt season. In Switzerland, glaciers have lost about 10% of their remaining volume in the past two years. Western North America experienced record glacier mass loss at rates that were five times higher than rates measured for the period 2000-2019. Glaciers in western North America lost an estimated 9% of their 2020 volume over the period 2020-2023.

Ocean. In 2023, ocean heat content reached its highest level. It is expected that warming will continue – a change that is irreversible on centennial to millennial timescales.

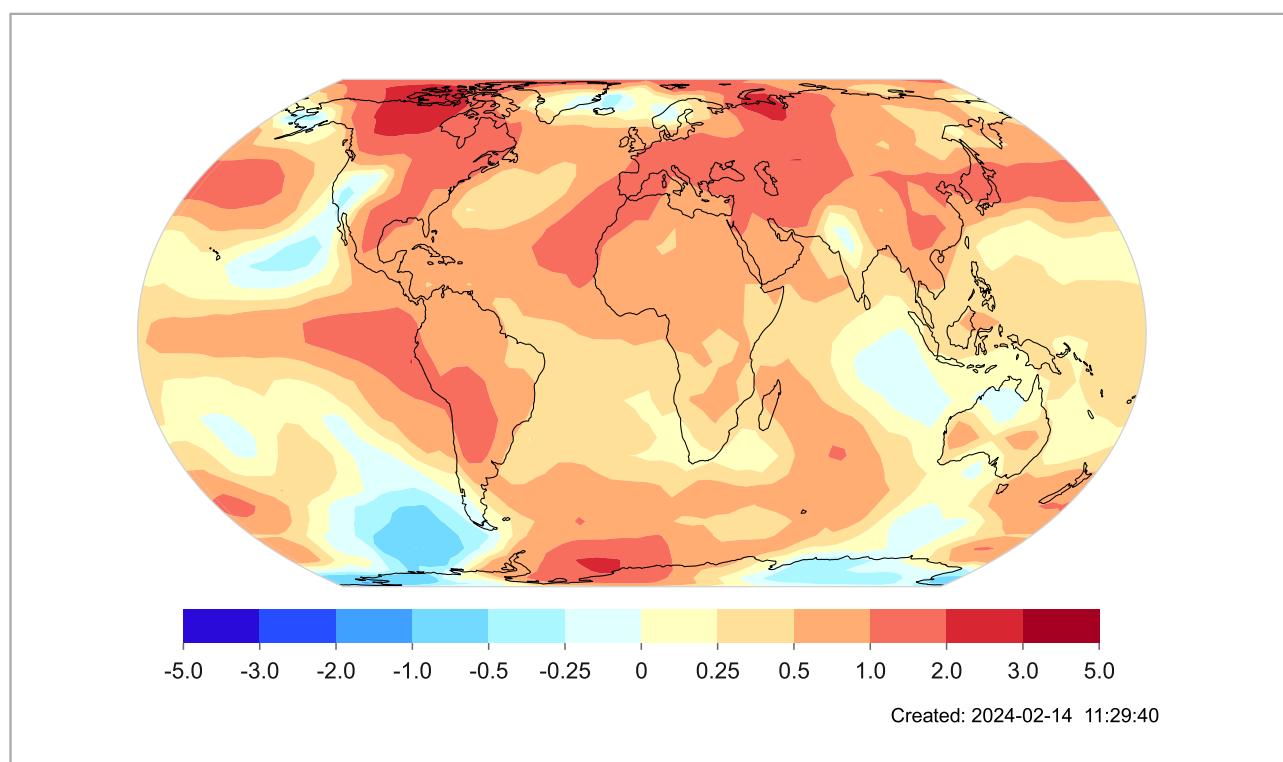
Most of the global ocean from roughly 20°N to 20°S of the equator had been in a marine heatwave state since early November. Of note in 2023 were the persistent and widespread marine heatwaves in the North Atlantic, which began in the northern hemisphere spring, peaked in extent in September and persisted through the end of the year, with temperature anomalies in the open ocean of $+3^\circ\text{C}$. The Mediterranean Sea experienced near-complete coverage of strong and severe marine heatwaves for the twelfth consecutive year.

Annual global mean temperature anomalies (relative to 1850-1900).
Data are from the six datasets indicated in the legend.



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Mean near-surface temperature anomalies (difference from the 1991-2020 average) for 2023.
Data are the median of the six datasets indicated in the legend



The ocean acidification increases as a result of absorption of CO₂.

Sea level. In 2023, global mean sea level reached a record high in the satellite record (from 1993 to present), reflecting continued ocean warming as well as the melting of glaciers and ice sheets.

The rate of global mean sea-level rise in the past 10 years (2014-2023) is more than twice the rate of sea-level rise in the first decade of the satellite record (1993-2002).

Socio-economic and environmental impacts

Extreme weather had major impacts on all inhabited continents in 2023.

Long-term **drought** persisted in North-western Africa and parts of the Iberian Peninsula, as well as in parts of Central and South-West Asia, and intensified in many parts of Central America, northern South America and the southern United States. In Uruguay, water storages reached critically low levels, badly affecting the quality of supplies to major centers, including Montevideo.

Flooding. Flooding associated with extreme rainfall from Mediterranean Cyclone Daniel affected Greece, Bulgaria, Türkiye and Libya. Tropical Cyclone Freddy in February and March was one of the world's longest-lived tropical cyclones impacting severely Madagascar, Mozambique and Malawi.

Heatwaves. Many significant heatwaves occurred in various parts of the world, especially in the second half of July, when severe and exceptionally persistent heat occurred in southern Europe and North Africa, including: 48.2°C in Italy; 49.0°C in Tunis; 50.4°C in Morocco; 49.2°C in Algeria. This caused extensive wildfire activity during the summer, particularly in Greece, where 96,000 ha were burned.

The deadliest single wildfire of the year occurred in Hawaii, where at least 100 deaths were reported.

Food insecurity. The number of people who are acutely food insecure worldwide has more than doubled, from 149 million people before the COVID-19 pandemic to 333 million people in 2023. Although global hunger levels remained unchanged from 2021 to 2022. However, they are still far above pre-COVID 19 pandemic levels: in 2022, 9.2% of the global population (735.1 million people) were undernourished.

Protracted conflicts, economic downturns and high food prices are at the root of high global food insecurity levels. High food prices are exacerbated by the high costs of agricultural inputs, driven by ongoing and widespread conflict around the world, and high global food insecurity levels are aggravated by the effects of climate and weather extremes. In southern Africa, for example, weather extremes, including the passage of Cyclone Freddy, have affected areas of Madagascar, southern Malawi, Mozambique and Zimbabwe and caused severe damage on crops and economy. Afghanistan experienced a substantial reduction in snowmelt and rainfall, resulting in another poor crop season.

Between May and October, 15.3 million Afghans were estimated to face severe acute food insecurity, especially in the north and northeast of the country. The return of El Niño in 2023 led to adverse consequences through the entire crop cycle of maize in Central America and northern parts of South America,

where water deficits and high temperature had negative impacts on final production, particularly for smallholders and more vulnerable households in the Dry Corridor. Floods in July affected the main crop-land areas in Libya, which was already in a state of food crisis and in need of external assistance.

Climate and Water Resources

Record temperatures across most of the world in 2023 also affected the global water cycle, from intensifying cyclones and other rainfall systems, to exacerbating drought and fire activity. In 2023, the Global Water Monitor Consortium³⁶⁹ published its [second annual report](#).

Key messages

Precipitation was close to average. There does not appear to be a clear trend towards more monthly high or low rainfall extremes. However, total precipitation in 2023 was unusually high in some regions at high northern latitudes (including Arctic Canada and parts of northern Europe), the Arabian Peninsula, the Horn of Africa, south Asia and the Himalayas.

Rainfall was unusually low in the southern half of Canada, Central America, the north and east of South America, the western Mediterranean, and Central Asia. Annual rainfall was unusually low in Mexico, Turkmenistan and Morocco ($\sigma < -2$).

The lowest annual rainfall since 1979 was recorded for six river basins in Canada, the Sao Francisco River in eastern Brazil, along the Central American coast, the Aral Basin. Record high annual precipitation was observed in several Arctic basins, as well as river catchments in Sweden and the Tibet Plateau.

Air humidity. Air humidity over land was the second lowest on record, continuing a trend towards drier average and extreme conditions. A total of 20 countries and territories experienced unusually low air humidity ($\sigma < -2$) in 2022. They include Russia, Turkmenistan and Uzbekistan in Central Asia, five countries and territories in the Caribbean, five in South America (including Brazil), three in North-Africa, Sudan and South Sudan in Eastern Africa.

Soil water. Despite warmer and drier conditions, high annual soil water conditions were observed in many

regions, with relatively wet soils across Europe, South and Eastern Asia, the western USA and Northern Australia.

Very dry soil conditions occurred in Central Asia (especially in Turkmenistan), the south of South America and in some regions in high northern latitudes.

Surface water occurrence. In 2023, global surface water occurrence was the second lowest in two decades, but months with record high water occurrence appear to be increasing globally. Annual water occurrence was average or below average in most countries. Water extent was unusually low for Turkmenistan due to ongoing water level declines in the Caspian Sea and in the Falkland Islands. Water occurrence was extremely high in Ethiopia, South Sudan and Egypt due to high rainfall in the Upper Nile. Water occurrence was also unusually high in 14 other countries, including India and Nepal in Asia, Guinea-Bissau and Chad in Africa, Cuba and several smaller island states.

River flows. In 2023, global river flows were slightly lower than the previous year. River flows were: (1) extremely high in both Congo's and unusually high and/or the highest since 2003 in Nigeria, the Central African Republic and Ethiopia in Africa, the UK, Ireland and Denmark in Europe, El Salvador and Ecuador in the Americas, Iran and Azerbaijan in Asia, and in New Zealand; (2) low and/or the lowest since 2003 in Georgia, Bhutan and Myanmar in Asia and Colombia in South America.

Terrestrial water storage³⁷⁰ was unusually low in much of North and Central America, the Mediterranean region, North Africa, Central Asia, and parts of China and South Asia. Long-term declines in Caspian Sea level and retreating mountain glaciers play a role in some of these regions. Terrestrial water storage was unusually high in most of the northern high latitudes, as well as isolated parts of South America, Africa and Oceania.

Climate Change Agreement

As of February 2023, 198 members of UNFCCC, which represent over 98% of global GHG emissions, are parties to the Paris agreement. China and USA are

the largest emitters of CO₂ among the members of the UNFCCC.³⁷¹ Since 2020, countries have been submitting their national action programs on climate

³⁶⁹ the Global Water Monitor Consortium brings together several public and private research and development organisations that share a goal of providing free, rapid and global information on climate and water resources (<http://www.globalwater.online/>)

³⁷⁰ the sum of all water on the continents, including soil water, groundwater and surface water as well as snow and ice

³⁷¹ UN Framework Convention on Climate Change

change, known as Nationally Determined Contributions (NDCs).

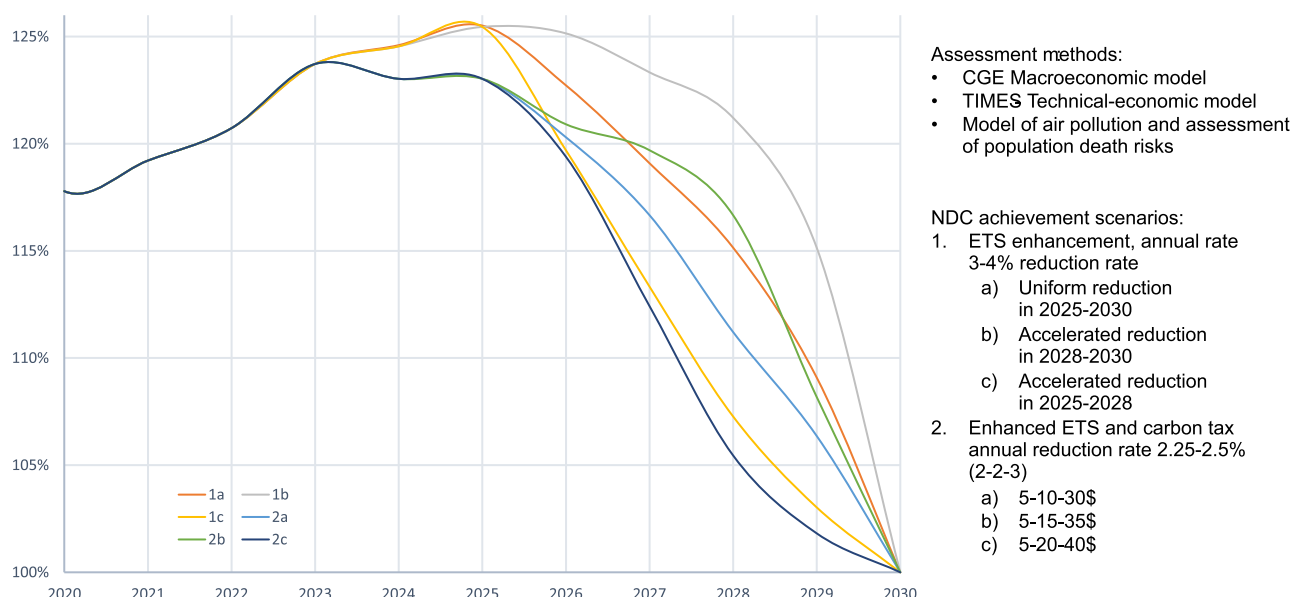
Implementation of Paris Agreement in CA

All five Central Asian countries ratified the Paris Agreement to address the climate change threats and take appropriate measures. This necessitates a profound transformation of national energy systems, requiring substantial investments in sustainable infrastructure. Crucially, achieving climate goals demands that national development plans are fully aligned with ambitious climate action targets.

Kazakhstan ratified the Paris Agreement in November 2016 and set the goal to mitigate climate change at the net zero level by adopting a carbon neutrality strategy for 2060. In 2023, Kazakhstan launched its **updated NDC**, which included an unconditional target of reducing GHG emissions by 15% by the end of 2030 relative to 1990 base year. The country has adopted the Development Strategy of the Republic of Kazakhstan until 2050, the Environmental Code, the Emissions trading system and the taxonomy of green projects³⁷² that contribute to transition to RES. Thus, the Government has set the goal that the share of RES in electricity production shall be increased to 15% by 2030 and to 50% by 2050.

Scenarios for achieving NDCs of Kazakhstan by 2030

Emission reduction projections



Kyrgyz Republic submitted its updated NDC in October 2021. The Republic has committed to unconditionally reduce GHG emissions by 16.63% by 2025 and by 15.97% by 2030, under the business-as-usual scenario. Should international support be provided, GHG emissions will be reduced by 36.61% by 2025 and by 43.62% by 2030. The country has developed and is implementing the following strategic documents related to the NDC: National Development Strategy of the Kyrgyz Republic for 2018-2040, Climate Investment Program of the Kyrgyz Republic and Program for the Development of a Green Economy in the Kyrgyz Republic for 2019-2023. In 2025, some adaptation measures of NDC will be revisited for 2026-2030.

Tajikistan launched its updated **NDC** in October 2021. In line with this NDC, the country is committed to reduce GHG emissions by 40-50% subject to an international funding by 2030 (against 1990). The uncondi-

tional contribution (NDC) of reducing GHG in Tajikistan is to reduce GHG by 30-40% by 2030 (against 1990) through enhanced adaptation in energy, water, agriculture, forestry and transport sectors. The National Development Strategy of Tajikistan until 2030, the Mid-Term Development Program (MDP) of the Republic of Tajikistan for the period of 2021-2025, the National Strategy of Tajikistan for Disaster Risk Reduction for 2019-2030 and the National Strategy for Adaptation to Climate Change until 2030 have been developed and are implemented in the country.

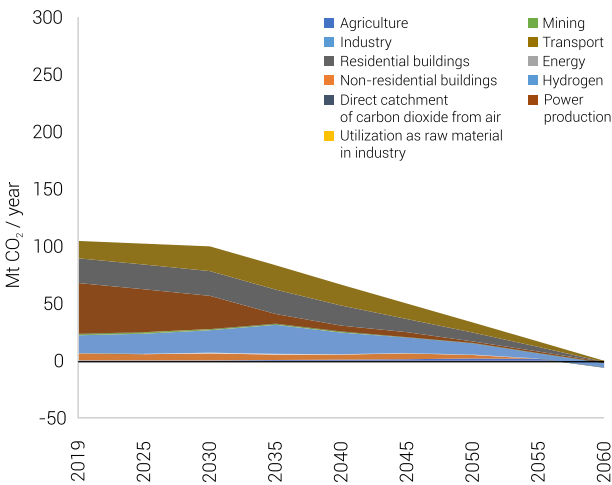
Turkmenistan in its second **NDC** submitted in 2022 commits to reduce GHG emissions by 20% by 2030 (against 2010). GHG emissions increased in Turkmenistan from 58.4 MtCO₂ in 2010 and 63 MtCO₂ in 2020 to 65.7 MtCO₂ in 2021. The specified target covers economy as a whole, including energy, industry, agriculture. It embraces CO₂, CH₄, N₂O and foamed plastic emissions.

³⁷² a classification framework for defining what can be called environmentally sustainable investments

Turkmenistan also declared the adaptation measures until 2030, in particular, increase resilience and reduce vulnerability to climate change to achieve sustainable economic growth. For this, the country needs about \$500 million of international support.

Uzbekistan submitted the updated NDC in October 2021. The goal is to reduce by 2030 specific greenhouse gas emissions per unit of GDP by 35% from the level of 2010. This is more than in the first NDC, which outlined the reduction by 10%. The updated NDC also increases adaptation, especially in agriculture. Additionally, the country works to align the NDC with the Strategy for Transition of the Republic of Uzbekistan to a Green Economy by 2030. The NDC goals are to be achieved by increasing the share of RES in power production to 25%, deploy alternative fuel types in the transport sector, improve solid waste management, promote energy-saving technologies in all economic sectors, expand forest areas, etc.

Zero emission scenario by 2060



Climate Change Conference 28

The 28th Conference of the Parties to the UN Framework Convention on Climate Change (COP28) took place under the motto 'Climate action can't wait' in Dubai, United Arab Emirates, from November 30 to December 13, 2023. Participants from almost 200 countries have recognized the need to transit away

from fossil fuel. Thus, COP28 was marked by the adoption of the UAE Consensus, an ambitious document, which addressed all key aspects of climate policy.

With this Consensus, the parties have committed to the following:

Tripling renewable energy capacity globally and doubling the global average annual rate of energy efficiency improvements by 2030

accelerating efforts towards the phase-down of unabated coal power

accelerating global efforts to develop and deploy zero-emission energy systems powered by zero- and low-carbon fuels, targeting widespread adoption well before mid-century

transitioning away from fossil fuels in energy systems, in a just, orderly and equitable manner, accelerating action in this critical decade, so as to achieve net zero by 2050 in keeping with the science

accelerating zero- and low-emission technologies, including, inter alia, renewables, nuclear, abatement and removal technologies such as carbon capture and utilisation and storage, particularly in hard-to-abate sectors, and low-carbon hydrogen production

accelerating and substantially reducing non-carbon-dioxide emissions globally, including in particular methane emissions by 2030

accelerating reductions in road transport emissions across all fronts, including by rapidly expanding infrastructure for and deploying zero- and low-emission vehicles

phasing out inefficient fossil fuel subsidies that do not address energy poverty or just transitions, as soon as possible

Other COP28 outcomes

For the first time in UNFCCC conferences, COP28 addressed such areas as **health, trade, relief, recovery and peace**. The outcomes were as follows:

- in order to work towards ensuring better health outcomes, including through the transformation of health systems to be climate-resilient, low-carbon, sustainable and equitable, and to better prepare communities and the most vulnerable populations for the impacts of climate change, the countries united and signed the [COP28 UAE Declaration on Climate and Health](#);

- The [loss and damage](#) fund designed to support climate-vulnerable developing countries was brought to life³⁷³; countries have pledged \$3.5 billion to replenish the resources of the [Green Climate Fund](#). At the GCF's High-level Pledging Conference in Bonn in October 5, 2023, 25 countries pledged their support to GCF totaling \$9.3 billion;

- COP28 Presidency also launched the [UAE Declaration on Sustainable Agriculture, Resilient Food Systems, and Climate Action](#); more than \$2.5 billion has been mobilized by the global community to support food security and the UAE and the Bill & Melinda Gates Foundation launched a partnership for Food Systems, Agriculture Innovation and Climate Action;

- 72 countries and 39 organizations joined the newly created Coalition for High Ambition Multilevel Partnership ([CHAMP](#)) for Climate Action. The Coalition aims to enhance cooperation, where applicable and appropriate, with subnational governments in the planning, financing, implementation, and monitoring of climate strategies;

- the COP28 Gender-Responsive Just Transitions and Climate Action Partnership was launched. This partnership represents a [package of commitments](#) in

support of the goals of the enhanced Lima Work Program on Gender and its Gender Action Plan. Kyrgyzstan joined the partnership among the Central Asian countries;

- 38 countries signed the [UNESCO Declaration](#) on the common agenda for education and climate change, where they committed to incorporate climate education into their NDCs and national adaptation plans. Uzbekistan is one of founding partners of the Declaration;

- 43 countries and the European Union have joined the [Freshwater Challenge](#), committing to conserve and restore 30% of degraded freshwater ecosystems. Tajikistan joined this Challenges among the Central Asia countries.

Central Asian countries at COP28

For the CA countries COP28 has started from the presentation of the [Regional Climate Change Adaptation Strategy](#) for Central Asia. The document outlines four strategic objectives: (1) strengthen regional coordination for climate change; (2) create mechanisms for the development and implementation of adaptation projects/programs and attraction of financing; (3) improve adaptive capacity through accumulation and sharing of knowledge and scientific cooperation; (4) develop climate monitoring, information exchange and forecasting systems.

During the 10th [meeting](#) of representatives from the MFAs and Parliamentarians of Central Asian countries, a regional statement on combating climate change was presented. This statement holds significant importance for the countries of the region and the global negotiation process. It strengthens the collective voice of the region, promotes regional cooperation and partnerships, demonstrates a shared commitment, and enhances the effectiveness of global negotiations.

Climate Change Reports

WMO has published the [Global Climate 2011-2020: A Decade of Acceleration report](#). This multi-agency effort provides a summary of the state of climate, extreme events and their socio-economic impacts from 2011-2020. The 2011-2020 report is the second in the series of the report, following the first decadal analysis from 2001-2010.

IPCC has released its sixth assessment report, [AR6 Synthesis Report: Climate Change 2023](#). The report highlights the shrinking window of opportunity to limit global temperature rise to 1.5°C and the escalating climate-related risks. Global temperatures could increase by up to 4°C, leading to severe consequences such as heightened water scarcity, food shorta-

ges, and declines in well-being and health. Addressing these challenges requires transitioning away from fossil fuels and significantly increasing investments in renewable energy.

10 New Insights in Climate Science 2023/2024

1. Overshooting 1.5°C is fast becoming inevitable. Keeping global mean temperature rise within 1.5°C is only possible in the near term with immediate, transformative action that rapidly decarbonises the economy, energy and land-use systems, cutting emissions by 43% by 2030 relative to 2019 levels.

2. A rapid and managed fossil fuel phase-out is required to stay within the Paris Agreement target range.

³⁷³ the total amount of pledges is \$661 million as of January 2024

Governments and the private sector must stop enabling new fossil fuel projects, accelerate the early retirement of existing infrastructure, and rapidly increase the pace of renewable energy deployment. High-income countries must lead the transition and provide support for low-income countries.

3. Robust policies are critical to attain the scale needed for effective carbon dioxide removal (CDR).

Meeting the Paris Agreement's targets will require scaling up CDR from a current level of about 2 billion tonnes of CO₂ to at least 5 billion tonnes or more by 2050. Today, virtually all CDR consists of afforestation and reforestation. Only 0.1% of current removals come from the rest of deployed methods, such as direct air capture and storage, bioenergy with carbon capture and storage, enhanced weathering, etc. However, almost all scenarios that limit warming to 1.5°C or 2°C rely on large-scale deployment of these CDR methods.

4. Over-reliance on natural carbon sinks is a risky strategy: their future contribution is uncertain.

Until now, land and ocean carbon sinks have grown in tandem with increasing CO₂ emissions, but research is revealing that carbon sinks may well absorb less carbon in the future than has been presumed from existing assessments. Therefore, emission reduction efforts have immediate priority, with nature-based solutions serving to increase carbon sinks in a complementary role to offset hard-to-abate emissions.

5. Joint governance is necessary to address the inter-linked climate and biodiversity emergencies.

The international conventions on climate change and biodiversity must find better alignment. Ensuring that the allocation of climate finance has nature-positive safeguards, and strengthening concrete cross-convention collaboration, are examples of key actions in the right direction.

6. Compound events amplify climate risks and increase their uncertainty.

"Compound events" refer to a combination of multiple drivers and/or hazards (simultaneous or sequential), and their impacts can be greater than the sum of individual events. Crops are particularly sensitive to the simultaneous occurrence of extreme hot and dry conditions. Early spring followed by a late frost, can also harm crops. Given that a large proportion of crops are grown in just a few breadbasket regions, global food security is threatened. Therefore, identifying and preparing for specific compound events is crucial for robust risk management and providing support in emergency situations.

7. Mountain glacier loss is accelerating. New global glacier projections estimate that glaciers will lose between 26% (at +1.5°C) and 41% (at +4°C) of their current volume by 2100. This threatens populations downstream with water shortages in the longer term (approximately 2 billion worldwide), and exposes

mountain dwellers to increased hazards, such as flash flooding.

8. Human immobility in areas exposed to climate risks is increasing.

People facing climate risks may be unable or unwilling to relocate, and existing institutional frameworks do not account for immobility and are insufficient to anticipate or support the needs of these populations.

9. New tools to operationalize justice enable more effective climate adaptation.

Monitoring the distinct dimensions of justice and incorporating them as part of strategic climate adaptation planning and evaluation can build resilience to climate change and decrease the risk of maladaptation.

10. Reforming food systems contributes to just climate action.

Food systems are responsible for 31% of global GHG emissions and are capable of pushing global warming towards 2°C by 2100 barring significant changes to the status quo. At the same time, over 700 million people face hunger, and marginalised groups are disproportionately affected by food insecurity. Sustainability transformations research shows that fundamental food systems change might take decades, so action cannot be delayed any further. Sufficiency, regeneration, distribution, commons and care are guiding principles to steer the restructuring of food systems.

Source: [10NICS-2023-Report_digital.pdf](#)

UNEP has published the **14th edition** of the **Emissions Gap Report for 2023** entitled "**Emissions Gap Report 2023: Broken Record – Temperatures hit new highs, yet world fails to cut emissions (again)**". The report concludes that 2023 was marked by broken records and unmet commitments: greenhouse gas emissions remain high, global temperatures reached unprecedented levels, and the impacts of climate change are intensifying and accelerating. Moreover, financial resources intended to support vulnerable communities in adapting to climate change remain undispersed.

Key messages:

1. Global GHG emissions set new record of 57.4 GtCO₂e in 2022.³⁷⁴

Global GHG emissions increased by 1.2% from 2021 to 2022 to reach a new record of 57.4 GtCO₂e. Global primary energy consumption expanded mainly through a growth in coal, oil and renewable electricity supply – whereas gas consumption declined by 3% following the energy crisis and the war in Ukraine. Investments in fossil fuel extraction and use have continued in most regions worldwide.

2. Current and historical emissions are highly unequally distributed within and among countries, reflecting global patterns of inequality.

Per capita territorial GHG emissions vary significantly across countries. They are

³⁷⁴ gigatons of CO₂ equivalent

more than double the world average of 6.5 tons of CO₂ equivalent (tCO₂e) in the Russian Federation and the United States of America, while those in India remain under half of it.

3. There has been negligible movement on NDCs since COP27, but some progress in NDCs and policies since the Paris Agreement was adopted. If all new and updated unconditional NDCs are fully implemented, they are estimated to reduce global GHG emissions by about 5.0 GtCO₂e annually by 2030, compared with the initial NDCs. The combined effect of the nine NDCs submitted since COP27 amounts to around 0.1 GtCO₂e of this total. Thus, while NDC progress since COP27 has been negligible, progress since the adoption of the Paris Agreement is more pronounced, although still insufficient to narrow the emissions gap.

4. The number of net-zero pledges continues to increase, but confidence in their implementation remains low. As at 25 September 2023, 97 Parties covering approximately 81% of global GHG emissions had adopted net-zero pledges either in law (27 Parties), in a policy document such as an NDC or a long-term strategy (54 Parties), or in an announcement by a high-level government official (16 Parties). Responsible for 76 per cent of global emissions, all G20 members except Mexico have set net-zero targets. However, most concerningly, none of the G20 members are currently reducing emissions at a pace consistent with meeting their net-zero targets.

5. The emissions gap in 2030 remains high: current unconditional NDCs imply a 14 GtCO₂e gap for a 2°C goal and a 22 GtCO₂e gap for the 1.5°C goal. The additional implementation of the conditional NDCs reduces these estimates by 3 GtCO₂e. The emissions gap is defined as the difference between the estimated global GHG emissions resulting from full implementation of the latest NDCs and those under least-cost pathways aligned with the long-term temperature goal of the Paris Agreement. The emissions gap for 2030 remains largely unchanged compared with last year's assessment. Full implementation of unconditional NDCs is estimated to result in a gap with below 2°C pathways of about 14 GtCO₂e (range: 13-16) with at least 66% chance.

6. Action in this decade will determine the ambition required in the next round of NDCs for 2035, and the feasibility of achieving the long-term temperature goal of the Paris Agreement. Global ambition in the next round of NDCs must be sufficient to bring global GHG emissions in 2035 to the levels consistent with below 2°C and 1.5°C pathways of 36 GtCO₂e (range: 31-39) and 25 GtCO₂e (range: 20-27) respectively, while also compensating for excess emissions until levels consistent with these pathways are achieved. In contrast, a continuation of current policies and NDC scenarios would result in widened and likely unbridgeable gaps in 2035.

7. If current policies are continued, global warming is estimated to be limited to 3°C. Delivering on all unconditional and conditional pledges by 2030 lowers this estimate to 2.5°C, with the additional fulfillment of all net-zero pledges bringing it to 2°C. Even in the most optimistic scenario, the chance of limiting global warming to 1.5°C is only 14%, and the various scenarios leave open a large possibility that global warming exceeds 2°C or even 3°C. This further illustrates the need to bring global emissions in 2030 lower than levels associated with full implementation of the current NDCs, to expand the coverage of net-zero pledges to all GHG emissions and to achieve these pledges.

8. The failure to stringently reduce emissions in high-income countries and to prevent further emissions growth in low- and middle-income countries implies that all countries must urgently accelerate economy-wide, low-carbon transformations to achieve the long-term temperature goal of the Paris Agreement. Energy is the dominant source of GHG emissions, currently accounting for 86% of global CO₂ emissions. Global transformation of energy systems is thus essential, including in low- and middle-income countries, where pressing development objectives must be met alongside a transition away from fossil fuels.

9. Low- and middle-income countries face substantial economic and institutional challenges in low-carbon energy transitions, but can also exploit opportunities. Access to affordable finance is therefore a prerequisite for increasing mitigation ambition in low- and middle-income countries. Yet, costs of capital are up to seven times higher in these countries compared with the United States of America and Europe. International financial assistance will therefore have to be significantly scaled up from existing levels, and new public and private sources of capital better distributed towards low-income countries, restructured through financing mechanisms that lower costs of capital. These include debt financing, increasing long-term concessional finance, guarantees and catalytic finance.

10. Further delay of stringent global GHG emissions reductions will increase future reliance on CDR³⁷⁵ to meet the long-term temperature goal of the Paris Agreement. CDR is necessary to achieve the long-term goal of the Paris Agreement as reaching net-zero CO₂ emissions is required to stabilize global warming, whereas net-zero GHG emissions will result in a peak and decline in global warming. CDR is already deployed today – mainly in the form of conventional land-based methods, such as afforestation, reforestation and management of existing forests, with a large share located in developing countries. Present-day direct removals through conventional land-based methods are estimated to be 2.0 (±0.9) GtCO₂ annually, almost entirely through conventional land-based methods.

³⁷⁵ carbon dioxide removal

Significant and Major Events

The UNGA adopted a [resolution](#) that asks the International Court of Justice for **an opinion on whether countries have a legal duty to address climate change** and what the legal consequences of climate inaction could be. The resolution came as a growing number of people around the world turned to courts to compel governments and businesses to act on climate change.

Global trends in climate change litigation. Climate-related lawsuits have more than doubled since 2017 according to the [Global Climate Litigation Report: 2023 Status Review](#). While most cases have been brought in the US, climate litigation is taking root all over the world, with about 17 per cent of cases now being reported in developing countries, including Small Island Developing States.

34 cases have been brought by and on behalf of children and youth under 25 years old, including by girls as young as seven and nine years of age in Pakistan and India respectively, while in Switzerland, plaintiffs are making their case based on the disproportionate impact of climate change on senior women. Globally, 55% of cases have had a [climate-positive ruling](#).

Most ongoing climate litigation falls into one or more of six categories: 1) cases relying on human rights enshrined in international law and national constitutions; 2) challenges to domestic non-enforcement of climate-related laws and policies; 3) litigants seeking to keep fossil fuels in the ground; 4) advocates for greater climate disclosures and an end to greenwashing; 5) claims addressing corporate liability and responsibility for climate harms; and 6) claims addressing failures to adapt to the impacts of climate change.

Remarkable climate change litigation cases in 2023

[105 United Nations member countries](#) led by a Pacific Island nation Vanuatu, asked the International Court of Justice to issue an opinion that would clarify the rights and responsibilities of states with regard to climate action. While the opinion will be nonbinding, it would clarify what obligations countries have under international law to tackle climate change and it would become more accessible for individuals to take governments to court.

A state court in [Montana](#) ruled in favor of 16 young people who had sued the state government, arguing that policies favoring fossil fuels had violated their constitutional right to a clean and healthful environment. Although the state has appealed the ruling, the verdict nevertheless marks an important precedent for those who are trying to use the legal system to address climate change.

21 youth plaintiffs in the landmark federal constitutional climate lawsuit, [Juliana v. United States](#) dismissed or delayed for over eight years, are currently moving forward toward trial on the question of whether

the federal government's fossil fuel-based energy system, and resulting climate destabilization, is unconstitutional.

18 young [Californians](#) filed a case against the U.S. Environmental Protection Agency (EPA). They allege that the EPA has been allowing dangerous levels of climate pollution, thereby harming and discriminating against them.

The Native American tribes – Makah Indian Tribe and the Shoalwater Bay Indian Tribe – filed the [first climate deception lawsuits](#) against fossil fuel giants such as Exxon Mobil, Shell, and others in Washington state's King County Superior Court.

Source: <https://blog.ucsusa.org/delta-merner/climate-litigation-reflection-and-anticipation-for-2024/>

An appeals court issued a landmark ruling in a human rights lawsuit filed by a group of [Belgian](#) citizens against the national government and regional jurisdictions. The court mandated that the Belgian government must slash carbon emissions by at least 55 percent below 1990 levels by the year 2030.

Greenpeace Nordic and Young Friends of the Earth Norway challenged the [Norwegian](#) government's approval of three new North Sea oil fields.

Six young people from [Portugal](#) – with the younger one being 11 years old- brought a lawsuit against 32 European countries, marking the first instance in which so many national governments had to defend their climate policies collectively before a court. The young plaintiffs initiated the legal action in 2020, following several years of record-breaking heat in Portugal and devastating wildfires in 2017.

Source: <https://www.sustainabilityforstudents.com/post/2023-climate-litigation-in-european-courts-recap>

The [Spanish](#) Supreme Court dismissed the claim filed by the environmental associations GreenPeace España, Ecologistas en Acción-CODA and Oxfam Intermón against the Spanish government, confirming the alignment of its climate efforts with Spain's commitments under the Paris Agreement.

Five farmers have petitioned a court to compel the Kenyan Government to limit the volume of greenhouse gas emissions in [Kenya](#) by 30%. The farmers claim that the emissions are posing a threat to the earth's temperature, which is having negative side-effects in Kenya in the form of flooding, heat stress, forest fires, droughts, as well as disruption of food production and the supply of clean drinking water.

Source: <https://www.nortonrosefulbright.com/en-hk/knowledge/publications/671a4943/climate-change-litigation-update-july-2023>

The International Court of Justice (ICJ) was requested an advisory opinion on climate change ([March 29](#)). The UNGA in line with its resolution (A/77/L.58)

initiated by the Republic of Vanuatu requested clarifications on the obligations of States with respect to climate change. For Vanuatu, similarly to other small island developing states, this is also a chance to spur transformative climate action, advance climate justice, and protect the environment for present and future generations.

An advisory opinion focuses on interpretation of the obligations in the Paris Agreement and UNFCCC and

also on the human rights implications of climate change. Although ICJ advisory opinions have no binding force, given the strong reputation and legal weight of the Court, its opinion could possibly influence other courts and domestic litigation, would provide an authoritative statement on “the long-neglected matter of loss and damage” and their compensation and, finally, contribute to a more climate-sensitive global consciousness. See also [International Court of Justice](#).

12.2. Achievement of Sustainable Development Goals

This section examines progress on selected Sustainable Development Goals (SDGs 6, 7, 13, and 15), drawing on UN reports on sustainable development.



The recent [data](#)³⁷⁶ obtained at the midpoint of the 2030 Agenda for Sustainable Development indicate that many of the Goals are severely off track. The ongoing repercussions of the COVID-19 pandemic, compounded by other crises such as climate change and armed conflicts, have exerted a profound and widespread impact on poverty, food security, health, and the environment.

The [Report 2023: Towards a Rescue Plan for People and Planet](#)³⁷⁷ highlights that access to drinking water, sanitation and hygiene improved significantly in rural areas, but stagnated or decreased in urban areas (SDG 6). Water use efficiency has risen by 9%, particularly in agriculture, but rising water stress in several areas is cause for concern. Central and Southern Asia experience high water stress levels, exceeding **75%**, and Northern Africa faces critical water stress, surpassing

100%. 2.2 billion people still lack safely managed drinking water. Sub-Saharan Africa is furthest behind.

The world continues to advance towards sustainable energy targets (SDG 7) – but not fast enough. Developing countries experience **9.6%** annual growth in renewable energy installation.

With a climate cataclysm looming, the pace and scale of current climate action plans are wholly insufficient to effectively tackle climate change (SDG 13). Record-high GHG concentrations are pushing global temperatures higher, with approximately **90%** of heat being absorbed by the ocean. This is causing sea levels to rise through ice loss on land, melting glaciers and ice sheets, and thermal expansion. The rate of global mean sea-level rise has doubled in the past decade – from **2.27** mm per year in 1993-2002 to

³⁷⁶ progress towards the Sustainable Development Goals: towards a rescue plan for people and planet, Report of the Secretary-General (special edition), Economic and Social Council, 78 session of UNGA

³⁷⁷ The Sustainable Development Goals Report 2023: Special edition

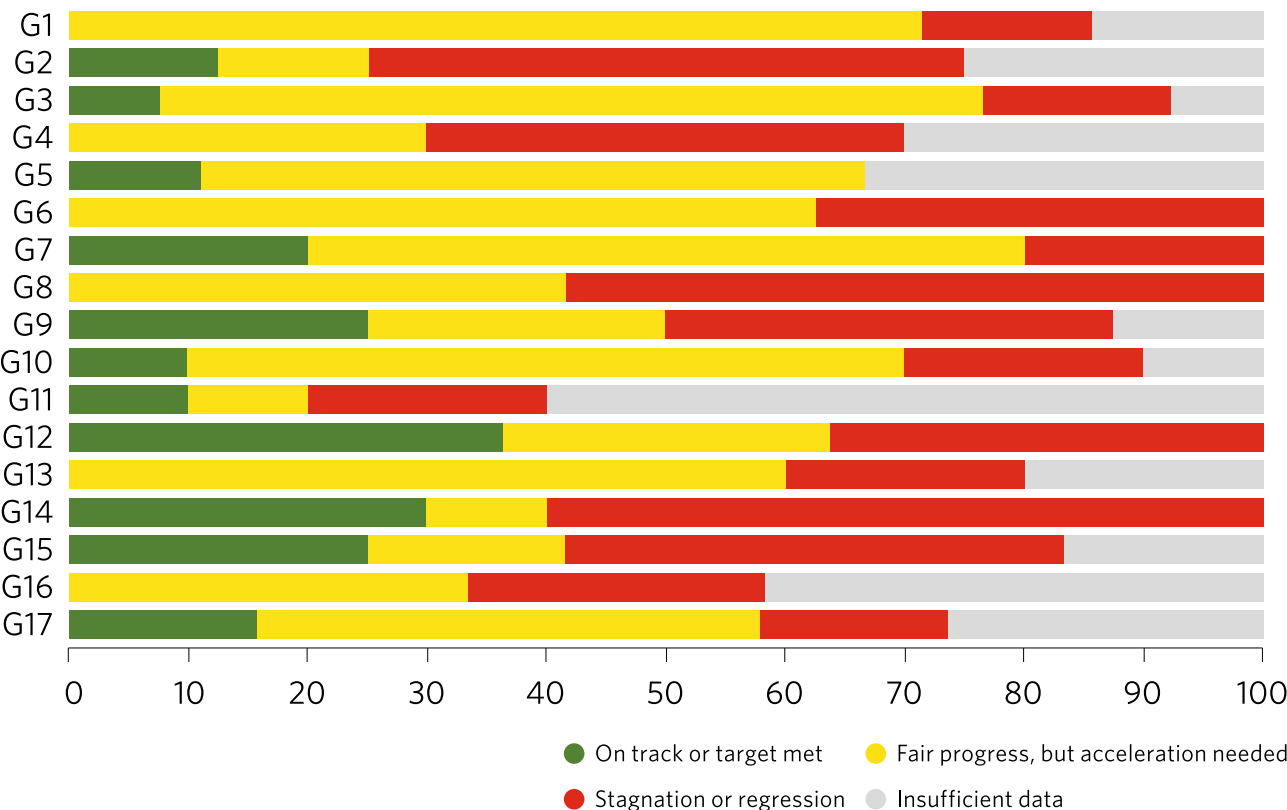
4.62 mm per year. Even with efforts to limit warming to 1.5°C, global sea levels are expected to continue rising over the coming century, creating significant hazards for communities worldwide. This requires global climate-resilient development action, accelerated adaptation and mitigation measures, as well as appropriate finance for climate action.

Despite some progress in sustainable forest management, protected areas, and the uptake of national biodiversity values and natural capital accounting, most improvements have been modest. Deforestation and forest degradation remain major global

threats. Nearly 100 million ha of net forest area have been lost over the past two decades, and global forest coverage decreased to **31.2%**. Agricultural expansion is the direct driver of almost **90%** of global deforestation (cropland accounts for **49.6%** and livestock grazing for **38.5%**). The recently adopted Kunming-Montreal Global Biodiversity Framework provides renewed impetus for Goal 15.

Progress assessment for the 17 Goals based on assessed targets is shown below. The picture is incomplete due to regular problems with obtaining timely data on all 169 targets.

Progress assessment for the 17 Goals based on assessed targets, 2023 or latest data (percentage)



Source: <https://unstats.un.org/sdgs/report/2023/The-Sustainable-Development-Goals-Report-2023.pdf>

Brief review of progress on SDG6 is shown below.

SDG 6

The eight targets of SDG 6 include: **(1)** drinking water (target 6.1), **(2)** sanitation and hygiene (6.2), **(3)** water quality (6.3), **(4)** water-use efficiency and level of water stress (6.4), **(5)** integrated water resources management (IWRM) and transboundary water cooperation (6.5), **(6)** water-related ecosystems (6.6), **(7)** international water cooperation (6.a), and **(8)** community participation (6.b).

According to the midterm review from the [SDG 6 Synthesis Report on Water and Sanitation 2023](#),³⁷⁸ progress towards SDG 6 continues to be well below the pace needed to meet the targets by 2030:

■ To meet the global target of universal access by 2030, progress needs to increase six times faster for safely managed drinking water, five times faster for

³⁷⁸ based on the results of the third round of global data compilation on SDG 6 indicators in 2023 as part of the Integrated Monitoring Initiative for SDG 6

safely managed sanitation and three times faster for basic hygiene.

- A significant portion (42%) of household wastewater is not treated properly. Data gaps make it difficult to assess global trends.

- Water stress has increased globally.

- Since 2017 to 2023, the global average degree of IWRM implementation increased from 49 to 57%, but the current rates of progress need to be doubled to achieve the global target:

(a) *at the regional level, significant efforts to accelerate IWRM implementation are needed in Central and Southern Asia, Latin America and the Caribbean, Oceania and sub-Saharan Africa since these regions have made limited progress and are lagging behind other regions;*

(b) *only 44 countries have achieved a high or very high degree of IWRM implementation. At the current rates of implementation progress, at least 107 countries will not achieve the target by 2030;*

(c) *the results show a need to accelerate transboundary cooperation: out of 153 countries that share transboundary waters, only 24 countries reported that all the rivers, lakes and aquifers they share are covered by operational arrangements for cooperation;*

(d) *Europe and North America, and sub-Saharan Africa are the most advanced SDG regions in terms of transboundary water cooperation. Progress in Latin America and the Caribbean, all Asian subregions and, more generally, for transboundary aquifers is significantly lagging behind.*

- The extent of surface water available in one fifth of the world's river basins changed significantly due to climate change and inefficient water management.

- On targets 6.a and 6.b ODA fell by 12% from 2015 to 2021, while disbursement decreased by 15% despite growing needs for financing. Although national laws and policies for community participation are increasing, their actual implementation is limited.

Progress on SDGs in the Central Asian countries

In 2023, the Central Asian region has shown mixed progress towards the SDGs.

Republic of Kazakhstan.³⁷⁹ As of 2023, Kazakhstan ranked 66th out of 163 countries in the SDG Index, scoring 71.7 out of 100. The only goal achieved since the adoption of SDGs is No poverty (SDG 1). Challenges persist in SDGs related to malnutrition (SDG 2), clean energy (SDG 7), climate change (SDG 13), terrestrial ecosystems (SDG 15), peace and justice (SDG 16).³⁸⁰

For SDG 6, significant growth of IWRM implementation was recorded – from 30% in 2017 to 51% in 2023; the share of transboundary water basins covered by operational arrangements for cooperation reached 63.4%. At the same time, the proportion of rivers with good water quality decreased from 72.5% in 2020 to 48.9% in 2023.

The Carbon Neutrality Strategy 2060 was officially adopted by Kazakhstan in February 2023. Kazakhstan has also joined the Global Methane Pledge at COP28, committing to reducing its GHG emissions. The updated Nationally Determined Contribution (NDC) was approved by governmental resolution.³⁸¹ The country commits to reduce GHG emissions by 25% by the end of 2030 relative to 1990 base year (SDG 7 and 13).

The mean area that is protected in freshwater sites important to biodiversity (SDG 15) increased from 8.4% in 2000 to 20.5% in 2023, and the mean area that is protected in terrestrial sites important to biodiversity increased from 8.9% in 2000 to 28.5% in 2023.

Kyrgyz Republic.³⁸² In the SDG Index Rank 2023 Kyrgyzstan was 48th out of 166 countries, and its SDC Index score reached 74.19, being the highest score for Central Asia. Positive dynamics is maintained for SDG 4 (quality education), SDG 11 (sustainable cities and communities) and SDG 13 (climate action).

The percentage of population using at least basin drinking water services reached 95.37%; the proportion of safely treated household and industrial wastewater is maintained at about 97% since 2021 (SDG 6). In 2023, the Republic showed a moderately low (38%) degree of IWRM implementation. The share of transboundary water basins covered by operational arrangements for cooperation reached 39%.

On SDG 7, the percentage of population with access to electricity increased from 70.82% in 2021 to 73.21% in 2023, including 19.93% of the population using mostly clean fuels and technology.

To preserve terrestrial ecosystems, the Republic has established a network of designated conservation

³⁷⁹ <https://kazakhstan.un.org/en/sdgs>

³⁸⁰ https://halykfinance.kz/download/files/analytics/AC_UN_report_.pdf

³⁸¹ No.313 of 19 April 2023

³⁸² <https://sustainabledevelopment-kyrgyzstan.github.io/>

areas covering **7.38%** of the country's total area. The network includes 10 state natural reserves, 13 state natural parks and 64 wildlife sanctuaries (SDG 15).

Republic of Tajikistan. In the [SDG Index Rank 2023](#) Tajikistan was 89th out of 166 countries, scoring 68.09. Tajikistan is [on the way](#) to achieve SDG 1 (poverty eradication) and SDG 10 (reduced inequalities). Significant progress was achieved on SDG 16 (peace, justice and strong institutions) and SDG 11 (sustainable cities and communities).

Relatively moderate progress is observed towards other SDGs, including access to clean water and sanitation (SDG 6), affordable and clean energy (SDG 7) and climate action (SDG 13). For example, Tajikistan currently generates **98%** of its electricity from hydropower. The country ranks sixth in the world in terms of green energy, and will rise to the fourth position after the completion of the Rogun HPP. Tajikistan is also among the countries with almost zero contribution to greenhouse gas emissions.

The degree of IWRM implementation in Tajikistan is **54%**.

The mean percentage area of freshwater key biodiversity areas that are protected (SDG 15) [increased](#) from **27.9%** in 2000 to **30.5%** in 2023.

Turkmenistan.³⁸³ With 67.13 score, Turkmenistan was 94th out of 166 countries in the [SDG Index Rank](#). Turkmenistan has achieved SDG 1 (poverty eradication).

Turkmenistan [maintained](#) a consistently high level of coverage of SDG targets and indicators in strategic and policy documents (**85%**). For example, the National Climate Change Strategy and the National Action Program for Combatting Desertification aim to improve efficiency of mitigation measures (SDG 13). Turkmenistan NDC³⁸⁴ provides for reducing GHG emissions by **20%** in 2030 relative to the level of emissions in 2010.

In 2023, the degree of IWRM implementation (SDG 6) was **68%**, and the proportion of transboundary river and lake basins covered by operational arrange-

ments for water cooperation was **66.02%**. The proportion of safely treated wastewater decreased from **57.4%** in 2022 to **48.7%** in 2023.

There was a decline in the transition to sustainable forest management in 2022, which continued in 2023 (from **34.78 thousand ha** in 2021 to **3.4 thousand ha** in 2023). The proportion of land that is degraded over total land area was **17.7%** (SDG 15).

Republic of Uzbekistan.³⁸⁵ With a score of 71.1, Uzbekistan has secured the 69th rank out of 166 countries in the [SDG Index Rank 2023](#), thus climbing eight positions from its preceding year's rank.

According to the World Resources Institute, the country was [ranked](#) 25th out of 164 in the ranking of countries suffering from water stress. The critical level of pressure on water resources in Uzbekistan results from the use of 169% of water reserves. Drinking water supply in Uzbekistan is provided through increased access of population to centralized drinking water supply. The share of population provided with safe water services (SDG 6) increased to **99.8%**. The share of transboundary water basins covered by operational arrangements for cooperation is **70%** and the degree of IWRM implementation is **64%**.

According to [UNDP](#), the alignment of global Sustainable Development Goals with national strategic development planning in Uzbekistan is currently at 79%. The least integration is found to be in SDG 13 – **60%**.

In line with the "Concept for the Development of the Forestry System of the Republic of Uzbekistan until 2030" [expansive measures](#) were taken to establish protective forest plantations over the desiccated bed of the Aral Sea (SDG 15). Between 2019 and 2023 alone, initiatives spanned across more than 1.7 million hectares. The forest area out of total land area of Uzbekistan increased from **8.6%** (2019) to **10.6%** (2023).

Uzbekistan's heavy reliance on natural gas continues to pose energy security risks, exacerbated by depleting gas production and increasing net imports (SDG 7).

12.3. Earth Overshoot Day 2023

Each year, [Earth Overshoot Day](#) marks the date when we have used all the biological resources that the Earth can renew during the entire year. In 2023, it falls on **2 August**. This means that humanity currently uses 75% more than what the planet's eco-systems can regenerate. From this day until the end of the year, humanity operates on ecological deficit spending.

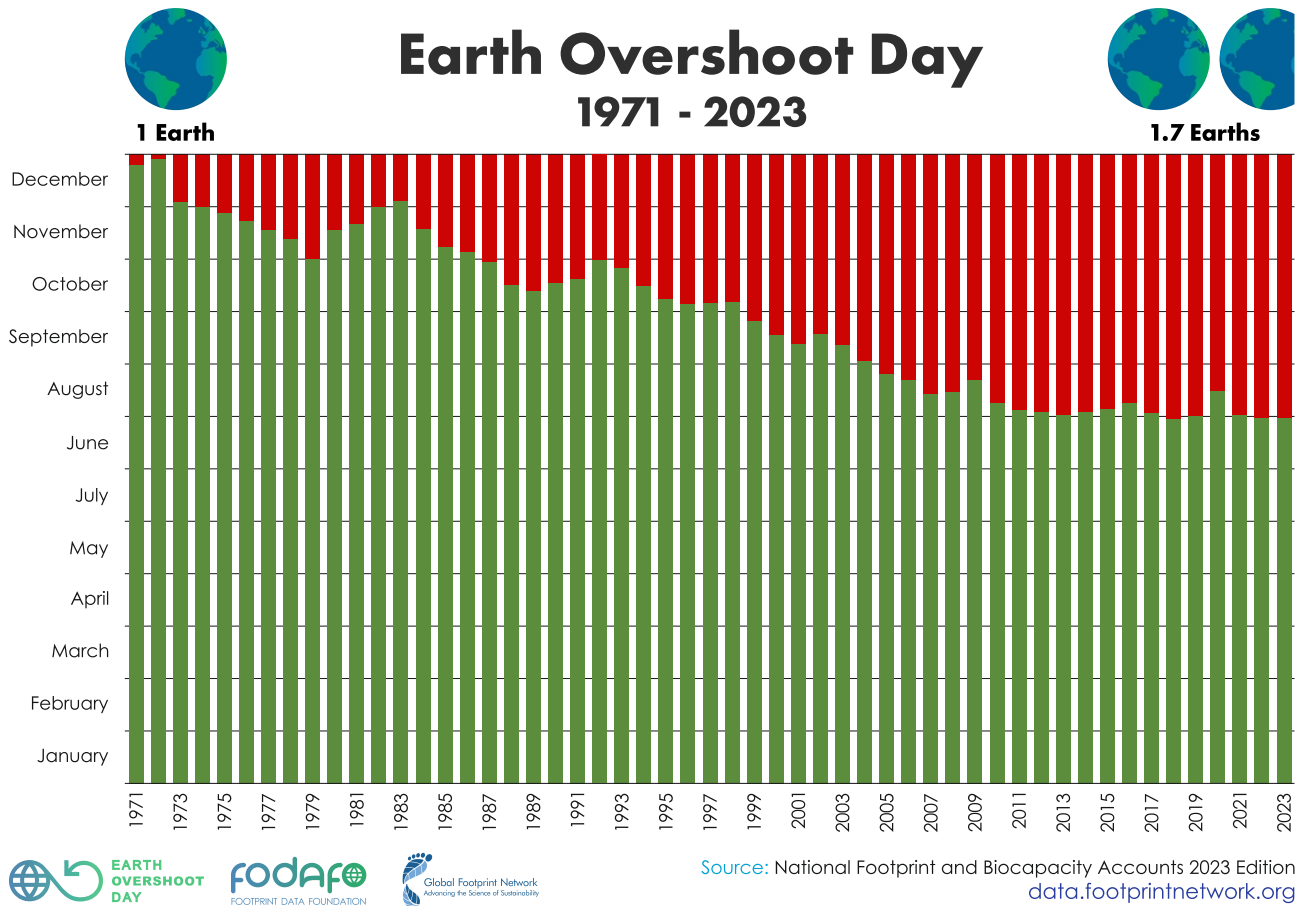
A Country Overshoot Day reflects the ecological footprint of a country by comparing the population's demand and the nation's biocapacity.

On a planetary scale, minimizing ecological footprint necessitates the conservation and restoration of ecosystems. If we prevent food loss and food waste, prefer plant based foods, and choose foods that are

³⁸³ <https://sdg.stat.gov.tm/ru/>

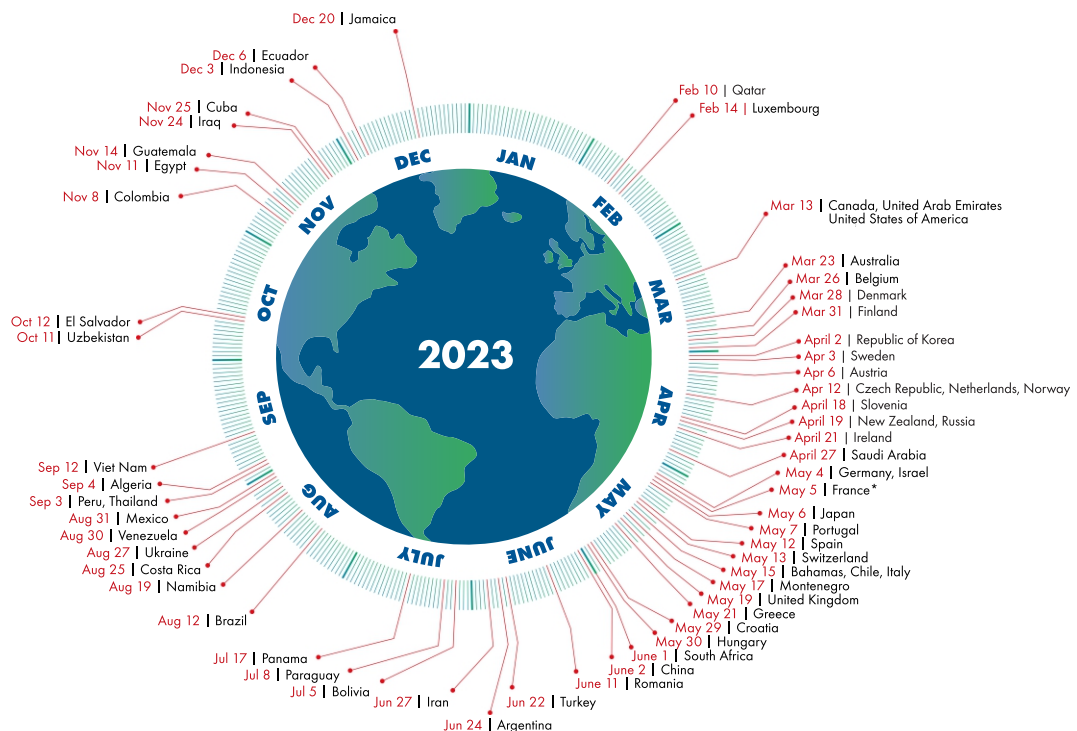
³⁸⁴ submitted to UNFCCC in May 2022

³⁸⁵ <https://nsdg.stat.uz/>



Country Overshoot Days 2023

When would Earth Overshoot Day land if the world's population lived like...



For a full list of countries, visit overshootday.org/country-overshoot-days.

*French Overshoot Day based on nowcasted data. See overshootday.org/france.

Source: National Footprint and Biocapacity Accounts, 2022 Edition
data.footprintnetwork.org

grown with agroecological and regenerative practices, we could move Earth Overshoot Day **32 days**. If we reduced global meat consumption by 50% and replaced these calories through a vegetarian diet, we would move Overshoot Day **17 days** (including 10 days from reduction of methane emissions) as half of Earth's *biocapacity* is used to feed us. Reforesting 350 million hectares of forest would move the date of Overshoot Day by 8 days.

If we reduce our Footprint from driving by 50% around the world and assume one-third of car miles are replaced by public transportation and the rest by biking and walking, Earth Overshoot Day would move back 13 days.

Reducing the carbon component of humanity's Ecological Footprint by 50% would move Earth Overshoot Day by 93 days, or more than three months. Existing off-the-shelf, commercial energy-efficiency technologies for buildings, industrial processes, and electricity production could move Overshoot Day at least 21 days, without any loss in productivity or comfort.

The United Nations projects that between 7.3 to 15.6 billion people will be living on Earth by 2100. Avoiding the population conversation does nothing to address one of the most significant contributors to humanity's increasing demand on the planet. If every other family had one less child and parenthood was postponed by two years, by 2050 we would move Overshoot Day 49 days.

12.4. Artificial intelligence and water resources management

Prepared by M.S. Valieva, D.R. Ziganshina (SIC ICWC)

The year 2023 will be remembered as a watershed moment in our collective understanding of artificial intelligence (AI). The launch of ChatGPT³⁸⁶ late last year catalyzed widespread exploration of AI's capabilities, its potential impact (both beneficial and detrimental), and its practical applications in daily life. This phenomenon was reflected in numerous rankings that identified AI development as a defining event of the year, alongside significant geopolitical shifts.³⁸⁷ Major consulting firms and leading universities³⁸⁸ conducted extensive research on AI's economic and societal implications.³⁸⁹ International news outlets extensively covered the technology, highlighting both its promise and its perils.

This review will delve into the specific applications of AI technologies within the critical domain of water resource management, while also examining the potential risks associated with their implementation.

Artificial Intelligence: Key Concepts

Artificial Intelligence (AI) refers to the ability of computer systems to perform creative functions that have traditionally been considered the prerogative of hu-

mans. Specific applications of AI include various expert systems, information processing in multiple languages, speech recognition, and systems used for financial trading. Two important concepts that are often mentioned in the context of AI are machine learning and computer vision.

Machine learning is an AI field focused on creating systems that learn and evolve based on the data they receive³⁹⁰. One of the best-known machine learning methods is the Artificial Neural Network (ANN) that works by mimicking biological neural networks that exist in a human brain. ANNs learn from training data³⁹¹ presented to them in order to capture the functional relationships among the data, even if the underlying relationships are not known or the physical meaning is difficult to explain. This enables the ANNs to discover patterns in data that are often unknown, even to the best experts in the field³⁹².

Computer Vision is an AI field related to image and video analysis; it includes a set of methods that empower a computer with the ability to interpret and understand digital images and videos. Examples of computer vision applications include systems for facial recognition, medical diagnostics and driverless cars³⁹³.

³⁸⁶ developed by OpenAI

³⁸⁷ Council on Foreign Relations (2023), *Ten most significant world events of 2023*.

URL: <https://www.cfr.org/blog/ten-most-significant-world-events-2023>

³⁸⁸ Stanford Human-Centered AI Institute (2023), *13 biggest AI stories of 2023*.

URL: <https://hai.stanford.edu/news/13-biggest-ai-stories-2023>

³⁸⁹ Hatzis J., Briggs, J., Kodhani, A., Pierdomenico G. (2023), *The potentially large effects of artificial intelligence on economic growth*, URL: https://www.key4biz.it/wp-content/uploads/2023/03/Global-Economics-Analyst_-The-Potentially-Large-Effects-of-Artificial-Intelligence-on-Economic-Growth-Briggs_Kodhani.pdf

³⁹⁰ Oracle. (n.d.). Что такое машинное обучение? (What is machine learning?)

URL: <https://www.oracle.com/cis/artificial-intelligence/machine-learning/what-is-machine-learning/>

³⁹¹ Training Data is used in machine learning in conjunction with Validation Data and Testing Data. Based on them, the model learns to process information

³⁹² International Water Association (2020), *Digital Water. Artificial Intelligence: Solutions for the Water Sector*.

URL: https://iwa-network.org/wp-content/uploads/2020/08/IWA_2020_Artificial_Intelligence_SCREEN.pdf

³⁹³ International Water Association (2020), *Digital Water. Artificial Intelligence: Solutions for the Water Sector*.

URL: https://iwa-network.org/wp-content/uploads/2020/08/IWA_2020_Artificial_Intelligence_SCREEN.pdf

A short digression

The term "artificial intelligence" (AI) was coined in 1956 at a workshop at Dartmouth College, USA. This workshop focused on developing methods for solving logical, rather than purely computational, problems. Notably, the English term "intelligence" signifies "the ability to reason intelligently," distinct from "intellect." This subtle nuance is often lost in translation, where "artificial intelligence" can carry a slightly anthropomorphic, almost fantastical connotation.

Shortly after its establishment as a distinct scientific field, AI research bifurcated into two major branches: neurocybernetics and "black box cybernetics." These branches have evolved largely independently, exhibiting significant differences in both methodology and technological approaches.

(Quoted by: T. Gavrilova, V. Khoroshevsky. Knowledge bases of intelligent systems. St. Petersburg: Peter, 2000 - 384 p.)

ChatGPT (short for Generative Pre-trained Transformer) is a chatbot with generative artificial intelligence that can operate in a dialog mode and handle queries in multiple languages. A key feature is its ability to generate code in various programming languages upon request³⁹⁴.

Internet of Things (IoT) is the concept of a data transmission network between physical objects equipped with built-in tools and technologies to interact with each other or with the external environment.

General trends in AI development in 2023

The latest annual McKinsey Global Survey on the current state of AI confirms the explosive growth of generative AI (gen AI) tools. Less than a year after many of these tools debuted, one-third of respondents reported that their organizations regularly use GenAI in at least one business function. Amid recent advances, AI has risen from a topic relegated to tech employees to a focus of company leaders: nearly a quarter of them report personal use of AI tools for work. Furthermore, 40% of respondents say their organizations will generally increase investments in AI³⁹⁵.

According to the BBC³⁹⁶, many employees use AI to solve administrative tasks, such as writing simple texts and generating ideas, which helps save time and frees up workers to focus on creative and more complex tasks³⁹⁷.

According to forecasts, AI has the potential to both create millions of new jobs and displace many existing ones. The World Economic Forum's Future of Jobs Report 2023 highlights that AI and machine learning specialists, data analysts and scientists, and digital transformation specialists are among the fastest-growing roles. However, AI cannot replace all professions, particularly those requiring common sense, creativity, physical dexterity, and emotional intelligence³⁹⁸.

Fastest growing vs. fastest declining jobs



Top-10 fastest growing jobs

1.	AI and Machine Learning Specialists
2.	Sustainability Specialists
3.	Business Intelligence Analysts
4.	Information Security Analysts
5.	Fintech Engineers
6.	Data Analysts and Scientists
7.	Robotics Engineers
8.	Big Data Specialists
9.	Agricultural Equipment Operators
10.	Digital Transformation Specialists

Top-10 fastest declining jobs

1.	Bank Tellers and Related Clerks
2.	Postal Service Clerks
3.	Cashiers and ticket Clerks
4.	Data Entry Clerks
5.	Administrative and Executive Secretaries
6.	Material-Recording and Stock-Keeping Clerks
7.	Accounting, Bookkeeping and Payroll Clerks
8.	Legislators and Officials
9.	Statistical, Finance and Insurance Clerks
10.	Door-To-Door Sales Workers, News and Street Vendors, and Related Workers

Note

The jobs which survey respondents expect to grow most quickly from 2023 to 2027 as a fraction of present employment figures

Source

World Economic Forum, Future of Jobs Report 2023

³⁹⁴ Wikipedia contributors (2024), ChatGPT, URL: <https://ru.wikipedia.org/wiki/ChatGPT>

³⁹⁵ McKinsey & Company (2023), *The state of AI in 2023: Generative AI's breakout year*. URL: <https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai-in-2023-generative-ais-breakout-year#/>

³⁹⁶ British Broadcasting Corporation (BBC)

³⁹⁷ BBC (2023), *Panic and possibility: What workers learned about AI in 2023*.

URL: <https://www.bbc.com/worklife/article/20231219-panic-and-possibility-what-workers-learned-about-ai-in-2023>

³⁹⁸ World Economic Forum (2023), *Everything you need to know about AI in 2023: the 6 must-read blogs*.

URL: <https://www.weforum.org/agenda/2023/11/ai-2023-governance-summit/>

In everyday life, AI has become an integral part, assisting through virtual assistants (Siri, Alexa, Alice), providing recommendations and information on search and entertainment platforms (Netflix, Spotify, Yandex), and more. In healthcare, AI is used for accurate diagnosis and personalized treatment. In digital advertising and financial security, AI enhances ad targeting and fraud detection. In the automotive industry, AI supports the development of autonomous vehicles, potentially increasing safety and efficiency in transportation. With the correct design of requests, AI is also effective in creating educational programs, selecting teaching models, and preparing instructional materials.

The use of AI in the water sector

The potential applications of AI in the water sector are immense. Below are some of the most compelling aspects of its use in data monitoring and analysis:

■ **Water Demand Management.** AI is capable of uncovering hidden trends in large datasets, enabling utilities to forecast demand, optimize water distribution throughout the day, reduce waste, and meet needs more effectively. Machine learning algorithms can analyze real-time data to adjust water flow and pressure, maintaining a steady supply and minimizing losses during maintenance. AI models trained to consider weather conditions, seasonality, and other factors can identify large-scale issues in water usage and assist in decision-making related to infrastructure, investments, and resources. For instance, Singapore uses intelligent water management systems that use AI to forecast water demand and optimize supply.

■ **Weather and Climate Forecasting.** AI-based water management models, incorporating data from the Internet of Things (IoT), can analyze disparate datasets to assess climate risks and develop adaptive water supply strategies. AI is used to create predictive models that forecast water resource availability based on climate change scenarios. These models can integrate a wide range of data, including historical weather patterns, current climate trends, and future climate projections. By analyzing this data, AI can provide valuable insights into the impact of climate change on future water availability. A study by Stanford University demonstrated AI's potential in forecasting groundwater recharge,

with the AI model achieving high accuracy in predicting groundwater replenishment rates³⁹⁹.

■ Researchers from Nvidia and Google have embarked on developing large AI models, known as foundation models, for weather forecasting. These models are capable of providing more accurate forecasts compared to existing numerical models and have lower computation costs⁴⁰⁰. Some of these models can predict weather conditions beyond seven days, opening new avenues for scientists⁴⁰¹. Methods for assessing precipitation intensity using video streams from smartphones or surveillance cameras, as well as unconventional IoT data sources, are advancing. Technological advances in image processing and computer vision enable extraction of diverse features, including identification of rain streaks enabling estimation of the instantaneous rainfall intensity (Allamano et al, 2015). Recent AI and machine learning approaches rely on the use of autoencoders, deep learning⁴⁰² and convolutional neural networks⁴⁰³ to address the problems. Companies such as WaterView (Italy), Hydroinformatics Institute (Singapore), as well as universities (Southern University of Science and Technology China, Shenzhen) have proposed and implemented practical approaches to weather hazards in energy, automotive and smart cities application domains (Jiant et al, 2019)⁴⁰⁴.

■ **Forecasting and Mitigating Potential Water-Related Risks.** Flooding poses a persistent threat in many urban areas and communities. AI can be used to analyze weather and water level data, as well as to predict the likelihood of flooding. This capability enables local authorities to implement preventive measures and evacuate individuals from high-risk areas. IBM⁴⁰⁵ employs AI to develop predictive analytics⁴⁰⁶ tools and optimize water resource management. Their solutions assist cities and industrial enterprises in effectively managing water resources.

The Serbian company Vodena is developing an innovative solution, VodostAI, to combat flooding in the Western Balkans, where damages amounted to €300 million in 2023 and over one million people were affected. The VodostAI platform employs AI and the Internet of Things (IoT) for continuous monitoring and updating of models based on new data. Vodena automates data collection using intelligent sensors and machine learning algorithms, enabling accu-

³⁹⁹ David Cain (2023), *Water Management enhanced by AI*.

URL: <https://www.linkedin.com/pulse/making-splash-how-ai-diving-water-management-david-cain/>

⁴⁰⁰ Computation cost refers to the total amount of time and resources required for processing and transferring data in a computing application

⁴⁰¹ Национальное информационное агентство «Экология» (2024), *Искусственный интеллект революционизирует прогнозирование погоды (Artificial intelligence revolutionizes weather forecasting)*. URL: <https://nia.eco/2024/07/10/86258/>

⁴⁰² Deep learning is a type of machine learning using multi-layered neural networks that self-learn on a large dataset

⁴⁰³ Convolutional Neural Networks (CNN) is a class of machine learning algorithms. With their help, it is possible to achieve impressive results in the field of pattern recognition, image classification, as well as video data processing and analysis

⁴⁰⁴ International Water Association (2020), *Digital Water. Artificial Intelligence: Solutions for the Water Sector*.

URL: https://iwa-network.org/wp-content/uploads/2020/08/IWA_2020_Artificial_Intelligence_SCREEN.pdf

⁴⁰⁵ International Business Machines is an American company headquartered in Armonk. One of the world's largest manufacturers and suppliers of hardware and software, as well as IT services and consulting services

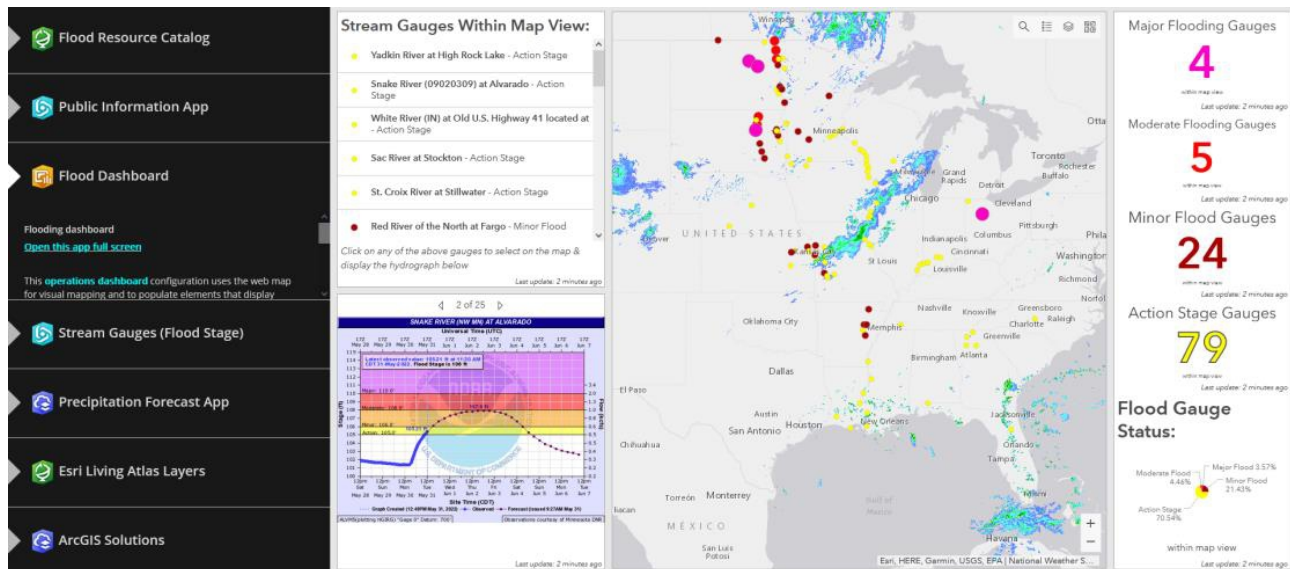
⁴⁰⁶ Predictive analytics is one of the areas of data analysis that focuses on predicting future events based on retrospective data

rate water level forecasting and timely notifications⁴⁰⁷.

In 2018, Google launched an AI-based flood forecasting system in India, a country frequently affected by severe flooding. The system employs a combination of machine learning, hydrological models, and the

most up-to-date weather data to predict areas at risk of flooding. According to a report by The Times of India, the system successfully provides timely and accurate flood threat alerts, allowing local communities to take necessary precautions and potentially saving countless lives⁴⁰⁸.

Interactive web map



Source: Sakti Prajna Mahardhika and Okkie Putriani (2023), IOP Conf. Ser.: Earth Environ. Sci. 1195 012056.

URL: <https://iopscience.iop.org/article/10.1088/1755-1315/1195/1/012056/pdf>

■ **Optimization of Water Consumption.** This approach is based on the concept of automated data analysis. The platform developed by Plutoshift, which employs AI, collects data from various sources and then processes it using machine learning algorithms to provide real-time insights for optimizing water use. The platform can identify patterns and trends that are difficult for humans to discern and forecast future water consumption based on historical data and current conditions. By optimizing water use, businesses can significantly reduce their operational costs. For instance, a beverage company utilizing Plutoshift's platform was able to save \$140,000 annually⁴⁰⁹.

■ **Optimization of Irrigation Systems.** AI-driven irrigation systems optimize water resource use by utilizing data on weather conditions, soil moisture levels, and crop requirements. These systems ensure that agricultural crops receive the precise amount of water needed at the appropriate times, reducing waste and improving yield. An example of such technology

is the AI-based irrigation systems from Netafim. Economic benefits of intelligent irrigation systems include substantial cost savings through reduced water and energy consumption. Although the initial investment in these systems may be significant, they typically pay off within one to three years through water savings, reduced labor costs, and increased yields. Additionally, improvements in soil fertility and environmental sustainability provide long-term advantages⁴¹⁰.

■ **Enhancing Water Supply Efficiency.** As highlighted in the Water Technology Trends 2023, AI models can be employed to optimize water supply systems, minimize costs, reduce water losses, and improve the energy efficiency of infrastructure. This can contribute to lowering operational and maintenance expenses while enhancing access to clean water.

The AI-based WaterScope solution detects leaks in municipal water supply systems and provides real-

⁴⁰⁷ Aquatech Trade (2024), *Essential Guide: How AI is used in the water sector*.

URL: <https://www.aquatechtrade.com/news/digital-solutions/essential-guide-ai-and-water#:~:text=just%20a%20few%3A-%22AI%20helps%20us%20to%20make%20faster%20decisions%20using%20the%20full, networks%2C%20facilitating%20the%20detection%20of>

⁴⁰⁸ David Cain (2023), *Water Management enhanced by AI*.

URL: <https://www.linkedin.com/pulse/making-splash-how-ai-diving-water-management-david-cain/>

⁴⁰⁹ David Cain (2023), *Water Management enhanced by AI*.

URL: <https://www.linkedin.com/pulse/making-splash-how-ai-diving-water-management-david-cain/>

⁴¹⁰ Nichols, J. (2024), *Economic Benefits of IoT-Driven Smart Irrigation Systems*. *Smart Water Magazine*.

URL: <https://smartwatermagazine.com/blogs/justin-nichols/economic-benefits-iot-driven-smart-irrigation-systems>

time alerts to prevent water loss. Siemens utilizes AI and the Internet of Things to deliver digital solutions that enhance water resource management and operational efficiency. The company Fracta has leveraged AI capabilities to refine methods for detecting and addressing losses in water infrastructure. Fracta employs machine learning to predict the likelihood of pipe failures in water supply systems. The AI system processes extensive datasets, including pipe material, age, diameter, and historical leak data. Machine learning algorithms are then applied to these data to predict where leaks are most likely to occur. This leak prediction method has been practically implemented with excellent results. For instance, Fracta's AI-based leak detection system was adopted by the Murfreesboro Water Resources Department in Tennessee, USA, and identified potential leaks with up to 69% accuracy, significantly surpassing industry standards. By forecasting likely leak locations, the system enables proactive maintenance, thereby preventing costly and damaging pipeline failures⁴¹¹.

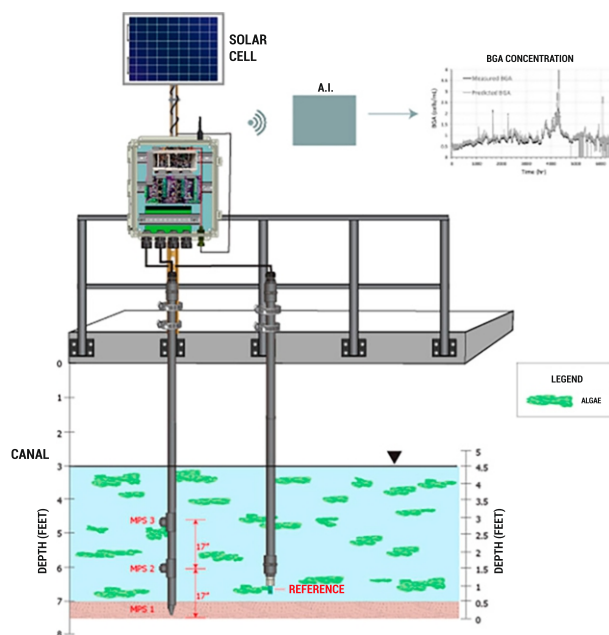
■ **Detection of Crop Growth Anomalies.** This process involves identifying irrigation issues and implementing timely corrective actions. When planning crops, AI analyzes data related to crop selection parameters, enabling optimal crop choices and the development of predictive models for future water supply needs. This supports the creation of resilient and sustainable agricultural systems that are adaptable to changing water availability conditions.

■ **Water Quality Monitoring.** The Netherlands, renowned for its innovative water management strategies, is at the forefront of integrating AI into water quality monitoring. A notable project in this regard is the "AI for Water Quality" (AI4WQ) initiative, undertaken collaboratively by water authorities, research institutions, and technology companies. The AI4WQ project utilizes AI algorithms to process vast datasets collected from various sensors installed in water bodies throughout the Netherlands. These sensors measure real-time data on temperature, pH, turbidity, and concentrations of various chemical and biological substances, identifying patterns and trends that may indicate changes in water quality⁴¹².

The U.S. Environmental Protection Agency (EPA) also employs AI for real-time water quality monitoring and the detection of pollutants. Hitachi leverages AI to provide advanced water resource management solutions, including predictive maintenance and optimization of water distribution networks.

Peter Ma from Intel has developed a prototype system that uses AI methods for detecting bacteria in water. This system features a digital microscope connected to a portable computer running Ubuntu

Real-time monitoring and forecasting of water quality



Source: Hesam Kamyab, Tayebbeh Khademi, Shreeshivadasan Chelliapan, Morteza Saberi Kamarposhti, Shahabaldin Rezania, Mohammad Yusuf, Mohammad Farajnezhad, Mohamed Abbasi, Byong Hun Jeon, Yongtae Ahn (2023). The latest innovative avenues for the utilization of artificial Intelligence and big data analytics in water resource management. Results in Engineering 20 (2023) 101566

and an Intel Movidius neural computer, enabling autonomous analysis and real-time mapping of contamination zones.

The platform, based on Intel Xeon processors, is designed for deep learning and computational tasks. Peter utilized Intel AI DevCloud to train the AI model and the Intel Movidius Neural Compute Stick for real-time water testing.

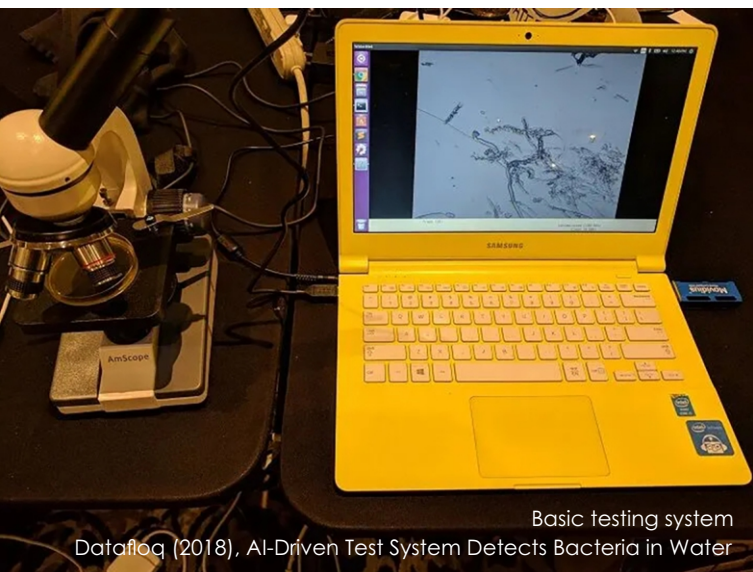
The entire testing system is composed of readily available components, such as a digital microscope and inexpensive computing devices, with a total cost not exceeding \$500. The underlying convolutional neural network enables the identification of current bacteria, such as *E. coli* and *Vibrio cholerae*, with the capability to extend the detection range⁴¹³.

AI also enables the detection of unregistered carcinogenic contaminants globally. Chinese scientists have developed a new platform for the detection and precise identification of unknown PFAS (per- and polyfluoroalkyl substances) in the environment. The platform employs an advanced molecular screening tool integrated with machine learning, allowing for

⁴¹¹ David Cain (2023), *Water Management enhanced by AI*. URL: <https://www.linkedin.com/pulse/making-splash-how-ai-diving-water-management-david-cain/>

⁴¹² David Cain (2023), *Water Management enhanced by AI*. URL: <https://www.linkedin.com/pulse/making-splash-how-ai-diving-water-management-david-cain/>

⁴¹³ Datafloq (2018), *AI-Driven Test System Detects Bacteria in Water*. URL: <https://datafloq.com/read/ai-driven-test-system-detects-bacteria-in-water/>



Basic testing system
Datafloq (2018), AI-Driven Test System Detects Bacteria in Water

the identification of 733 PFAS in wastewater, of which 17 groups were previously unknown. Additionally, 126 PFAS were detected in samples from 20 countries, including 37 new and 81 previously unrecognized substances. The platform achieves an accuracy of 58.3% with a low false positive rate of 0.7%, significantly surpassing other methods. This advancement provides opportunities for better risk management and enhances the study of synthetic chemicals' impact on health and the environment⁴¹⁴.

■ **Air Quality Monitoring.** AI can be utilized to monitor air quality at water treatment facilities. This capability can detect and prevent air pollution that may adversely affect water quality.

In addition to fundamental research and development, it is crucial to focus on the practical application of innovations, including prototype development, localization, and user engagement. In this context, the advancement of AI technologies contributes to addressing the following challenges⁴¹⁵:

■ **Organizing Unstructured Earth Data and Localizing Models.** Earth sciences rely on vast amounts of unstructured and disorganized data, with over 100 terabytes of satellite imagery collected daily. Recent research and developments illustrate AI's ability to optimize these data. For example, Google Earth Engine, a leading platform for Earth observation, integrates various satellite images and geospatial data with analytical capabilities. AI also advances Earth sciences by adapting global models to local condi-

tions through transfer learning⁴¹⁶. This method leverages previously studied information about specific areas to address tasks such as predicting forest fires in particular locations. This is especially crucial in data-sparse regions, as it helps bridge information gaps and effectively utilize extensive observational data.

■ **Simplifying Model Understanding.** Generative AI, based on large language models (LLM), facilitates interactive engagement with data users and simplifies the understanding of complex processes. By providing a GPT-like interface, it enables users of all skill levels to interact with climate and hydrological data tailored to their needs.

■ **Accelerating the Prototyping Stage in Technology Development.** AI can shorten the deep tech cycle, particularly in prototyping, speeding up the introduction of essential technologies. In materials science, AI accelerates discovery and design, crucial for climate mitigation (such as improving lithium-ion batteries and solar cells) and adaptation (developing fire-resistant materials). Traditional methods, which calculate material properties from scratch, consume significant time, costs and computational resources. Up to one-third of global supercomputing power is used for materials science. AI now predicts new material properties without exhaustive initial calculations. It does this by learning relationships between atomic structures and their properties, and suggesting optimal configurations. While this is a nascent space with limitations (e.g. documented "hallucinations"⁴¹⁷ in discovery processes), there is significant potential for innovation. For example, GenAI is tackling the inverse design problem, which starts with a desired property (e.g. resilience to extreme weather) and reverse-engineers its design⁴¹⁸.

Risks of AI Deployment

Currently, it is challenging to definitively assess the consequences of using AI, as people tend to overestimate the short-term impacts of new technologies while significantly underestimating their long-term effects. Overall, experts highlight the following risks associated with the deployment of AI, including in the water sector:

■ **Data Volume.** Effective AI models require large volumes of high-quality data, which may not always be available, particularly in developing countries.

■ **Limitation.** AI models are trained on limited data, which can lead to mediocre or insufficient re-

⁴¹⁴ Хайтек+ (2024), Китайский ИИ обнаружил незарегистрированное канцерогенное загрязнение по всему миру (Chinese AI has discovered unregistered carcinogenic pollution around the world). URL: <https://hightech.plus/2024/05/28/kitaiskii-ii-obnaruzhil-nezaregistrovannoe-kancerogennoe-zagryaznenie-po-vsemu-miru>

⁴¹⁵ World Economic Forum (2024), Post breakthrough: How AI can lift climate research out of the lab and into the real world. URL: <https://www.weforum.org/agenda/2024/05/ai-lift-climate-research-out-lab-and-real-world/>

⁴¹⁶ Transfer learning (TL) is a machine learning method in which a model pre-trained to perform one task is configured to perform a new one related to the previous one

⁴¹⁷ In artificial intelligence, a hallucination or artificial hallucination is a confident reaction of an AI that is not supported by its training data, or fictional responses that are unrelated to reality

⁴¹⁸ Reverse engineering is a method of disassembling an object that helps to understand how a previously created device, process, system, or piece of software is designed

sults. This limitation may hinder innovation and development, as excessive reliance on AI without critical analysis can slow progress⁴¹⁹. The ease of adopting new technologies may distract from addressing the core needs of clients and employees. It is crucial to critically evaluate AI outcomes and avoid a "set and forget" approach, which can result in a loss of expertise and critical thinking⁴²⁰. AI-generated forecasts are not infallible and should be used in conjunction with other forms of analysis and expert evaluations.

■ **Responsibility.** Daniel Kiley from HWL Ebsworth Lawyers emphasizes the importance of maintaining accountability when using AI. Organizations must ensure the proper functionality of AI tools and take responsibility for their outcomes. The use of AI should

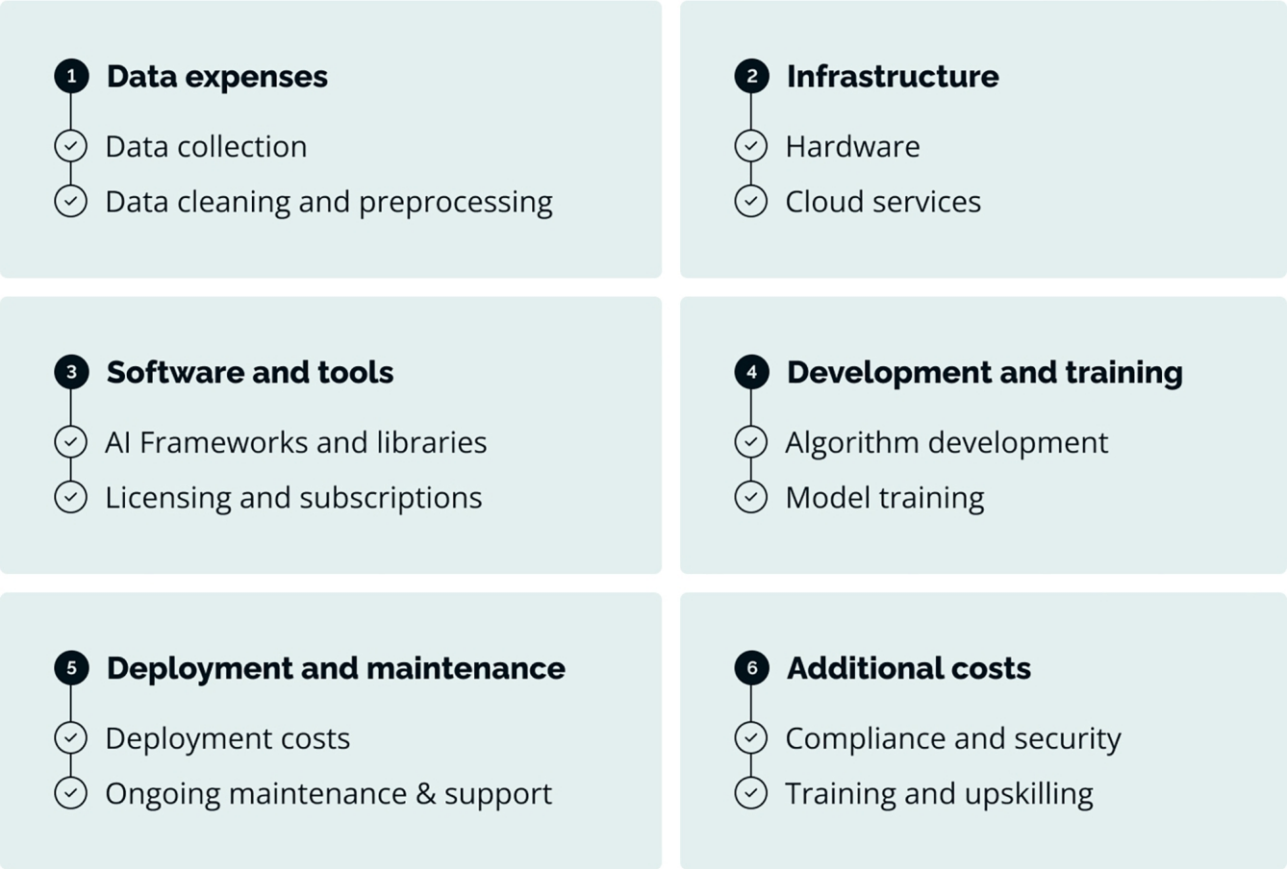
be justified, and it is crucial to avoid shifting blame onto the tool if issues arise.

■ **Development costs**⁴²¹. The costs associated with developing AI software can vary widely depending on numerous factors. Key factors include data costs, project complexity, infrastructure, development, deployment, regulatory compliance, and ongoing maintenance. On average, the costs for AI software development range from \$50,000 to \$500,000 for small to medium-sized projects and from \$500,000 to \$5 million for large-scale projects. While these costs can be substantial, the potential benefits of implementing AI – such as increased efficiency, reduced expenses, improved customer service, innovation, and optimized data use – often justify the investment.

AI Development Costs



Breakdown of AI Components



Source: TechMagic (2024), AI Development Cost: Analyzing Expenses and Returns

⁴¹⁹ Australian Water Association (2024), *Addressing the Risks of AI in the Water Sector*.
URL: <https://www.awa.asn.au/resources/latest-news/addressing-the-risks-of-ai-in-the-water-sector>

⁴²⁰ Australian Water Association (2024), *Addressing the Risks of AI in the Water Sector*.
URL: <https://www.awa.asn.au/resources/latest-news/addressing-the-risks-of-ai-in-the-water-sector>

⁴²¹ TechMagic (2024), *AI Development Cost: Analyzing Expenses and Returns*.
URL: <https://www.techmagic.co/blog/ai-development-cost/#::-:text=The%20primary%20factors%20include%20data,5%2C000%2C000%20for%20large%2Dscale%20projects>

■ **High Power Consumption.** The International Energy Agency (IEA) anticipates that the advancement of AI technologies will double the demand for electricity⁴²². Data centers, numbering over 8,000 globally (with 16% located in Europe), consume substantial amounts of energy for both server operations and cooling. According to 2023 estimates by the IEA, data centers account for 1-1.5% of global electricity consumption. Their CO₂ emissions are approximately 1% of the global total, comparable to the aviation sector⁴²³. From 2024 to 2026, electricity consumption could potentially double, reaching the total electricity consumption level of Japan. In 2023, the share of electricity used by data centers increased to 20%, up from 18% in 2015. Queries to AI chatbots may consume up to ten times more energy than traditional Google searches, while generative AI systems can use up to 33 times more energy than conventional software. This rising energy consumption contributes to increased CO₂ emissions, as it is predominantly powered by fossil fuels.

■ **Water Consumption.** Data centers use a significant amount of water for cooling purposes. For instance, in the United States in 2021, approximately 7,100 liters of water were used per megawatt-hour of energy. Google's data centers alone consumed 12.7 billion liters of fresh water. This issue becomes particularly critical in water-scarce regions, especially in the context of global warming and extreme temperatures⁴²⁴.

■ The use of AI also raises **ethical and privacy** issues related to data collection and usage, necessitating transparency and accountability. Ensuring that data practices are ethical and that privacy is protected is crucial in the deployment of AI technologies⁴²⁵.

Legal Regulation of AI

The rapid development of AI technologies and the associated risks necessitate appropriate legal regulation. Many countries are in the process of establishing legal frameworks for AI implementation, but a well-established and cohesive structure is not yet in place. The European Union and China are currently leading efforts in this area.

On December 8, 2023, negotiators from the European Parliament and the Council reached a preliminary agreement on the AI Act, aimed at ensuring protection against high-risk AI applications for fundamental human rights, democracy, the rule of law, and environmental sustainability, while also promoting innovation. Specifically, the agreement includes provisions on the overarching objectives of AI; restrictions on the use of biometric identification systems by law enforcement; bans on social scoring and using AI to manipulate or exploit user vulnerabilities; the right for consumers to file complaints and receive substantive explanations; and fines ranging from €35 million (or 7% of global turnover) to €7.5 million (or 1.5% of global turnover)⁴²⁶. The agreed text now needs to be officially adopted by the Parliament and the Council. The proposed legislation has sparked mixed reactions: an open letter signed by over 150 European business leaders (from Renault to Heineken) highlights concerns that the law may negatively impact businesses and threaten regional competitiveness, while failing to address the very issues it was designed to resolve⁴²⁷.

In China, specific regulatory measures concerning AI have already been implemented, but these address a narrow range of issues. A comprehensive law establishing general rules for the AI industry is still lacking. In August 2023, a preliminary draft law was prepared by a group of researchers from the Chinese Academy of Social Sciences and published for discussion as the Model Law on Artificial Intelligence, Version 1.0 (Expert Draft Proposal). Notable features of the Chinese approach include its iterative nature, allowing for adjustments with each new step, and its sector-specific focus⁴²⁸.

In March 2024, the United Nations General Assembly adopted a resolution titled "**Seizing the opportunities of safe, secure, and trustworthy artificial intelligence systems for sustainable development**".⁴²⁹ Although non-binding, this resolution represents the first UN-level document aimed to establish a framework for the development and regulation of AI technologies globally. The document begins by reaffirming commitment to international law, particularly the UN Charter and the Universal Declaration of Human Rights. The reference to human rights is particularly pertinent regarding the ethical and secure use of

⁴²² Overclockers.ru. (2024). МЭА ожидает увеличения спроса на электроэнергию в два раза на фоне развития ИИ-технологий (The IEA expects electricity demand to double due to the development of AI technology). URL: <https://overclockers.ru/blog/Vizir47/show/134982/MEA-schitaet-cto-kriptoaljutj-i-ll-sozdajut-ser-eznye-energeticheskie-problemy>

⁴²³ Национальное информационное агентство «Экология» (2024). Энергетические аппетиты ИИ: новая угроза для экологии? [Energy appetites of AI: a new threat to the environment?]. URL: <https://nia.eco/2024/07/09/86104/>

⁴²⁴ Национальное информационное агентство «Экология» (2024). Энергетические аппетиты ИИ: новая угроза для экологии? [Energy appetites of AI: a new threat to the environment?]. URL: <https://nia.eco/2024/07/09/86104/>

⁴²⁵ TGI (2024). AI's Role in Improving Water Resource Management. URL: <https://www.tabsgi.com/ais-role-in-improving-water-resource-management/>

⁴²⁶ European Parliament (2023). Artificial Intelligence Act: Deal on comprehensive rules for trustworthy AI. URL: www.europarl.europa.eu/news/en/press-room/20231206IPR15699/artificial-intelligence-act-deal-on-comprehensive-rules-for-trustworthy-ai

⁴²⁷ World Economic Forum (2023). Everything you need to know about AI in 2023: the 6 must-read blogs. URL: <https://www.weforum.org/agenda/2023/11/ai-2023-governance-summit/>. See also: Associated Press News (2023). Europe reaches a deal on the world's first comprehensive AI rules. URL: <https://apnews.com/article/ai-act-europe-regulation-59466a4d8fd3597b04542ef25831322c>

⁴²⁸ Filipova, I. A. (2024). Legal Regulation of Artificial Intelligence: Experience of China. *Journal of Digital Technologies and Law*, 2(1), 46-73. URL: <https://doi.org/10.21202/jdtl.2024.4>

⁴²⁹ United Nations General Assembly (UNGA). Resolution A/78/L.49 adopted on 21 March 2024 without a vote <https://undocs.org/A/78/L.49>

data. The resolution calls for bridging the digital divide in AI and other technologies, both between and within countries, to achieve the 17 Sustainable Development Goals (SDGs)⁴³⁰.

The resolution outlines measures for ensuring data privacy, advocating for the safe development of AI, especially when dealing with sensitive personal information such as medical, biometric, or financial data. Member states and relevant stakeholders are encouraged to monitor AI systems for risks and assess their impact on data security and privacy protections throughout the entire lifecycle of these systems (6.e, p5/8). The repeated references to "the entire lifecycle" imply a comprehensive regulatory approach to AI, commencing with the "training" phase, where attention to data privacy in selection and usage is critical, and extending through technological development to consumer delivery. Impact assessments on privacy and detailed product testing during the development process are proposed as mechanisms for data protection and safeguarding fundamental rights to privacy⁴³¹. The document also affirms that states should execute their responsibilities in accordance with national legislation, thus providing substantial latitude for states in implementation.

Conclusion

In the context of global climate change, population growth, and increasing water scarcity, AI emerges as

a crucial tool for ensuring a sustainable future in water resource management. The use of AI not only aids in effectively addressing existing water supply challenges but also opens up new opportunities for achieving water security and sustainable development. For instance, smart irrigation systems can significantly enhance water distribution efficiency in agriculture, while leak detection systems can help reduce water losses.

At the same time, integrating AI into water resource management presents several challenges that must be addressed. Firstly, the need for high-quality data for training and optimizing AI models can be hindered by a lack of or incomplete data availability. Secondly, the implementation of AI technologies involves significant costs, which can be a barrier to widespread adoption, particularly in developing countries or regions with limited resources. Thirdly, issues of ethics and data privacy arise, necessitating careful regulation and adherence to standards to prevent misuse and protect user rights.

Therefore, the rational application of digital technologies should be coupled with adherence to ethical standards, effective data and resource management, and continuous monitoring and adjustment of methods. It is crucial that the integration of AI into water resource management is approached with awareness and balance, focusing on maximizing its potential benefits while minimizing possible risks and negative consequences.

12.5. Green Hydrogen: Global and Central Asian Development Trends

Prepared by M.S. Valieva, D.R. Ziganshina (SIC ICWC)

In recent decades, the global community has grappled with the pressing challenge of climate change, necessitating significant societal transformations. This includes a decisive shift away from fossil fuels towards renewable energy sources (RES), increased energy efficiency, and widespread electrification. In this context, green hydrogen – hydrogen produced using renewable energy – emerges as a pivotal component in the transition to a decarbonized future.

Green hydrogen, as a relatively new technology, is subject to intense scrutiny. Many aspects of its production remain unclear or insufficiently studied, including land use implications, actual greenhouse gas emissions, and the potential to extend the lifespan of fossil fuel power plants. This thematic review offers a concise overview of global and Central Asian trends in green hydrogen development, with a particular focus on its potential impact on water resources.

Hydrogen and its types

Hydrogen is the most common chemical element on Earth, which is found in water, air and solids. In world practice, there is a conditional classification of hydrogen by color, depending on the environmental friendliness of the process of its production. They distinguish:

- *gray hydrogen*, which produces the largest amount of carbon dioxide from coal or methane;
- *pink/red/yellow hydrogen* produced by atomic energy;
- *turquoise/blue hydrogen* produced from natural gas using Carbon Capture, Utilization and Storage (CCUS) technology or without carbon dioxide release (experimental pyrolysis);

⁴³⁰ Kohtyulina I., Smirnov A. (2024), Первая Резолюция Генассамблеи ООН по искусственному интеллекту. Пройдет ли Резолюция тест Тьюринга в новых реалиях? (The first Resolution of the UN General Assembly on artificial intelligence. Will the Resolution pass the Turing test in the new realities?). URL: <https://interaffairs.ru/news/show/45318>

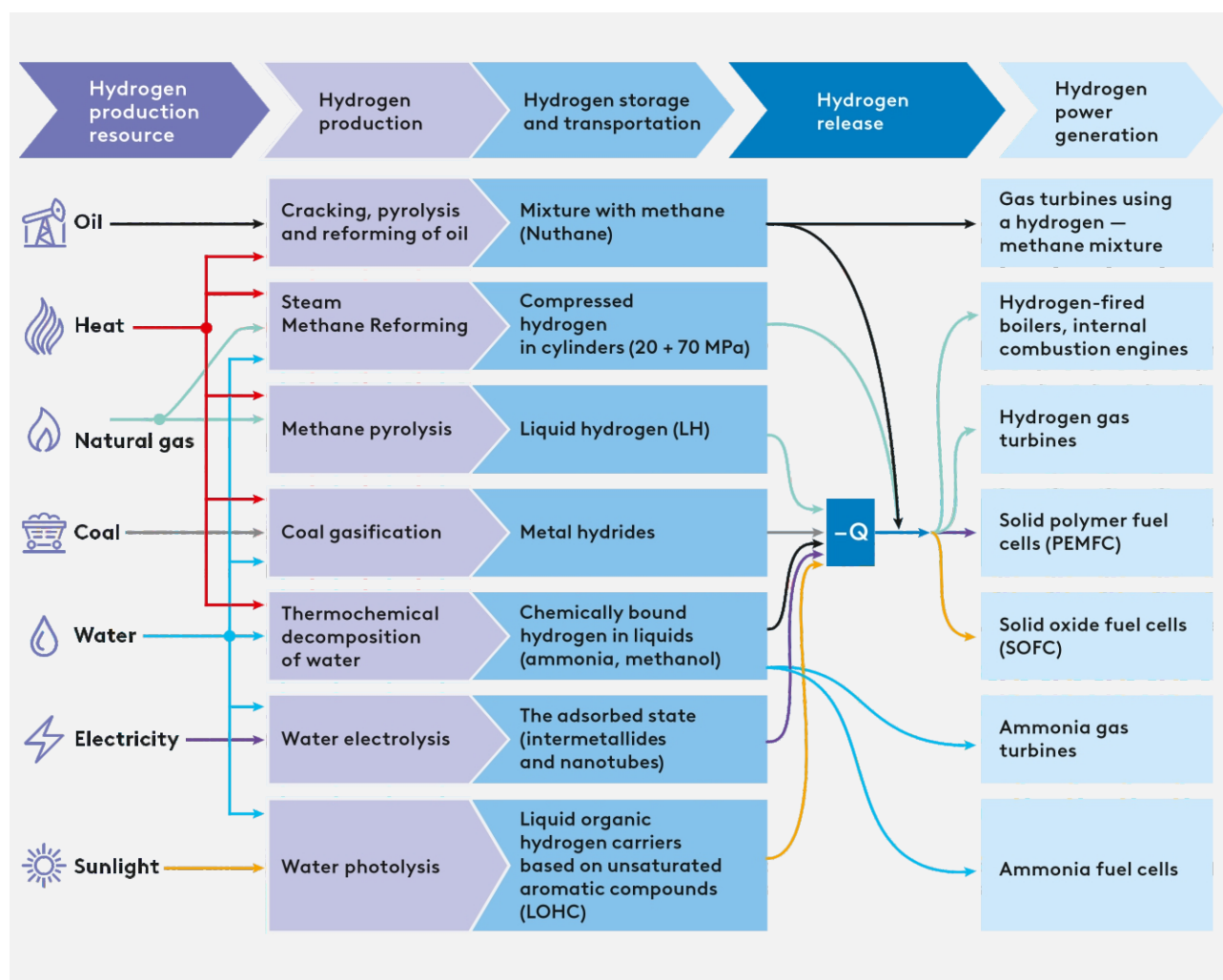
⁴³¹ Khelif M. (2024), United Nations AI Resolution: a Significant Global Policy Effort to Harness the Technology for Sustainable Development. URL: <https://executive.graduateinstitute.ch/communications/news/united-nations-ai-resolution-significant-global-policy-effort-harness>

■ green hydrogen, which is produced by electrolysis of water using electricity produced from renewable energy sources. It is considered the most environmentally friendly and clean.

There are other types of hydrogen classification, including "low carbon hydrogen", which refers to hydrogen based on fossil fuels with CO₂ capture and hydrogen based on electricity.

Currently, hydrogen production worldwide is predominantly based on organic fuels – natural gas, coal, and oil – accounting for 96% of total production. Only 4% of hydrogen is produced through water electrolysis. The figure below illustrates the main technological pathways of hydrogen energy, from production to its utilization as an energy carrier. However, with the growing need to transition away from fossil fuels, the demand for and production of green hydrogen is steadily increasing.

The main technological chains of hydrogen energy



Source: Green Technologies for Eurasia's Sustainable Future/Edited by Evgeny Vinokurov. Moscow: Eurasian Development Bank, Global Energy Association, 2021
URL: https://eabr.org/upload/iblock/d4f/EDB_-GLEN_2021_Report_Green-Technologies_eng.pdf

Growing demand for green hydrogen

Global hydrogen consumption in 2022 reached 95 million tons, representing an increase of nearly 3% compared to 2021. Significant growth was observed across all major consumer regions, except Europe,

where industrial activity was impacted by a sharp rise in natural gas prices.⁴³²

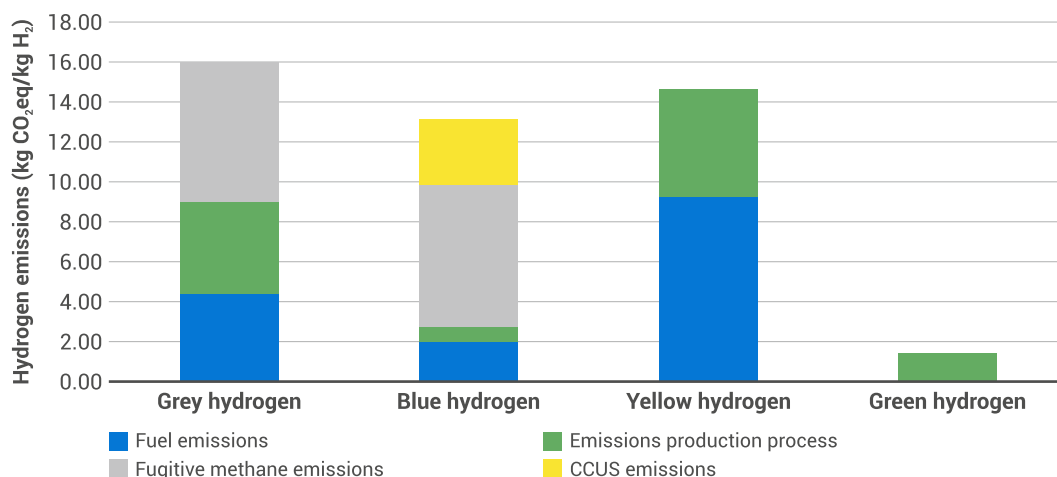
The International Energy Agency (IEA) estimates that global hydrogen demand could reach 115 million tons by 2030, with less than 2 million tons driven by new applications. This falls short of the 130 million tons

⁴³² International Energy Agency (2023), *Global hydrogen review 2023*.
URL: <https://www.iea.org/reports/global-hydrogen-review-2023/executive-summary>

(25% from new uses) required to meet countries' existing climate commitments and the 200 million tons needed by 2030 to align with achieving net-zero

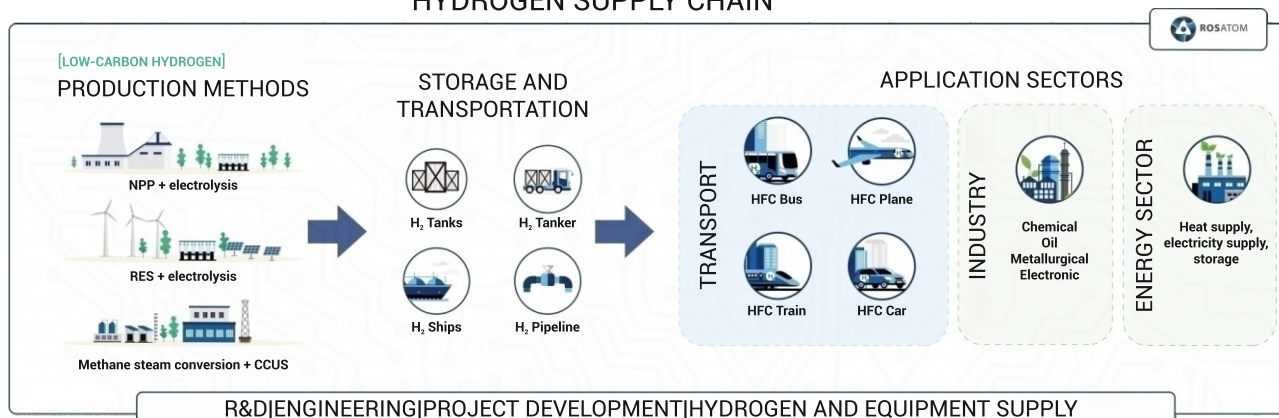
emissions by 2050.⁴³³ According to McKinsey's forecasts,⁴³⁴ demand for pure hydrogen could rise to between 125 and 585 million tons per year by 2050.⁴³⁵

Comparison of emissions from various hydrogen (H₂) production methods



Source: Francisco L. D. Simões and Diogo M. F. Santos (2024), A SWOT Analysis of the Green Hydrogen Market.
URL: <https://www.mdpi.com/1996-1073/17/13/3114>

HYDROGEN SUPPLY CHAIN



Source: Rosatom. URL: <https://www.eastrussia.ru/material/stechenie-vodorodnykh-obstoyatelstv/>

Green hydrogen: advantages and disadvantages

Like most energy sources, green hydrogen has both advantages and disadvantages. Among the key advantages of green hydrogen are the following:

- **Environmental friendliness.** Green hydrogen is produced using renewable energy sources such as

solar, wind and hydropower, without the emission of harmful greenhouse gases, which ensures its purity and sustainability as an energy source;

- **Wide range of applications in various industries thanks to its versatility and stability.** Green hydrogen can provide fuel for such hard-to-carbonize heavy industries as steel, chemical and cement industries that cannot use solar or wind energy, shipping, aviation and ammonia production. A higher energy

⁴³³ International Energy Agency (2022), *Global hydrogen review 2022*.

URL: <https://iea.blob.core.windows.net/assets/c5bc75b1-9e4d-460d-9056-6e8e626a11c4/GlobalHydrogenReview2022.pdf>

⁴³⁴ McKinsey & Company is an international consulting company specializing in solving problems related to strategic management

⁴³⁵ McKinsey & Company (2024), *Global energy perspective 2023: Hydrogen outlook*.

URL: <https://www.mckinsey.com/industries/oil-and-gas/our-insights/global-energy-perspective-2023-hydrogen-outlook>

density than that of batteries makes it possible to use hydrogen for long-haul freight transportation;

■ *The possibility of storage and use as an energy carrier.* During peak production periods, excess electricity generated from the sun and wind can be used to produce hydrogen, which can be stored indefinitely. When production levels drop or demand increases sharply, the generator converts the stored hydrogen into electricity, which is supplied to the grid, ensuring a continuous and stable energy supply⁴³⁶. In addition, hydrogen can be used as a clean fuel for various types of transport, such as cars, trucks, buses and even hydrogen fuel cell trains. Fast refueling capabilities make green hydrogen a viable alternative to fossil fuels.

■ *The possibility of transportation through the existing infrastructure.* Like natural gas, green hydrogen can be safely delivered to the end user through a pipeline. Using the existing natural gas supply network and laying new pipelines where necessary, it is possible to create a reliable national transportation network for hydrogen, the carbon-neutral energy carrier of the future. In particular, Gasunie, which is engaged in the safe transportation of natural gas throughout the Netherlands, has also accumulated many years of experience in transporting hydrogen between two companies in the province of Zeeland through an existing decommissioned gas pipeline⁴³⁷.

■ *The highest efficiency of all types of pure hydrogen in terms of water use.* On average, hydrogen production by electrolysis with a proton exchange membrane (PEM) has the lowest water consumption – about 17.5 l/kg. This is followed by alkaline electrolysis with a water consumption rate of 22.3 l/kg. For comparison, the method of steam conversion of methane – carbon capture, utilization and storage (SMR-CCUS) – uses 32.2 l/kg, and autothermal reforming (ATR)-CCUS uses 24.2 l/kg⁴³⁸.

Despite the many advantages of green hydrogen as an energy source, its **potential disadvantages** must also be taken into account:

■ *Higher cost of green hydrogen production compared to hydrogen derived from fossil fuels.* This cost disparity stems from the high expense of renewable energy sources and the technological processes involved in water electrolysis. For instance, electrolyzers can cost up to six times more than natural gas-based equipment. The production cost of green hydrogen ranges from \$2.5 to \$5 per kilogram, compared to \$1.50–\$3.50/kg for blue hydrogen and \$1.50/kg for gray hydrogen.⁴³⁹ According to the IEA's 2019 analysis, producing hydrogen from fossil fuels is expected to remain the most cost-effective option until 2030. Lowering the production cost of green hydrogen is essential for scaling up access to clean hydrogen.⁴⁴⁰ High production costs for green hydrogen pose a significant challenge to the European Union's ambitious goals as a leading player in the hydrogen market. Under the REPowerEU plan adopted in 2022, Europe aimed to produce and import 10 million tons of green hydrogen by 2030. However, in April 2024, the CEO of TotalEnergies stated at the World Economic Forum that achieving these targets is unrealistic due to the nascent stage of market development and the high costs associated with green hydrogen production.⁴⁴¹ The European Court of Auditors has confirmed that the EU's aspirations are based on "political will" and not on realistic assessments⁴⁴².

■ *The cost of hydrogen.* In July 2024, FTI Consulting⁴⁴³ presented a "Green Hydrogen Global Market Price Model" with calculations of the cost of producing and delivering green hydrogen in various ways, including marine transport and pipeline systems. According to the data, by 2030 the average price of green hydrogen may reach \$5.3 per kg⁴⁴⁴. The Dutch Institute TNO⁴⁴⁵ conducted (2024) a study of prices for hydrogen production in the Netherlands, analyzing 14 projects implemented by 11 major market participants. It turned out that the cost of European-made electrolysis plants is significantly higher than expected: €3,050 per kW for a 100 MW plant and €2,630 per kW for 200 MW. In recent years, production costs for green hydrogen have risen due to increases in energy prices, material and labor costs, higher interest rates, and transportation tariffs. Consequently, the current price of green hydrogen in the Netherlands

⁴³⁶ Vinci (2024), *What are the uses of hydrogen in today's world and its future?*

URL: <https://emag.vinci.com/en/what-are-uses-hydrogen-todays-world-and-future>

⁴³⁷ Gasunie (n.d.), *Hydrogen through natural gas pipelines: safe and sustainable.*

URL: [https://www.gasunie.nl/en/expertise/hydrogen/hydrogen-through-gas-pipelines-safe-and-sustainable#:~:text=This%20project%20has%20demonstrated%20that,diverted\)%20on%20various%20pipeline%20sections](https://www.gasunie.nl/en/expertise/hydrogen/hydrogen-through-gas-pipelines-safe-and-sustainable#:~:text=This%20project%20has%20demonstrated%20that,diverted)%20on%20various%20pipeline%20sections)

⁴³⁸ IRENA and Bluerisk (2023), *Water for hydrogen production*, International Renewable Energy Agency, Bluerisk, Abu Dhabi, United Arab Emirates. URL: www.irena.org/-/media/Files/IRENA/Agency/Publication/2023/Dec/IRENA_Bluerisk_Water_for_hydrogen_production_2023.pdf

⁴³⁹ Scita, Rossana and Raimondi, Pier Paolo and Noussan, Michel (2020), *Green Hydrogen: The Holy Grail of Decarbonisation? An Analysis of the Technical and Geopolitical Implications of the Future Hydrogen Economy.*

URL: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3709789

⁴⁴⁰ Shayan Sadeghi, Samane Ghandehariun, Marc A. Rosen (2020), *Comparative economic and life cycle assessment of solar-based hydrogen production for oil and gas industries.* URL: <https://www.sciencedirect.com/science/article/abs/pii/S0360544220314547>

⁴⁴¹ YouTube (2024), *The Rise of Green Molecules in the World Economic Forum* [Video]. URL: <https://www.youtube.com/live/ys7LymIfj2M>

⁴⁴² Financial Times (2024), *EU hydrogen targets are 'unrealistic', says audit body.*

URL: <https://www.ft.com/content/6ea87a1c-1413-4b08-a953-a33dc729dd3c>

⁴⁴³ FTI Consulting is a business consulting firm founded in 1982 and headquartered in Washington, DC, USA

⁴⁴⁴ FTI Consulting (2024), *Green hydrogen global market price model.*

URL: <https://www.fticonsulting.com/-/media/files/insights/reports/2024/jul/green-hydrogen-global-market-price-model.pdf>

⁴⁴⁵ Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek (TNO; English: Dutch Organization for Applied Scientific Research) is an independent research organization in the Netherlands specializing in applied science

ranges from €12 to €14 per kilogram, significantly exceeding initial forecasts.⁴⁴⁶

■ **Problems of hydrogen storage systems.** The shift toward large-scale industrial production of green hydrogen, coupled with its widespread distribution, could address the challenge of storage. According to the EnergyNet research center, a significant reduction in the cost of storing liquefied hydrogen is anticipated globally after 2025, with prices expected to nearly halve from \$2 to \$0.9 per kilogram. Storing hydrogen in the form of ammonia is projected to be the most economical option, with storage costs dropping to approximately \$0.1 per kilogram by 2025.

■ **High power consumption.** The production of hydrogen, particularly green hydrogen, requires more energy compared to the production of other fuels.

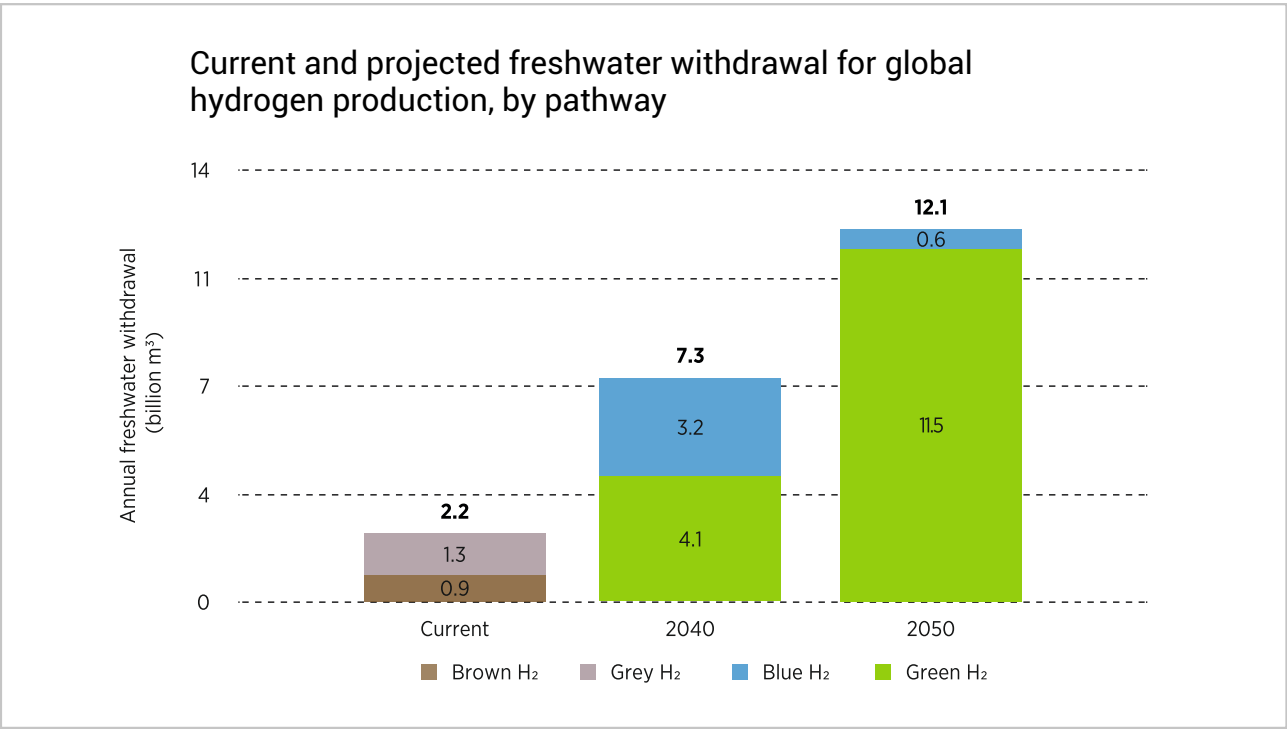
■ **Large volume.** The volume of green hydrogen is nearly four times larger than that of natural gas. To store green hydrogen, it must either be compressed to a pressure 700 times higher than normal atmospheric pressure or cooled to -253°C, which is close to absolute zero.⁴⁴⁷

■ **Infrastructure.** Hydrogen atoms are small and can sometimes seep through steel. Therefore, some existing pipelines may need to be upgraded.

■ **Significant amounts of water used for electrolysis,** which poses a problem for water-scarce regions. Water is required not only as a raw material for production but also for cooling in all types of hydrogen production. The water consumption for producing 1 kg of renewable hydrogen ranges from 20 to 30 liters per kilogram (untreated water).⁴⁴⁸ OECD estimates this as about 1 billion liters annually with a production goal of 40 million tons per year, which is one of the targets for increasing pure hydrogen production by 2030.⁴⁴⁹

According to IRENA, approximately 2.2 billion m³ of freshwater are used annually for global hydrogen production, accounting for 0.6% of the total volume of freshwater withdrawn by the energy sector.

Gray hydrogen production accounts for about 59% of the world's freshwater consumption, while brown hydrogen accounts for 40%, with the remainder attributed to green and blue hydrogen. Freshwater consumption for global hydrogen production could more than triple by 2040 and increase sixfold by 2050 compared to 2023 (see the figure below)⁴⁵⁰. Additionally, rising water demand for hydrogen production may intensify competition between sectors, such as agriculture and household consumption, potentially threatening food security and impacting the well-being of populations.



⁴⁴⁶ TNO (2024), *Evaluation of the levelised cost of hydrogen based on proposed electrolyser projects in the Netherlands*. URL: <https://publications.tno.nl/publication/34642511/mzKClN/TNO-2024-R10766.pdf>

⁴⁴⁷ ABC News (2021), *What is green hydrogen, how is it made and will it be the fuel of the future?* URL: <https://www.abc.net.au/news/science/2021-01-23/green-hydrogen-renewable-energy-climate-emissions-explainer/13081872>

⁴⁴⁸ Peline Atamer (2023), *Sustainable water use for green hydrogen production: preliminary insights from OECD work in Mongolia*

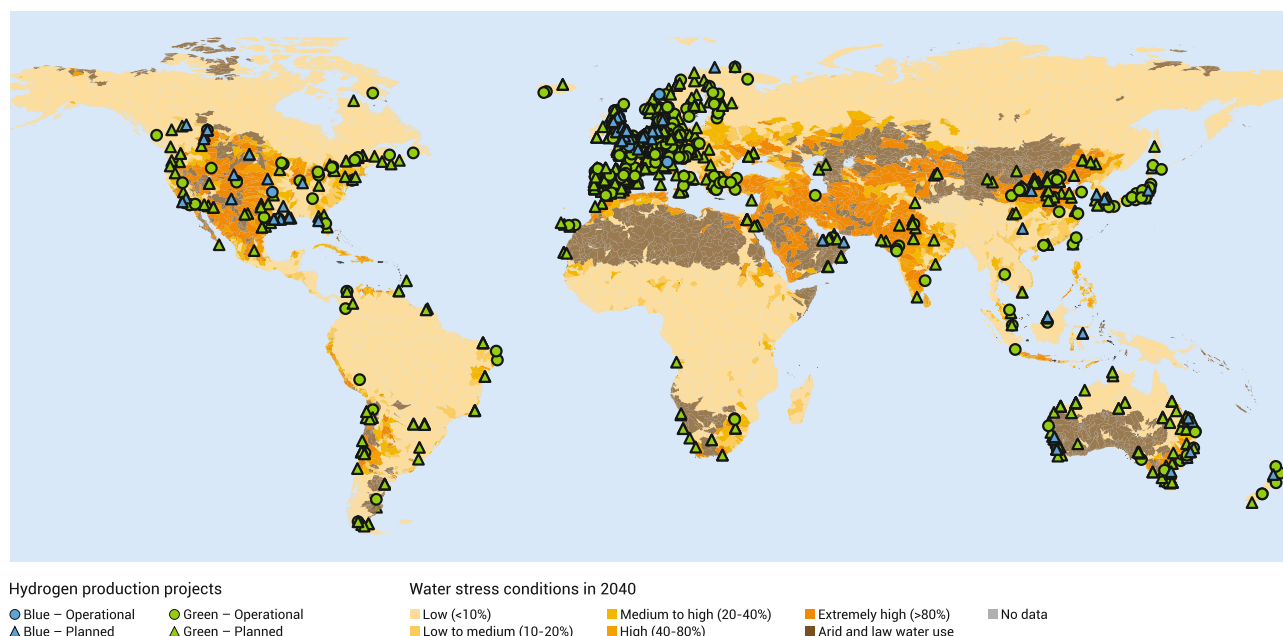
⁴⁴⁹ Peline Atamer (2023), *Sustainable water use for green hydrogen production: preliminary insights from OECD work in Mongolia*

⁴⁵⁰ IRENA and Bluerisk (2023), *Water for hydrogen production*, International Renewable Energy Agency, Bluerisk, Abu Dhabi, United Arab Emirates. URL: www.irena.org/-/media/Files/IRENA/Agency/Publication/2023/Dec/IRENA_Bluerisk_Water_for_hydrogen_production_2023.pdf

Although the use of deionized water produced by desalination plants can reduce the need for fresh water, it also causes the need to discharge residual brine into water sources and soil⁴⁵¹. In addition, despite the generally insignificant use of water for hydrogen

production at the global level, it is important to take into account local conditions. More than 35% of the world's green and blue hydrogen production capacities (in operation and planned) are located in regions with acute water shortages⁴⁵².

Global water stress conditions and green and blue hydrogen project locations for 2040



■ **Low demand for green hydrogen.** Experts suggest that the high cost of equipment required for hydrogen use and the challenges surrounding its supply infrastructure have resulted in a lack of significant demand.⁴⁵³ In particular, the passenger car sector saw a 30.2% decline in global sales of hydrogen fuel cell vehicles in 2023 compared to 2022.⁴⁵⁴ Additionally, a recent study indicates that hydrogen fuel cell trucks are unlikely to compete with electric vehicles on cost⁴⁵⁵. In 2024, McKinsey revised its forecast for the hydrogen market's development through 2050, reducing it by 10-25% compared to previous estimates. According to the updated report, hydrogen consumption by 2050 could range from 180 to 350 million tons per year, with 50-70% of this volume expected to be green hydrogen.⁴⁵⁶

■ **Explosion hazard.** Green hydrogen is a highly flammable substance, and its storage and transportation require the use of high-pressure containers and pipelines. In the event of leaks or explosions, these systems could pose a significant threat to public health and safety. Therefore, strict safety measures are essential to prevent such incidents.

■ **Impact on climate change.** In the event of leakage into the atmosphere, hydrogen can enhance the heat-trapping effect of methane and act as a greenhouse gas, leading to the formation of water vapor in the upper atmosphere. Additionally, studies indicate that burning hydrogen in power plants increases the formation of nitrogen oxides (Nox), pollutants that contribute to smog, harm public health, and accelerate global warming⁴⁵⁷.

⁴⁵¹ Hurwitz Z., Bujak N., Tapia M., Daza E., Gischler Ch. (2023), *Key aspects for managing the environmental and social risks of green hydrogen*, Inter-American Development Bank.

⁴⁵² IRENA and Bluerisk (2023), *Water for hydrogen production*, International Renewable Energy Agency, Bluerisk, Abu Dhabi, United Arab Emirates. URL: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2023/Dec/IRENA_Bluerisk_Water_for_hydrogen_production_2023.pdf

⁴⁵³ David R Baker (2024), *Why almost nobody is buying green hydrogen*, Bloomberg. URL: <https://www.japantimes.co.jp/environment/2024/08/14/energy/nobody-buying-green-hydrogen/>

⁴⁵⁴ RenEn (2024), *Продажи водородных автомобилей в мире упали на 30,2% в 2023 г.* URL: <https://renen.ru/prodazhi-vodorodnyh-avtomobilej-v-mire-upali-na-30-2-v-2023-godu/>

⁴⁵⁵ International Transport Forum (2024), *Decarbonising Europe's trucks: Minimise cost and uncertainty*. URL: <https://www.itf-oecd.org/sites/default/files/docs/decarbonising-europes-trucks-minimise-cost-uncertainty.pdf>

⁴⁵⁶ McKinsey & Company (2024), *Global energy perspective 2024*. URL: <https://www.mckinsey.com/industries/energy-and-materials/our-insights/global-energy-perspective>

⁴⁵⁷ Kari Lydersen (2024), *Scientists warn a poorly managed hydrogen rush could make climate change worse*. URL: <https://energynews.us/2024/02/28/scientists-warn-a-poorly-managed-hydrogen-rush-could-make-climate-change-worse/#::-:text=Hydrogen%20is%20%E2%80%99Can%20indirect%20global,of%20methane%20in%20the%20atmosphere>

■ **Green hydrogen and hydropower plants.** Environmental and human rights organizations warn that the growth of the green hydrogen industry could lead to a new wave of large-scale hydroelectric power plant construction worldwide. This trend is linked to significant environmental, social, and economic issues, including ecosystem destruction, displacement of populations, high capital costs, and the risk of man-made disasters.⁴⁵⁸ Environmentalists from the Rivers Without Borders Public Foundation, in their review of the draft Concept for the Development of Hydrogen Energy in the Republic of Kazakhstan, argue that the country's energy-intensive hydrogen production is primarily aimed at justifying the construction of new energy facilities, such as large hydroelectric and nuclear power plants. These projects could have significant negative impacts on the environment and biodiversity.⁴⁵⁹ Reservoirs created for hydroelectric power plants are a source of greenhouse gas emissions, particularly methane, which in the near future will have an emissions impact 84 times greater than that of carbon dioxide.⁴⁶⁰ Therefore, to ensure the optimal use of hydroelectric power plants, careful planning and the development of strategies to minimize their negative impact while maximizing their benefits are essential.

Global development of green hydrogen

Given the potential of green hydrogen as an environmentally friendly and low-carbon method of energy production, storage, and transmission, many of the world's leading countries have created opportunities for its development in recent years.

In 2017, **Japan** became the first country in the world to adopt a national hydrogen strategy, which was updated in 2023. The updated strategy identifies nine key technologies, including fuel cells and water electrolysis devices. It was also decided to invest more than 15 trillion yen (\$98.8 billion) over the next 15 years and increase hydrogen consumption to 12 million tons per year by 2040.⁴⁶¹

Germany plans to invest over €10 billion in the hydrogen sector by 2023, including €7 billion for "market

launch" (creating framework conditions and stimulating domestic demand), €2 billion for international cooperation, and another €1 billion for the needs of the industry, which in turn is expected to implement hydrogen technologies to potentially become the world's largest exporter.⁴⁶² The German government views hydrogen energy as the most effective way to utilize existing energy sources.⁴⁶³

It is important to note that in recent years, there has been a shift in leadership within the hydrogen economy. The BRICS countries are taking the lead, showcasing significant achievements in technological development, project implementation, and the growth of domestic markets, as well as in the volume of export agreements.⁴⁶⁴

China, as the world's largest hydrogen producer and with the world's largest renewable energy capacity, is striving to create an integrated hydrogen industry encompassing transportation, energy storage and the industrial sector. By 2035, the country plans to increase the share of green hydrogen in its energy mix.

According to the "Green Hydrogen Energy Development Plan for 2021-2035," China aims to achieve annual hydrogen production from renewable energy sources of 0.1-0.2 million tons. At the same time, approximately 60% of the world's electrolyser production capacity is concentrated in China, with costs significantly lower than those of European counterparts.⁴⁶⁵

In 2020, **South Korea** set standards for clean hydrogen energy, and in 2021 it defined the criteria for certification of green hydrogen. The country is actively developing infrastructure for hydrogen vehicles, charging stations and fuel cells for the mass deployment of hydrogen technologies.

As of 2020, 99% of hydrogen in the **USA** was produced from fossil fuels. To stimulate the production of "clean hydrogen" (produced with low or zero carbon emissions), the Bipartisan Infrastructure Law was passed in 2021, allocating over \$9.5 billion in direct investments for clean hydrogen initiatives. In 2022, the tax credit for its production was reduced.⁴⁶⁶ In 2023, the National

⁴⁵⁸ International Rivers (2022), *Green hydrogen factsheet*.

URL: <https://www.internationalrivers.org/wp-content/uploads/sites/86/2022/07/Green-Hydrogen-Factsheet.pdf>

⁴⁵⁹ Central Asia Climate Portal (2024), *Kazakhstan may ban the use of hydroelectric power plants for the production of green hydrogen*.

URL: <https://centralasiacclimateportal.org/kazakhstan-may-ban-the-use-of-hydroelectric-power-plants-for-the-production-of-green-hydrogen/>

⁴⁶⁰ International Rivers (2022), *Green hydrogen factsheet*.

URL: <https://www.internationalrivers.org/wp-content/uploads/sites/86/2022/07/Green-Hydrogen-Factsheet.pdf>; RenEn (2016), Гидроэлектростанции и выбросы парниковых газов. URL: <https://renen.ru/gidroelektrostantsii-i-vybrosy-parnikovyyh-gazov/>

⁴⁶¹ Ministry of Economy, Trade and Industry (2023), *Basic Hydrogen Strategy of Japan*.

URL: www.meti.go.jp/shingikai/enecho/shoene/shinene/suiso_seisaku/pdf/20230606_5.pdf

⁴⁶² РБК (2021), *Водородная энергетика России и Европы: перспективы рынка на \$700 млрд*.

URL: <https://trends.rbc.ru/trends/green/5ef46e379a7947a89c25170d>

⁴⁶³ *Green Technologies for Eurasia's Sustainable Future*/Edited by Evgeny Vinokurov. Moscow: Eurasian Development Bank, Global Energy Association, 2021. URL: https://eabr.org/upload/iblock/d4f/EDB_GLEN_2021_Report_Green-Technologies_eng.pdf

⁴⁶⁴ Forbes (2024), «Водородная эйфория» закончилась: почему этот источник энергии не спасет планету.

URL: <https://www.forbes.ru/sustainability/522323-vodorodnaa-eyforia-zakoncilas-pocemu-etot-istocnik-energii-ne-spaset-planetu>

⁴⁶⁵ Forbes (2024), «Водородная эйфория» закончилась: почему этот источник энергии не спасет планету.

URL: <https://www.forbes.ru/sustainability/522323-vodorodnaa-eyforia-zakoncilas-pocemu-etot-istocnik-energii-ne-spaset-planetu>

⁴⁶⁶ WRI (2023), *Unlocking Clean Hydrogen Investments in U.S. Climate Policy*. URL: www.wri.org/update/clean-hydrogen-investments-bil-ira

Strategy and Roadmap for Clean Hydrogen were adopted.⁴⁶⁷

The Hydrogen Strategy of the **European Union**, adopted in 2020 (COM/2020/301), established a foundation for supporting the production and use of renewable and low-carbon hydrogen.⁴⁶⁸ The European Union plans to invest \$430 billion in clean hydrogen by 2030.

In 2023, **India** approved the National Mission for Green Hydrogen with the goal of producing at least 5 million tons of clean hydrogen annually, accompanied by an increase in renewable energy capacity of 125 GW through over €2.24 billion in investments.⁴⁶⁹

The Ministry of Energy of the **Russian Federation** has developed a Roadmap titled "Development of Hydrogen Energy in Russia" for 2020-2024, which served as the foundation for the Action Plan approved by RF Government Decree No.2634-r on 12.10.2020. Russia plans to produce and export hydrogen in line with the global trend of phasing out hydrocarbon energy. The country's competitive advantages include its vast energy reserves, proximity to potential consumers (such as EU countries, China, and Japan), and the existing transportation infrastructure.⁴⁷⁰

Central Asian development of green hydrogen

Kazakhstan is an energy-surplus country and an important regional exporter of coal, oil, and gas, with growing production rates. Coal dominates the electricity and heat supply, contributing to a relatively rapid increase in greenhouse gas emissions. The variety of resources available in the country for low-carbon hydrogen production presents opportunities for synergy and the accelerated development of Kazakhstan's hydrogen economy, driven by economies of scale.⁴⁷¹

The development of hydrogen energy in Kazakhstan can help balance the intermittent electricity production from renewable energy sources, meet electricity

demand, and enhance network stability, while also contributing to the decarbonization of various emission-intensive sectors (such as industry, transport, and energy). According to UNECE forecasts, the potential for hydrogen production from water via electrolysis using renewable energy sources in Kazakhstan by 2040 ranges from 85 to 1,464 thousand tons.⁴⁷²

In line with the Strategy for Achieving Carbon Neutrality of the Republic of Kazakhstan by 2060 and the National Development Plan through 2025, the country has approved the Concept of Hydrogen Energy Development until 2030.⁴⁷³ The document highlights hydrogen as a key element in the transition to a low-carbon economy, with the potential to decarbonize industrial processes and transport. The expected outcome of the Concept is to achieve hydrogen production of 10 thousand tons by 2027. By 2029, the planned production volume is expected to reach 18 thousand tons per year, with a target of 25 thousand tons by 2030, with at least 50% of that being green hydrogen. A key goal is also to reduce carbon dioxide emissions by 0.1% by 2030 through the use of hydrogen across various sectors of the economy. Additionally, Kazakhstan plans to export 15 thousand tons of hydrogen per year to partner countries by 2030. As part of international cooperation, five agreements on joint hydrogen energy projects are expected to be concluded by 2030. The introduction of hydrogen buses is also planned for at least three cities by that date.⁴⁷⁴

A Competence Center for Hydrogen Energy was established under the National Company KazMunaiGas, which has been functioning as a research hub for hydrogen energy technologies since April 2022.⁴⁷⁵ In 2021, a Framework Agreement was signed between the Government of the Republic of Kazakhstan and NEH Eurasia GmbH (Germany) on the basic principles for implementing renewable energy projects and producing green hydrogen in the Mangystau region. The plan includes the construction of a solar and wind farm to generate 40 GW of electricity, which will be used for hydrogen production via electrolysis using desalinated water. Additionally, Kazakhstan and the European

⁴⁶⁷ U.S. Department of Energy (2021), *Clean hydrogen strategy and roadmap*.

URL: www.hydrogen.energy.gov/library/roadmaps-vision/clean-hydrogen-strategy-roadmap; See also: U.S. Department of Energy, Office of Fossil Energy, *Hydrogen Strategy – Enabling a Low-Carbon Economy*.

URL: www.energy.gov/sites/prod/files/2020/07/f76/USDOE_FE_Hydrogen_Strategy_July2020.pdf

⁴⁶⁸ European Commission (n.d.), *Hydrogen*. URL: https://energy.ec.europa.eu/topics/energy-systems-integration/hydrogen_en

⁴⁶⁹ Green Hydrogen Organisation (n.d.), *India*. URL: <https://gh2.org/countries/india>

⁴⁷⁰ *Green Technologies for Eurasia's Sustainable Future*/Edited by Evgeny Vinokurov. Moscow: Eurasian Development Bank, Global Energy Association, 2021. URL: https://eabr.org/upload/iblock/d4f/EDB_GLEN_2021_Report_Green-Technologies_eng.pdf

⁴⁷¹ United Nations Economic Commission For Europe (2023), *Low-carbon hydrogen production in the CIS countries and its role in the development of the hydrogen ecosystem and export potential*.

URL: https://unece.org/sites/default/files/2023/03/EN_Sustainable%20Hydrogen%20Production%20Pathways_final_0.pdf

⁴⁷² United Nations Economic Commission For Europe (2023), *Low-carbon hydrogen production in the CIS countries and its role in the development of the hydrogen ecosystem and export potential*.

URL: https://unece.org/sites/default/files/2023/03/EN_Sustainable%20Hydrogen%20Production%20Pathways_final_0.pdf

⁴⁷³ Order of the Minister of Energy of the Republic of Kazakhstan (September 27, 2024) No.342. "On approval of the Concept of development of hydrogen energy in the Republic of Kazakhstan until 2030".

URL: https://online.zakon.kz/Document/?doc_id=38912454&pos=5;-106#pos=5;-106

⁴⁷⁴ Zakon.kz (2024), *Концепция развития водородной энергетики утвердили в Казахстане*.

URL: <https://www.zakon.kz/pravo/6452721-kontseptsiiyu-razvitiya-vodorodnoy-energetiki-utverdili-v-kazakhstane.html>

⁴⁷⁵ Zholdayakova, S., Y. Abuov, D. Zhakupov, B. Suleimenova, and A. Kim (2022), *Toward Hydrogen Economy in Kazakhstan*, Asian Development Bank Institute. URL: <https://doi.org/10.56506/IWLU3832>

Union have signed a memorandum on strategic partnership in the fields of sustainable raw materials, batteries, and green hydrogen value chains.

Kyrgyzstan is an energy-deficient country, meeting only 51% of its electricity needs from domestic resources, primarily hydroelectric power plants. The country has significant potential for developing hydro and solar energy, which could be used to produce between 5,000 and 145,000 tons of low-carbon hydrogen per year.⁴⁷⁶ The relatively low cost of hydropower generation in Kyrgyzstan (2-2.3 cents per kWh) helps reduce the cost of producing green hydrogen.⁴⁷⁷ While there are currently no active green hydrogen projects in Kyrgyzstan, the President has expressed interest in developing cooperation with Germany in the field of green hydrogen production and use.⁴⁷⁸

Tajikistan is an energy-deficient country with limited fossil energy resources, but it meets 90% of its electricity needs through hydropower. The country possesses vast potential in hydropower, though it has not yet explored its solar energy potential. The estimated share of the country's territory that could be covered by photovoltaic installations to generate the equivalent of the annual electricity consumption is just 0.074%. With the development of these resources, Tajikistan is projected to have the potential to produce between 9,000 and 204,000 tons of low-carbon hydrogen per year by 2040.⁴⁷⁹ According to the leadership of the Ministry of Energy and Water Resources, Tajikistan plans to produce 1 million tons of green hydrogen annually by 2040, both for domestic consumption and exports to Central Asian countries.⁴⁸⁰ Currently, no projects have been completed.

Turkmenistan is an energy-rich country and a major exporter of natural gas, which dominates its energy sector, accounting for nearly 100% of electricity pro-

duction. The share of renewable energy in the country's energy mix remains minimal. However, Turkmenistan holds significant potential for low-carbon energy production. Blue hydrogen can be produced from natural gas using carbon capture, utilization, and storage (CCUS) technologies.⁴⁸¹ The country's relatively modern gas pipelines present opportunities for hydrogen injection and retrofitting.⁴⁸² Additionally, by harnessing its untapped renewable energy resources, including offshore wind in the Caspian Sea, Turkmenistan could establish green hydrogen production through water electrolysis powered by renewable energy. Projections estimate that the country could produce between 6,000 and 321,000 tons of hydrogen annually, paving the way for a sustainable energy future. Low-carbon hydrogen could replace petroleum products in the transport sector and position Turkmenistan as a key player in future export projects, particularly to markets like China.⁴⁸³ Since 2022, a draft "Roadmap for the Development of Green Hydrogen Energy in Turkmenistan"⁴⁸⁴ has been under discussion. However, no projects have been implemented yet.

Uzbekistan is an energy-rich country, a major producer and exporter of natural gas, and a significant producer of oil and coal to meet domestic demand. The country also possesses substantial potential for renewable energy, particularly solar power, with a technical capacity estimated at 180 million tons of oil equivalent.⁴⁸⁵ According to the UNECE, Uzbekistan's resource potential for green hydrogen production, based on its available resources and energy sources, ranges between 33,000 and 1,310,000 tons annually.⁴⁸⁶

Uzbekistan is actively pursuing a transition to a green economy and implementing reforms in its energy sector, including expanding the use of renewable

⁴⁷⁶ United Nations Economic Commission For Europe (2023), *Low-carbon hydrogen production in the CIS countries and its role in the development of the hydrogen ecosystem and export potential*.

URL: https://unece.org/sites/default/files/2023-03/EN_Sustainable%20Hydrogen%20Production%20Pathways_final_0.pdf

⁴⁷⁷ Индина М. (2022), Кыргызстан может занять свою нишу в производстве водородной энергии.

URL: <https://www.akchabar.kg/ru/article/economy/kyrgyzstan-mozhet-zanyat-svoyu-nishu-v-proizvodstve-vodorodnoy-enerгии>

⁴⁷⁸ Central Asia News (2023), Киргизия намерена расширить связи с ФРГ в сфере выработки «зелёного» водорода.

URL: <https://centralasia.news/22440-kirgizija-namerena-rasshirit-svjazi-s-frg-v-sfere-vyrabotki-zelenogo-vodoroda.html>

⁴⁷⁹ United Nations Economic Commission For Europe (2023), *Low-carbon hydrogen production in the CIS countries and its role in the development of the hydrogen ecosystem and export potential*.

URL: https://unece.org/sites/default/files/2023-03/EN_Sustainable%20Hydrogen%20Production%20Pathways_final_0.pdf

⁴⁸⁰ Neftgaz (2023), Таджикистан планирует ежегодно производить 1 млн т зеленого водорода для экспорта в страны ЦА.

URL: <https://neftgaz.ru/news/Alternative-energy/795709-tadzhikistan-planiruet-ezhegodno-proizvodit-1-mln-t-zelenogo-vodoroda-dlya-eksporta-v-strany-tsentra/>

⁴⁸¹ CO₂ can be permanently stored in aquifers or old oil and gas reservoirs. See also: UNECE Technology Brief – Carbon Capture, Use and Storage (CCUS). URL: https://unece.org/sites/default/files/2021-03/CCUS%20brochure_EN_final.pdf

⁴⁸² Мельников Ю. (2022), Низкоуглеродное производство водорода в странах СНГ и его роль в развитии водородной экосистемы и экспортного потенциала, UNECE.

URL: <https://unece.org/sites/default/files/2022-11/2022-11-14%20Almaty%20conference%20%28RUS%29.pdf>

⁴⁸³ United Nations Economic Commission For Europe (2023), *Low-carbon hydrogen production in the CIS countries and its role in the development of the hydrogen ecosystem and export potential*.

URL: https://unece.org/sites/default/files/2023-03/EN_Sustainable%20Hydrogen%20Production%20Pathways_final_0.pdf

⁴⁸⁴ OSCE (2022), *Roadmap for the development of green hydrogen energy discussed at OSCE-organized roundtable in Turkmenistan*.

URL: <https://www.osce.org/ru/centre-in-ashgabat/518067>

⁴⁸⁵ Energy Charter (2022), *IDEER: Uzbekistan 2022*.

URL: https://www.energycharter.org/fileadmin/DocumentsMedia/IDEER/IDEER-Uzbekistan_2022_ru.pdf

⁴⁸⁶ United Nations Economic Commission For Europe (2023), *Low-carbon hydrogen production in the CIS countries and its role in the development of the hydrogen ecosystem and export potential*.

URL: https://unece.org/sites/default/files/2023-03/EN_Sustainable%20Hydrogen%20Production%20Pathways_final_0.pdf

energy sources and fostering the stable development of hydrogen energy.⁴⁸⁷ As part of the "Roadmap for the Transition to Low-Carbon Energy" in the Uzbek electric power sector – developed with support from the EBRD and financing from Japan – plans include utilizing excess renewable energy production to support the growth of a hydrogen economy.⁴⁸⁸

In 2021, the National Research Institute of Renewable Energy was established, building upon the International Solar Energy Institute of the Academy of Sciences under the Ministry of Energy. Within its structure, the institute includes the Research Center for Hydrogen Energy and laboratories dedicated to testing and certifying renewable and hydrogen energy technologies.⁴⁸⁹ The institute focuses on advancing priority areas such as expanding the use of renewable energy sources and promoting hydrogen energy. It also works on developing regulatory projects aligned with international standards. Furthermore, plans are underway to establish a Green Hydrogen Center with support from USAID.⁴⁹⁰

Other institutes in Uzbekistan are also conducting groundbreaking research in hydrogen energy. For instance, a team of scientists from the Institute of Material Sciences of the Academy of Sciences of the Republic of Uzbekistan, led by Dr. R. Rakhimov, has developed a new photocatalyst with the potential to revolutionize green hydrogen production. This innovative catalyst achieves record efficiency of up to 95% when using solar energy. The process leverages the pulsed tunneling effect, enabling precise adjustment of radiation pulse parameters to match the energy required for water decomposition. This approach significantly enhances energy efficiency. Remarkably, the catalyst operates at steam temperatures as low as 93-98°C, compared to traditional methods that necessitate heating water to 900°C.⁴⁹¹

In 2022, the Ministries of Energy of Uzbekistan and Saudi Arabia, along with Saudi companies ACWA Power and Air Products, signed an agreement to advance research, development, and production of green hydrogen in Uzbekistan.⁴⁹² By 2023, in collaboration with ACWA Power, construction began on a pilot green hydrogen production facility. In the first

phase, with financing from the EBRD,⁴⁹³ the project aims to produce 3,000 tons of hydrogen annually. This hydrogen will be processed into mineral fertilizers using a 20 MW electrolyser installed in Chirchik, Tashkent region, and supported by a 52 MW wind power plant located at the existing Bash WPP in Gijduvan district, Bukhara region.⁴⁹⁴ In the second phase, 2.4 GW of wind energy will be harnessed to enable the production of 500,000 tons of green ammonia annually.

Conclusion

Green hydrogen holds strategic importance for global decarbonization and achieving the UN Sustainable Development Goals (SDGs), particularly in providing clean, affordable energy and combating climate change. The development of a green hydrogen economy is being actively pursued by countries like Japan, China, India, South Korea, the United States, and EU nations, which are making significant investments and advancing technologies in this field. Key drivers behind the development of green hydrogen energy include the need for decarbonization, its potential for export, and its contribution to energy security. However, its adoption faces challenges such as high production costs, significant water requirements, the need for substantial infrastructure development, and the creation of a viable sales market.

The key prerequisites for green hydrogen production include: availability of land resources for installing renewable energy infrastructure, favorable climatic conditions to support the development of renewable energy potential, access to water sources for electrolysis and cooling processes, a developed industrial infrastructure to facilitate domestic consumption, particularly industries already using gray hydrogen and with potential demand for green hydrogen, and transport connectivity to enable efficient hydrogen exports.

Central Asian countries possess favorable conditions for the development of green hydrogen energy. Among them, Kazakhstan and Uzbekistan, which have the greatest production potential (see the

⁴⁸⁷ Decree No.PP-4477 dated 04.10.2019 "On approval of the Strategy for the Transition of the Republic of Uzbekistan to a green economy for the period 2019-2030". Decree No.PP-436 dated 02.12.2022 "On measures to improve the effectiveness of reforms aimed at the transition of the Republic of Uzbekistan to a green economy by 2030"

⁴⁸⁸ A roadmap for the transition to low-carbon energy in the Uzbek electricity sector. The document has not been officially approved. URL: https://minenergy.uz/uploads/0e7a9206-2afc-0897-d164-101e895a5d3c_media_.pdf

⁴⁸⁹ Decree No.PP-5063 dated 04.09.2021 "On measures for the development of renewable and hydrogen energy in the Republic of Uzbekistan"

⁴⁹⁰ U.S. Embassy in Uzbekistan (2024), USAID energizes Uzbekistan's first green hydrogen hub. URL: <https://uz.usembassy.gov/ru/usaide-energizes-uzbekistans-first-green-hydrogen-hub-ru/>

⁴⁹¹ Anhor.uz (2024), Узбекиские ученые разработали прорывную технологию получения зеленого водорода. URL: <https://anhor.uz/ekologiya/vodorod/>

⁴⁹² Ministry of Energy of the Republic of Uzbekistan (2022), Новый этап узбекско-саудовского энергетического сотрудничества. URL: <https://minenergy.uz/ru/news/view/2109>

⁴⁹³ The project is estimated at a total of \$95.4 million, including a loan of \$58.2 million

⁴⁹⁴ Weekly.uz (2024), В Узбекистане запускается пилотный проект «Зеленый водород». URL: <https://weekly.uz/articles/5874/>

⁴⁹⁵ RenEn (2023), В Узбекистане начат проект по производству «зеленого» водорода. URL: <https://renen.ru/v-uzbekistane-nachat-proekt-po-proizvodstvu-zelenogo-vodoroda/>

table below),⁴⁹⁶ are already taking initial steps to advance this sector.

The successful development of green hydrogen requires a comprehensive approach, including the

creation of a robust regulatory framework, advancement of technologies, establishment of necessary infrastructure, reduction of production costs, expansion of local demand for green hydrogen in key industries, and active international cooperation.

Resource potential for green hydrogen production (generated from water electrolysis using renewable energy sources) in Central Asian countries by 2040, thousand tons per year

Country	Minimum scenario	Maximum scenario
Kazakhstan	85	1,464
Kyrgyz Republic*	5	145
Tajikistan	9	204
Turkmenistan	6	321
Uzbekistan	33	1,310

*) From small and large hydropower plants

Source: United Nations Economic Commission For Europe (2023), *Low-carbon hydrogen production in the CIS countries and its role in the development of the hydrogen ecosystem and export potential*.

URL: https://unece.org/sites/default/files/2023-03/EN_Sustainable%20Hydrogen%20Production%20Pathways_final_0.pdf

Development of sales markets. Currently, hydrogen exports from Central Asia face challenges due to the region's distance from key importers, such as the European Union, and the lack of direct access to the open sea. However, there is an opportunity to enter the Chinese market via a shared border, as well as potential access to the European market through cooperation with Russia and countries in the Caucasus. Export opportunities could also be expanded by leveraging the existing and promising gas transportation infrastructure.

Regional clusters. Experts suggest that, in the context of an actively developing renewable energy market across all Central Asian countries, regional cooperation will be a logical response to the growing competition in the export of green hydrogen. Such collaboration would allow for the most efficient use of existing infrastructure, optimizing it for green hydrogen exports, and enabling a greater utilization of renewable energy resources for its production.⁴⁹⁷ Central Asian countries can maximize the benefits of cooperation in green hydrogen if they coordinate their efforts and develop regional production clusters.⁴⁹⁸ This approach would also help diversify govern-

ment revenues and reduce dependence on oil and gas exports. To achieve the most efficient production of green hydrogen and increase their share in the global market as exporters, these countries need to:

- promote the creation of a coordinated renewable energy development program among the countries in the region;
- develop a unified, transparent legislative framework to attract investments;
- adopt standardized technical requirements for green hydrogen infrastructure;
- establish joint training programs for new specialists, involving the private sector;
- create a regional distribution system for green hydrogen;
- upgrade power lines to ensure efficient transmission of electricity generated from renewable energy sources, thereby increasing the capacity for green hydrogen production.⁴⁹⁹

⁴⁹⁶ Indina M. (2022), Кыргызстан может занять свою нишу в производстве водородной энергии.

URL: www.akchabar.kg/ru/article/economy/kyrgyzstan-mozhet-zanyat-svoyu-nishu-v-proizvodstve-vodorodn/

⁴⁹⁷ Qazaq Green (2022), Необходимость региональной кооперации для развития «зеленого» водорода в Центральной Азии.

URL: <https://qazaqgreen.com/journal-qazaqgreen/expert-opinion/187/>

⁴⁹⁸ Development of the capacities of "green" hydrogen with the help of the formation of international clusters is already a popular strategy, for example in the European Union. URL: <https://qazaqgreen.com/journal-qazaqgreen/expert-opinion/187/>

⁴⁹⁹ Qazaq Green (2022), Необходимость региональной кооперации для развития «зеленого» водорода в Центральной Азии.

URL: <https://qazaqgreen.com/journal-qazaqgreen/expert-opinion/187/>

The development of green hydrogen in Central Asia requires careful consideration of the relationship between water and energy resources. In water-scarce regions, it is important to address the need for water in hydrogen production, as well as the potential impacts of constructing hydropower plants. One promising approach is to explore the use of hydrogen as an energy storage solution for regulating the flow of transboundary rivers in the Aral Sea basin. Specifically, it is proposed to convert excess hydropower in Kyrgyzstan and Tajikistan, during periods of high water flow, into hydrogen for storage and later use.⁵⁰⁰

To develop integrated, sustainable, and socially responsible green hydrogen projects, **it is recommended to utilize strategic environmental and social assessment (SESA).** This process evaluates the potential environmental and social consequences of green hydrogen policies, plans, or programs from a strategic perspective. The approach considers various types of infrastructure and incorporates environmental and social criteria for evaluating and licensing potential green hydrogen production projects and related facilities. Additionally, it is essential to develop appropriate measures to mitigate impacts and risks throughout the implementation of these policies, plans, or programs.⁵⁰¹

⁵⁰⁰ *Green Technologies for Eurasia's Sustainable Future*/Edited by Evgeny Vinokurov. Moscow: Eurasian Development Bank, Global Energy Association, 2021. URL: https://eabr.org/upload/iblock/d4f/EDB_-GLEN_2021_Report_Green-Technologies_eng.pdf

⁵⁰¹ Hurwitz Z., Bujak N., Tapia M., Daza E., Gischler Ch. (2023) *Key aspects for managing the environmental and social risks of green hydrogen*. Inter-American Development Bank. URL: <https://blogs.iadb.org/sostenibilidad/en/key-aspects-for-managing-the-environmental-and-social-risks-of-green-hydrogen/>



13

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Publications
in 2023



ORGANIZATIONS OF THE IFAS

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The International Fund for saving the Aral Sea celebrates its 30th anniversary,
<http://cawater-info.net/library/rus/ifas-30-years-ru.pdf>;

30 years of IFAS (Basic documents), <http://cawater-info.net/library/rus/ifas-docs-30-years-ru.pdf>;

Regional cooperation in Central Asia (collection of articles dedicated to the 30th anniversary of IFAS),
<http://cawater-info.net/library/rus/ifas/30ifas-papers.pdf>.

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30th Anniversary of the International Fund for Saving the Aral Sea,
https://aral.uz/doc/30_years_of_IFAS.pdf;

Monitoring of wetland biodiversity in Southern part of the Aral Sea 2023, <https://aral.uz/doc/bio-2023.pdf>.

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No.16. Mirzaev N.N. – Irrigation systems operation and maintenance management: theory and practice;

No.17. Stulina G., Solodky F. – Crop water requirements in the context of saline land;

No.18. Mukhamedjanov Sh. – Calculation of the share of seepage from on-farm irrigation canals in groundwater and drainage water;

No.19. Sorokin A.G. – Amu Darya River Balance Calculation Methodology;

No.20. Mukhamedjanov Sh.Sh., Sagdullaev R.R. – Methodology for water use planning based on daily water allowance;

No.21. Mirzaev N.N. – Analysis of IWRM tools for Central Asia;

No.22. Monitoring water resources in Central Asia: analytical aspects;

No.23. Ruziev I.B., Kosnazarov K.A., Ruziev I.I. – Assessment of water resources management in the Aral Sea region and the Amu Darya delta and proposals for improvement.

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Vol. 2. International practices of water pricing in irrigated agriculture / Muminov Sh., Sattarov R.;

Vol. 3. Progress in integrated water resources management and transboundary water cooperation in Central Asia (SDG 6.5) / Ziganshina D.;

Vol. 4. Territorial water security outlook: Case studies of Khorezm, Navoyi, and Samarkand provinces in Uzbekistan / Ziganshina D., Muminov Sh., Kenjabaev Sh., Galustyan A.;

Vol. 5. Growing non-traditional crops in Central Asia / Stulina G., Kurbanova C.

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The Water Crisis is approaching... (part 3), <http://cawater-info.net/library/rus/water-crisis-3.pdf>;

Water security: world experience (Part 1, Part 2),
<http://cawater-info.net/library/rus/water-security.pdf>
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Climate change: COP27 and afterwards, <http://cawater-info.net/library/rus/clim-ch-2023-8.pdf>;

Climate change: 2022 in review and forecasts for 2023,
<http://cawater-info.net/library/rus/clim-ch-2023-9.pdf>;

Ziganshina D.R. 28th Conference of the Parties to the UN Framework Convention on Climate Change,
<http://cawater-info.net/library/rus/clim-ch-2023-10.pdf>;

United Nations Conference on the Midterm Comprehensive Review of the Implementation of the Objectives of the International Decade for Action, 'Water for Sustainable Development', 2018-2028,
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Rethinking Institutional and Financial Mechanisms on Water and Energy Cooperation in Central Asia: Discussion paper,
<http://cawater-info.net/expert-platform/pdf/watfin-ru.pdf>;

Afghanistan and its neighbors, <http://cawater-info.net/library/rus/afghanistan-and-neighbors.pdf>;

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No 94-99, http://cawater-info.net/library/icwc10_e.htm.

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No.56 "2040 National Water Strategy of the Kyrgyz Republic and national laws of Uzbekistan and Kyrgyzstan on drinking water supply (July 2022-February 2023)";

No.57 "Water laws and regulations of the Republic of Uzbekistan (June-November 2023)";

No.58 "Water laws and regulations of the Republic of Kazakhstan (October 2023)".

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<https://openknowledge.worldbank.org/entities/publication/33f10171-511d-4ee4-bfde-49b728ed6f04>;

Scaling Up Finance for Water: A WBG Strategic Framework and Roadmap for Action,
<https://openknowledge.worldbank.org/entities/publication/f574089b-96d6-41eb-abd4-e1691e5ca156>;

What the Future Has in Store: A New Paradigm for Water Storage,
<https://openknowledge.worldbank.org/entities/publication/036466e7-cf3d-4f4f-acb0-978aa80685aa>;

The Development, Climate, and Nature Crisis: Solutions to End Poverty on a Livable Planet – Insights from World Bank Country Climate and Development Reports covering 42 economies,
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<https://unece.org/ru/info/publications/pub/359843>;

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United Nations Convention to Combat Desertification

Global Drought Snapshot 2023, [https://www.droughtglobal.org/.](https://www.droughtglobal.org/)





14

SECTION

Central Asia
Water Awards

Awards of the Heads of Central Asian States

On September 14, 2023, Gurbanguly Berdimuhamedov, the National Leader of the Turkmen people and Chairman of the Khalk Maslakhaty of Turkmenistan, was presented with the "Badge of Honor," the highest award conferred by the Heads of Central Asian States, during a ceremony at the Palace of the Nation in Dushanbe.



Source: Ministry for Foreign Affairs of Turkmenistan

Awards in connection with the 30th anniversary of IFAS

On the sidelines of the International Conference "Central Asia: Towards a Sustainable Future through a Strong Regional Institution," held from June 5 to 7 in Dushanbe, an award ceremony took place to honor IFAS labor veterans for their significant contributions to the development of the Fund's activities.

On behalf of the IFAS President, President of the Republic of Tajikistan Emomali Rahmon, the following individuals were recognized during the award ceremony:

- IFAS Board Members from each Central Asian country: Awarded the breastplate "30th Anniversary of IFAS" and a diploma;
- Representatives of Central Asian governments, structural subdivisions, veterans, ambassadors extraordinary and plenipotentiary of IFAS founding states, development partners, and others: Presented with the jubilee medal "30th Anniversary of IFAS."

A letter of thanks from the Executive Committee of IFAS was presented to IFAS veterans, representatives of the ICWC, ICSD, structural subdivisions, IFAS bodies, employees of relevant ministries and agencies, international development partners, and others actively engaged in water resource management and environmental protection in the Aral Sea basin, <http://cawater-info.net/library/rus/icwc/97-ru.pdf>.

Source: EC IFAS

As part of the jubilee events organized by the Nukus branch of EC IFAS on April 20-21, an award ceremony was held on behalf of the Jokargy Kenges of the Republic of Karakalpakstan. The following individuals were recognized:

- Z. Doshchanova, Chief Accountant: Awarded the "Honored Economist of Karakalpakstan" sign;
- B. Doshtimov, Leading Expert, and V. I. Sokolov, Head of the IFAS Agency: Presented with the "Vatan Fidoyisi" sign;



- J. Priniyazov, G. Kalimbetov, K. Baizhanov, and L. Eshimbetova, Employees: Honored with Diplomas from the Jokargy Kenges of the Republic of Karakalpakstan.

Source: IFAS Agency

State awards of Kazakhstan

In celebration of Republic Day, the Minister of Water Resources and Irrigation of the Republic of Kazakhstan, Mr. N. Nurzhigitov, presented state and departmental awards to distinguished workers and veterans of the water sector. The honorees included:

- R. Tolepbergenov, Head of the Tausugur Division of the "Big Almaty Canal named after D. Kunaev" branch of RSE "Kazvodkhoz": Awarded the Order "Kurmet";
- R. Imanbet, Head of RGU "Balkash-Alakol Basin Inspection on Regulation of Water Resources Use and Protection"; M. Imangaliev, Deputy Head of BWO Syr Darya; M. Nazhimedenova, Head of the Department of the Ministry of Water Resources and Irrigation of the RK; and G. Sarsenbaeva, Labor Veteran: Awarded the Medal "Eren Enbegi Ushin";
- Zh. Uashpaev, Chief Expert of the Water Resources Regulation and Accounting Department of the Water Resources Committee, Ministry of Water Resources and Irrigation of the Republic of Kazakhstan: Awarded the Badge "Su Sharuashylygynyn Yzdigi";
- Darya Abu, Chief Expert of the Department on Control and Protection of the Water Fund of the Esil Basin Inspection on Regulation of Use and Protection of Water Resources, and A. Sultanova, Head of the Department of Planning and Tariffication of RSE "Kazvodkhoz": Presented with Certificates of Honor;
- E. Ismailov, Hydraulic Engineer of the Department of Normative and Analytical Support of RGU "Republican Methodical Center 'Kazagromeliovodkhoz'," and Sh. Shymyrbekov, Head of the Warehouse of the Production Complex "Sabyndy" of RGP "Nurinsk Group Water Supply": Presented with Letters of Thanks.



Source: Ministry of Water Resources and Irrigation of Kazakhstan

State awards of Kyrgyzstan

In August 2023, the Kyrgyz Republic adopted the Law "On State Awards, Honorary Titles, and State Prizes of the Kyrgyz Republic." This legislation defines the legal status of state awards, honorary titles, and state prizes, as well as the rights and obligations of recipients. It also establishes regulations governing the awarding of state honors, the conferral of honorary titles, and the granting of state prizes within the Kyrgyz Republic.

Source: Information legal system "Centralized databank of legal information"

On Independence Day, the President of the Kyrgyz Republic awarded S. Satarkulov, Chief Expert for Hydraulic Construction at the Design and Engineering Institute "Vodavtomatika and Metrology," with the Order "Manas" of the II Degree in recognition of his significant professional achievements. Additionally, a group of citizens was granted the honorary title of "Honored Worker of Agriculture of the Kyrgyz Republic" by presidential decree.

Source: Kaktus Media

State awards of Tajikistan

In celebration of the 32nd anniversary of Tajikistan's independence, the President of Tajikistan presented awards and conferred honorary titles to individuals from various professions, recognizing their contributions to the nation's development and progress.

Source: "ASIA-Plus"

State awards of Turkmenistan

To commemorate the 32nd anniversary of Turkmenistan's independence, a Presidential Decree, issued on September 24, 2023, conferred state awards on individuals who have made significant contributions to strengthening the nation's independence and sovereignty, enhancing its economic potential and international prestige, and advancing state programs aimed at the development of key economic sectors, including agriculture and water management.

On the occasion of the Harvest Festival, several individuals were awarded the Turkmenistan medal "**Watana bolan söýgüsi üçin**" (For Love of the Homeland) by a Presidential Decree dated November 10, 2023.

State awards of Uzbekistan

In connection with the Day of Workers of the Mahalla (Local Community) System, a Presidential Decree issued on March 22, 2023 honored several compatriots with state awards.

On the occasion of the Independence Day of the Republic of Uzbekistan, by the Decrees of the President:

- dated 25.08.2023 a group of foreign investors was awarded with the order "Dustlik" (Friendship);
- dated 27.08.2023, a group of civil servants and workers from production and socio-economic sectors received state awards.

On the 32nd anniversary of the independence of the Republic of Uzbekistan, A. Orynbayev, Chairman of the Jokargy Kenes of the Republic of Karakalpakstan, honored several public servants with awards. Among them, P. Toreshov, Head of the Crop Diversification Laboratory at the International Innovation Center for the Aral Sea Basin, received the prestigious "Vatan Fidoyisi" award.

Source: International Innovation Center for Aral Sea Basin

By the decision of the Jokargy Kenes of the Republic of Karakalpakstan dated August 30, 2023, A.O. Mambetkarimov, Head of the Nukus Branch of EC IFAS, was awarded the title of "Honored Irrigator of the Republic of Karakalpakstan".

Source: IFAS Agency

Governmentwide awards

By the Order of the Minister of Water Management of Uzbekistan, D.R. Ziganshina, Director of SIC ICWC, and A.R. Uktamov, Head of the Water Allocation and Water Balances Department at BWO Syr Darya, were awarded the badge of "Excellent Worker in Water Management of Uzbekistan".

Source: SIC ICWC



The National Institute of Deserts, Flora, and Fauna of Turkmenistan was honored with the Anniversary Medal of A.N. Kostyakov, the founder of reclamation science in Russia, in recognition of its fruitful Russian-Turkmen cooperation in ecology, water management, and desertification control.

The diploma and medal, issued by the All-Russian Research Institute of Hydraulic Engineering and Land Reclamation named after A.N. Kostyakov, were presented to the Institute's Director, Mr. P. Kepbanov.

Source: News Central Asia

New awards

By Resolution No.467 of the Uzbek Cabinet of Ministers dated September 13, 2023, the "Excellent Seismic Safety Officer" badge was established. This badge honors individuals who have made significant contributions to advancements in seismology, earthquake-resistant construction, and ensuring the seismic safety of the population and territories.



The badge and its accompanying certificate are ceremoniously presented by the President of the Academy of Sciences, or designated representatives, each year on the eve of October 13, in commemoration of the International Day for Disaster Reduction.

Source: Norma.uz



15

SECTION

Global Risks 2024

This Section presents key global risks and foreign policy trends according to the versions of several analytical centers, namely the analysts of the World Economic Forum (WEF), the consulting company Eurasia Group, the Russian Economic News Agency PRIME, and the largest bank company “Charles Schwab”.

15.1. Risks 2024 (WEF version)

The **Global Risks Report** analyses global risks over one-, two- and 10-year horizons. According to the annual survey conducted among nearly 1,500 experts from academia, business, government, 30% respondents

anticipate a high risk of global catastrophes over the next two years, while more than half of respondents (63%) do not exclude such a scenario over the next decade.

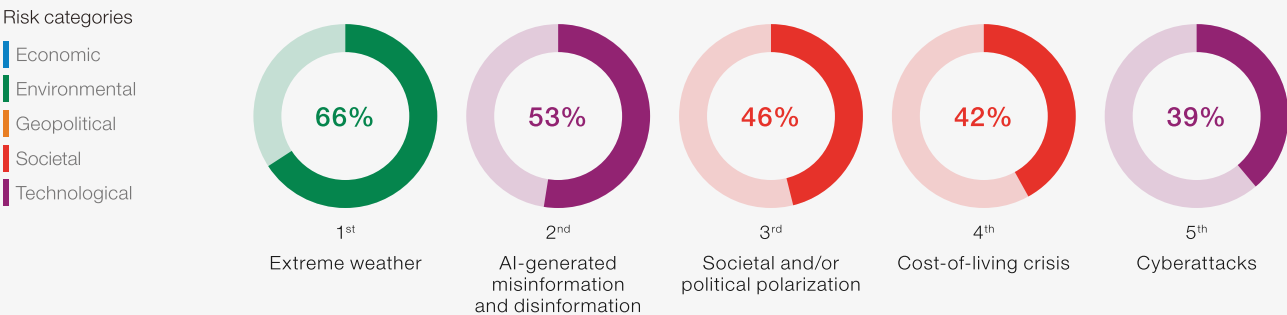
Global risks ranked by severity over the short and long term

"Please estimate the likely impact (severity) of the following risks over a 2-year and 10-year period."



Current risk landscape

"Please select up to five risks that you believe are most likely to present a material crisis on a global scale in 2024."



Source
World Economic Forum Global Risks
Perception Survey 2023-2024.

In experts' opinion, **the top risks 2024** include:

1. Extreme weather events (66%). Environmental risks, such as climate change, biodiversity loss and natural resource shortages are the top long-term risks and continue dominating in the global risks landscape. Two thirds of the respondents consider extreme weather events as the greatest risk, which is most likely to present a material crisis on a global scale in 2024. Many economies will remain largely unprepared for "non-linear" impacts: the potential triggering of a nexus of several related socio-environmental risks has the potential to speed up climate change, through the release of carbon emissions, and amplify related impacts, threatening climate-vulnerable populations. The collective ability of societies to adapt could be overwhelmed, considering the sheer scale of potential impacts and infrastructure investment requirements, leaving some communities and countries unable to absorb both the acute and chronic effects of rapid climate change.

2. AI-generated misinformation and disinformation (53%). A growing distrust of information, as well as media and governments as sources, will deepen polarized views – a vicious cycle that could trigger civil unrest and possibly confrontation. WEF analysts pay attention to the risk of inaccurate and falsified information in electoral processes in 2024-2025 across several economies, including the United States, Europe, Russia, India, South Africa, Indonesia, the United Kingdom and Mexico. If the legitimacy of elections is questioned, civil confrontation is possible – and could even expand to state collapse in more extreme cases. There is also a risk to global trade and financial markets. The control of dissemination of fakes, in turn, creates risks of repressions, censorship, erosion of human rights and domestic disinformation.

3. Societal and political polarization (46%). Societal polarization features among the top three risks over both the current and two-year time horizons, ranking #9 over the longer term. In addition, societal polarization and economic downturn are seen as the most interconnected – and therefore influential – risks in the global risks network, as drivers and possible consequences of numerous risks.

4. Cost-of-living crisis (42%). Economic uncertainty will weigh heavily across most markets, but capital will be the costliest for the most vulnerable countries.

5. Cyberattacks (39%). Cyberattacks and cybercrime are escalating globally, with the finance,

healthcare, IT, and public sectors experiencing the most significant impacts. 2023 witnessed another record year for internet scams, with reported incidents surging by 49% compared to 2022. Cybercriminals are evolving into sophisticated criminal organizations, adapting to new threats, exploiting emerging vulnerabilities, and employing increasingly complex attack vectors.

6. Economic downturn (33%). There's a growing perception that the world is moving away from the principles of globalization. Many countries are prioritizing national interests, focusing on strategies for national security and economic self-sufficiency. This shift is evident in the decline of long-standing international cooperation mechanisms. Nearly 70% of surveyed economists fear a rise in geo-economic fragmentation in 2024. Central banks' rates in different economies will be higher in the next years. Continued high inflation, driven by factors such as de-globalization, demographic shifts, and climate challenges, poses a significant threat to long-term development progress and living standards.

7. Disrupted supply chains for critical goods and resources (25%). Shifts in geopolitical power, economic fragility and limits to the efficacy and capacity of international security mechanisms will remain in the near-term horizon, destabilizing the global financial system and supply chains.

8. Escalation or outbreak of interstate armed conflict(s) (25%). The report notes that the survey was conducted in September 2023, i.e. before the HAMAS' attack to Israel and aggravation of the situation in the Middle East. Nevertheless, the armed conflict related risks were in top five concerns through to 2026 and in the near ten-year horizon. The respondents named three key hotspots – Ukraine, Israel and Taiwan, with possible escalation. If the conflict intensifies, it is still more likely to do so through conventional rather than nuclear means, but it could also expand to neighboring countries. Analysts do not exclude that the war could 'refreeze' into a prolonged, sporadic conflict that could last years or even decades. If the Israel-Gaza conflict destabilizes into wider regional warfare, more extensive intervention by major powers is possible, including Iran and the West. Frozen conflicts at risk could include the Balkans, Libya, Syria, Kashmir, Guyana, the Kurdish region and Korean peninsula.

The Global Risks Report 2024 can be found on https://www3.weforum.org/docs/WEF_The_Global_Risks_Report_2024.pdf

15.2. Risks 2024 (Eurasia Group version)

The Eurasia Group consulting company launched its forecast of global risks 2024:

1. Russia vs. Ukraine. American experts predict probably an unexpected outcome of the conflict in Ukraine for the West rather than for Russia. Ukraine is in a more troubled position. Ukraine now stands to lose

significant international interest and support. In authors' opinion, Russia can keep control of the territory it now occupies on the Crimean peninsula and in Donetsk, Luhansk, Zaporizhzhia, and Kherson oblasts, i.e. one fifth of Ukraine's territory. Kyiv will be forced to defend, and Russia, being in material and technical advantage, could take more land.

It is expected that Ukraine could face setbacks in 2025.

2. Israel vs. Hamas. The Middle East, which is on the brink of a large-scale war, is considered as another major risk by analysts. The current fighting in Gaza is accordingly likely to be only the first phase in an expanding conflict in 2024. One path to escalation would be a decision by Israel to strike Hezbollah in Lebanon. As the war drags on, the schism between Washington and the rest of the world will grow.

3. The United States vs. itself. Experts anticipate another one world conflict – the United States versus itself. Elections in 2024 will be a real test for American democracy. In experts' opinion, the US political system is remarkably divided, and its legitimacy and functionality have eroded accordingly. Public trust in core institutions – such as Congress, the judiciary, and the media – is at historic lows.

4. Ungoverned AI. Breakthroughs in artificial intelligence will move much faster than governance efforts.

5. Axis of rogues. Deeper alignment and mutual support between Russia, Iran, and North Korea will pose a growing threat to global stability.

6. No China recovery. Any green shoots in the Chinese economy will only raise false hopes of a recovery as economic constraints and political dynamics prevent a durable growth rebound.

7. The fight for critical minerals. The scramble for critical minerals will heat up as importers and exporters intensify their use of industrial policies and trade restrictions.

8. No room for error. The global inflation shock that began in 2021 will continue to exert a powerful economic and political drag in 2024.

9. El Nino is back. A powerful El Nino climate pattern will bring extreme weather events that cause food insecurity, increase water stress, disrupt logistics, spread disease, and fuel migration and political instability.

10. Risky business. Companies caught in the crossfire of US culture wars will see their decision-making autonomy limited and their cost of doing business rise.

The Eurasia Group's Top Risks for 2024 can be found on <https://www.eurasiagroup.net/issues/Top-Risks-2024>

15.3. Economic News Agency “PRIME”

1. Economy and investments – United States, India, China and Russia. In 2024, a stable US economy could propel the stock market to a 15% growth. This potential could be further amplified by favorable factors like sustained investment inflows from emerging markets, decelerating inflation, and controlled debt growth.

Conversely, investments in the Chinese economy currently appear less appealing compared to the anticipated US market growth. The trajectory of the Chinese economy remains uncertain, clouded by geopolitical tensions and internal challenges. Domestic market data provides an unclear picture of the future. The Chinese economy faces structural issues including sluggish business activity, high youth unemployment, declining exports and imports, and concurrent deflationary pressures.

The Indian stock market remains a compelling investment destination this year. Indian companies are experiencing robust share growth driven by rising profits and strong investor interest. Furthermore, India is witnessing a surge in foreign companies relocating production from China, establishing new facilities or expanding existing ones within the country. This trend positions India as an “island of stability” for international investors amidst emerging market uncertainties. India's GDP is projected to grow at 6.3% for the fiscal year 2023-2024. Long-term growth drivers for the Indian economy include a relatively low urbanization rate (less than 40% of the population resides in cities) and a large youthful demographic.

The Russian Ministry of Economic Development forecasts economic growth of 2.3% in 2024 and 2.2% in 2026. Despite increased Western sanctions pressure stemming from the Ukraine conflict, Russia's economy continues to demonstrate resilience. These sanctions have, however, contributed to rising energy prices (electricity and fuel) and food inflation in Europe and the United States.

2. Food crisis. Global food prices are surging, accelerating food inflation. This, coupled with pre-existing high debt levels in many countries and unprecedented inflation rates, presents significant economic challenges. The pace of global trade recovery, particularly in the areas of exports and imports of services, will be crucial in mitigating these challenges.

3. Impact of US sanctions on the world economy. The excessive use of U.S. sanctions is disrupting global trade flows and altering the structure of the global economy, which will likely exacerbate global inflation. In January, the IMF downgraded its forecast for global trade growth in 2024 to 3.3% and in 2025 to 3.6%. The current international trade system is ill-equipped to address trade disputes rooted in national security concerns. This, coupled with the weakest global growth prospects in decades, poses significant challenges to the world economy.

4. US government debt. The escalating U.S. government debt poses a significant threat to the global economy. According to the Roscongress Foundation, the U.S. national debt has surpassed \$34 trillion. Servicing this debt is projected to require annual

expenditures of \$1 trillion in the near future. Such a substantial debt burden carries risks for both the global financial system and the broader world economy.

5. The Middle East and other potential hotspots in the world. Yemen, along with other states, including the wealthiest monarchies of the Gulf, faces an increasing likelihood of being drawn into the escalating conflict in the Middle East. The ongoing crisis in the Red Sea poses the risk of sparking another surge in oil prices and intensifying confrontations within this critical region. While Iran's decision to refrain from active involvement at the onset of the crisis offers some reassurance, the potential for escalation remains significant. A clash of interests between the West and the Islamic world could trigger a chain reaction in the region at any moment. Meanwhile, the Korean Penin-

sula and the Indo-Pakistan border continue to represent other potential flashpoints on the Eurasian map.

6. Climate. The year 2024 is on track to become the hottest year on record. This unprecedented heat is primarily driven by the natural phenomenon of El Niño. The significant temperature rise will have far-reaching consequences. Accelerated ice melt will disrupt the North Atlantic Current, potentially leading to more severe storms in Europe. Warming temperatures will severely impact agriculture, particularly in drought-prone regions such as East Asia, southern Africa, and Central America. Human activity is further exacerbating this crisis. Experts predict that the average global temperature in 2024 will surpass pre-industrial levels by 1.3-1.6°C, a concerning increase.

Source: Economic News Agency PRIME

15.4. Risks 2024 according to the World Economic Situation and Prospects report⁵⁰²

Projections of the UN analysts are discouraging – a protracted period of low growth is looming for the world economy. Persistently high interest rates, further escalation of conflicts, sluggish international trade, and increasing climate disasters, pose significant challenges to global growth and to the achievement of the SDGs. Global economic growth is projected to slow from an estimated 2.7 per cent in 2023 to 2.4 per cent in 2024. The prospects of a prolonged period of tighter credit conditions and higher borrowing costs present strong headwinds for a world economy saddled with debt, while in need of more investments to resuscitate growth, fight climate change and accelerate progress towards the SDGs. The growth rates in most developing regions are projected to be slow or moderate. The least developed countries are

projected to grow by 5.0 per cent in 2024, still well below the 7.0 per cent growth target set in the SDGs. Cascading global crises and slowed down economic growth may undermine progress towards the SDGs, including poverty reduction efforts. While global poverty marginally declined in 2023, in low-income countries poverty rates remained well above pre-pandemic levels. UN analysts consider that escalating geopolitical tensions, tighter monetary and fiscal conditions, and weakened global trade pose risks for the socio-economic development.

The World Economic Situation and Prospects Report can be found on
https://desapublications.un.org/sites/default/files/publications/2024-03/WESP%202024_Executive%20Summary_0.pdf

⁵⁰² produced by the United Nations Department of Economic and Social Affairs (UN DESA), in partnership with the United Nations Conference on Trade and Development (UNCTAD) and the five United Nations regional commissions



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SECTION

2024 Calendar
of events

January

- **January 17** – Capacity-Building Seminar on Nexus Between Sustainable Trade, Water Management, Food Security, Trade Facilitation, and Circular Economy, Dushanbe, Tajikistan
- **January 17-18** – International Conference on Water, Energy and Environmental Management (ICWEEM-24), Montreal, Canada
- **January 17-19** – International Exhibition “Water India 2024”, New Delhi, India
- **January 17-20** – 31st Governing Council Meeting of Asian-Pacific Water Forum (APWF), online
- **January 18** – Global Forum for Food and Agriculture (GFFA), Berlin, Germany
- **January 30-31** – Meeting of the Bureau to the Water Convention, Geneva, Switzerland

February

- **February 2** – World Wetlands Day
- **February 6** – South Asia Hydromet Forum IV- 2024, Colombo, Sri Lanka
- **February 8-9** – 8th [International Conference](#) on Climate Change 2024, Colombo, Sri Lanka
- **February 12-17** – 14th Meeting of the Conference of the Parties to the Convention on the Conservation of Migratory Species of Wild Animals, Samarkand, Uzbekistan
- **February 16-18** – 86th World Water Council Board of Governance's Meeting, Istanbul, Turkey
- **February 20-22** – E-world Energy & Water 2024, Essen, Germany
- **February 21** – All-Russian Scientific and Practical Conference “Role of Land Reclamation and Water Management in Ensuring Sustainable Agricultural Development”, Novocherkassk, Russia
- **February 22-24** – [International Conference](#): Silk Road of Knowledge: Science meets Green Policy, Almaty, Kazakhstan
- **February 25-28** – 1st [Middle East Regional Conference on Irrigation and Drainage](#), Riyadh, Saudi Arabia
- **February 26-27** – Global Workshop on Droughts in Transboundary Basins, Geneva, Switzerland
- **February 26-March 1** – 6th of the UN Environment Assembly (UNEA-6), Nairobi, Kenya
- **February 28** – 14th Meeting of the Task Force on Water and Climate, Geneva, Switzerland

March

- **March 3** – World Wildlife Day
- **March 3-6** – [Conference](#) “Responsible Water Management and Circular Economy”, Uttarakhand, India

- **March 4-7** – WaterEX World Expo 2024, Mumbai, India
- **March 4-8** – Women in Water Diplomacy: Second Global Network Forum, Vienna, Austria
- **March 5-7** – 1st Arab Academic Water Summit, Rabat, Morocco
- **March 6-7** – International Scientific-Practical Conference “Sustainable Management of Water Resources – the Basis for Solving the Strategic Goal of Food Security in a Changing Climate”, Dushanbe, Tajikistan
- **March 7-8** – 17th meeting of the Implementation Committee of the Water Convention, Italy
- **March 12** – International Scientific Theoretical Conference “Climate Change and its Impact on Economic and Social Development of Countries”, Khujand, Tajikistan
- **March 12-14** – [Baku Water Week](#), Baku, Azerbaijan
- **March 12-14** – 19th International Exhibition on Agriculture /AgroWorld Uzbekistan 2024
- **March 13-14** – 8th [Annual International Congress and Exhibition](#): Hydropower Central Asia and Caspian, Tashkent Uzbekistan
- **March 14** – World Rivers Day
- **March 21** – International Day of Forests
- **March 22** – World Water Day
- **March 23** – World Meteorological Day
- **March 26** – Aral Sea Day

April

- **April 9-12** – 5th Global Food Security Conference, Leuven, Belgium
- **April 10-13** – 4th [International Conference](#) “Waters in Sensitive and Protected Areas”, Pula, Croatia
- **April 12** – 86th ICWC meeting, Shymkent, Kazakhstan
- **April 14-17** – [Water Loss 2024](#), San Sebastian, Spain
- **April 14-22** – 2nd Central Asian Dust Conference (CADUC-2), Nukus, Uzbekistan
- **April 15-17** – [Global Water Summit 2024](#), London
- **April 15-17** – [Ecosperity Week 2024](#), Singapore
- **April 16-17** – Meeting of the Parties to the Protocol on Water and Health to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes, Geneva, Switzerland
- **April 16-18** – World Future Energy Summit at ADNEC, Abu Dhabi, UAE

- **April 17** – International Scientific-Practical Conference “Goodwill Ambassadors”, Nukus, Uzbekistan
- **April 22** – International Mother Earth Day
- **April 23-24** – [UNECE Workshop](#) on increasing capacities to prevent, prepare for and respond to accidental water pollution from tailing facilities, Bratislava, Slovakia
- **April 25-26** – Scientific-Practical Conference “Extending Water and Energy Cooperation between the Central Asian Countries”, Dushanbe, Tajikistan
- **April 27-29** – [4th Baghdad International Water Conference](#), Baghdad, Iraq

May

- **May 9-10** – 9th Multistakeholder Forum on Science, Technology and Innovation for the Sustainable Development Goals, New York, USA
- **May 14-15** – [3rd International Conference](#) “Water Management in Changing Conditions”, Munich, Germany
- **May 14-15** – [7th International Energy Summit](#), St. Petersburg, Russia
- **May 17-20** – [18th IWA Conference on Sustainable Sludge Management](#), Beijing, China
- **May 18-25** – [10th World Water Forum](#), Bali, Indonesia
- **May 27-29** – Central Asia Climate Change Conference (CACCC-2024), Almaty, Kazakhstan
- **May 27-31** – [15th International Conference on Hydroinformatics](#) “From Nature to Digital Water: Challenges and Opportunities”, Beijing, China
- **May 30-June 1** – [14th International Drainage Workshop](#), Dushanbe, Tajikistan

June

- **June 2-14** – [16th International Conference on Urban Drainage](#), Delft, the Netherlands
- **June 3-5** – [ENVEX 2024](#) – International Exhibition on Environmental Technology & Green Energy, Seoul, South Korea
- **June 3-7** – [Asia Clean Energy Forum 2024](#) / ACEF 2024, Manila, Philippines
- **June 5** – World Environment Day
- **June 8** – World Oceans Day
- **June 10-13** – 3rd International High-Level Conference on the International Decade for Action “Water for Sustainable Development”, 2018-2028, Dushanbe, Tajikistan
- **June 16-19** – European Young Water Professionals Conference [YWP 2024](#), Copenhagen, Denmark

- **June 16-21** – World Biodiversity Forum, Davos, Switzerland
- **June 17** – World Day to Combat Desertification and Drought
- **June 18-20** – 8th [Russian Water Congress and Exhibition VODEXPO 2024](#), Moscow, Russia
- **June 18-21** – International Conference on Wider-Uptake of Water Resource Recovery from Wastewater Treatment ([ICWRR2024](#)), Palermo, Italy
- **June 18-22** – [Singapore International Water Week 2024](#), Singapore
- **June 24-28** – 19th [IWA Leading Edge Conference on Water and Wastewater Technologies \(LET2024\)](#), Essen, Germany

July

- **July 1-5** – [CGIAR Science Week](#), Nairobi, Kenya
- **July 3-5** – International Conference "Nature-Based Solutions for Water Security and Climate Adaptation", Belgrade, Serbia
- **July 8-17** – [High-level Political Forum on Sustainable Development](#), New York, USA
- **July 12** – International Day of Combating Sand and Dust Storms
- **July 20-21** – International Conference on Environmental Science and Development, Rome, Italy

August

- **August 1** – Earth Overshoot Day
- **August 11-15** – [IWA World Water Congress & Exhibition](#), Toronto, Canada
- **August 12** – Caspian Sea Day
- **August 12-15** – International Conference "Pathways to Sustainability: Social-Ecological Resilience and Transformation across Multiple Scales", Montreal, Canada
- **August 25-29** – [World Water Week](#), Stockholm, Sweden (Hybrid)

September

- **September 1-7** – 9th [Asian Regional Irrigation and Drainage Conference](#) and 75th IEC Meeting, Sydney, Australia
- **September 3-5** – International Environmental Technology and Recycling Fair and Congress ([The Green Expo 2024](#)), Mexico City, Mexico
- **September 4** – Forum on Sustainable Use of Water Resources in Central Asia, Almaty, Kazakhstan

- **September 4-6** – 1st [Islands Water Congress](#) "Freshwater and Islands: Administration, Innovation, Collaboration", Faroe Islands
- **September 10-12** – International Exhibition of Technologies and Equipment for Water Treatment Supply and Disposal, [ECWATECH](#), Moscow, Russia
- **September 16-18** – Ecumene Global Forum, Moscow, Russia
- **September 17-21** – 8th [India Water Week](#) "Partnership and cooperation for inclusive water development and management", New Delhi, India
- **September 18-20** – 4th Eurasian Women's Forum, St. Petersburg, Russia
- **September 19** – World Cleanup Day
- **September 22-23** – One Water Summit, New York, USA
- **September 22-23** – [Summit of the Future: Multilateral Solutions for a Better Tomorrow](#), New York, USA
- **September 23-27** – [IWA conference](#) "Water in Industry", Nanjing, China
- **September 26** – World Environmental Health Day
- **September 28** – World Maritime Day

October

- **October 1-3** – Water, Energy, Technology, and Environment Exhibition ([WETEX 2024](#)), Dubai, UAE
- **October 6-10** – 12th [INBO World General Assembly](#), Bordeaux, France
- **October 14-18** – World Food Forum, Rome, Italy
- **October 15** – International Day of Rural Women
- **October 16** – World Food Day
- **October 21-November 1** – UN Biodiversity Conference, Cali, Colombia

November

- **November 6** – 87th ICWC Meeting, Ashgabat, Turkmenistan
- **November 7-13** – International Week of Science and Peace
- **November 8** – Scientific-Practical Conference "Water in Central Asia: the Future in Cooperation", Tashkent, Uzbekistan
- **November 10** – World Science Day for Peace and Development

- **November 11-24** – UN Climate Change Conference (COP29), Baku, Azerbaijan
- **November 12-14** – [IWA Digital Water Summit](#), Bilbao, Spain
- **November 18-20** – [HYDRO 2024](#) International Conference and Exhibition, Graz, Austria
- **November 26-27** – 2024 SPECA Economic Forum, Dushanbe, Tajikistan

December

- **December 2-13** – 16th session of the UNCCD's Conference of the Parties (COP16), Riyadh, Saudi Arabia
- **December 4-5** – International Wind Energy Forum, Moscow, Russia
- **December 5** – World Soil Day
- **December 8-12** – 2024 World Congress and Exhibition on Desalination, Abu Dhabi, UAE
- **December 9-10** – [World Agri-Tech Innovation Summit](#), Dubai, UAE
- **December 9-11** – International Soil and Water Forum 2024, Bangkok, Thailand
- **December 11** – International Mountain Day





17

SECTION

In Memoriam

Time and tide wait for no man and, unfortunately, our veterans pass away... but they remain in our memories forever.



On January 5, Academician, Doctor of Technical Sciences, Professor **Malik Zh. Burlibayev** passed away.

He dedicated his career to the KazHydromet system, serving since 1996 in various roles. These included Senior Researcher, Head of Laboratory, Scientific Secretary, Deputy Director, and ultimately, General Director of the Republican State Enterprise "Kazakh Research Institute of Ecology and Climate" within the Ministry of Environmental Protection of the Republic of Kazakhstan.

Source: KazHydromet



On May 4, **Vladislav A. Bensman**, Corresponding Member of the International Academy of Ecology, Human Security and Nature Sciences (MANEB), passed away.

He graduated from the Moscow Hydromeliorative Institute (now the Moscow State University of Environmental Engineering) in 1984 and the Ukrainian Agricultural Academy (Kiev) in 1989. From 1990 to 2004, he worked in specialized secondary education, water construction, and transboundary water resources management. Since 2005, he served as the Deputy Director for Scientific and Applied Work at TOO Ecoservice-S

Source: MANEB



Myrat Koshekbaev, Director of the Dashoguz branch of the IFAS Executive Committee, died suddenly on May 31.

He graduated from the Bezmeyin Construction Technical School in 1978, specializing in Industrial and Civil Construction.

He was appointed Director of the Dashoguz branch on December 11, 2012.

Source: Dashoguz branch of the EC IFAS



Shukhrat Sh. Mukhamedjanov, a veteran of the SIC ICWC, passed away on June 20.

He began his career in 1977 at SANIIRI, where he progressed from engineer to Deputy Director. Since 2008, he has dedicated his career to the SIC ICWC, focusing on the implementation of Integrated Water Resources Management (IWRM) and enhancing water productivity at the field level. In recent years, he also served as the Secretary of the Working Group on Irrigation and Drainage in the States under Socio-Economic Transformation (WG-IDSST) of the International Commission on Irrigation and Drainage.

Source: SIC ICWC



Asanakun A. Isabekov, a veteran of the water sector with over 50 years of service, passed away on August 30 at the age of 84.

He served as Deputy Minister of Water Management and was honored with the title of "Honored Irrigator" in 1981.

Source: Water Resources Service of the Kyrgyz Republic



On October 12, renowned scholar, Doctor of Geographical Sciences, Professor **Viktor Ye. Chub** passed away. He served as the head of Uzhydromet from 1992 to 2017.

After graduating from Tashkent State University in 1967, he dedicated his career to Uzbekistan's hydrometeorological service, holding various positions until 1992. From 1992 to 2004, he led the Main Department of Hydrometeorology under the Cabinet of Ministers of the Republic of Uzbekistan (Glavhydromet, later renamed Uzhydromet in 2004). Concurrently, he served as Director of the Central Asian Research Hydrometeorological Institute named after V.A. Bugayev from 1993 onwards.

Source: News Agency "Gazeta.uz"



Medet O. Ospanov passed away on November 21.

After graduating from the Zhambyl Hydromelioration and Construction Institute (now Taraz State University) in 1972, he began his career at the Talas Irrigation Systems Administration of the Zhambyl Regional Water Management Organization. From 1981 to 1989, he worked for the Ministry of Water Management of the Kazakh SSR, followed by a tenure at the State Water Resources Committee of the Republic of Kazakhstan from 1990 to 1997. He then dedicated his career to the International Fund for Saving the Aral Sea (IFAS) and its Executive Directorate in Kazakhstan from 1997 to 2019, holding key positions. Medet Ospanov made invaluable contributions to fostering cooperation among the countries of the region during his time with IFAS.

